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Household vulnerability and small ruminant benefits in the transitional zone of Ghana

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This study investigated household vulnerability and small ruminant benefits in the transitional zone of Ghana. The dimensions of vulnerability considered were the sex and socio-economic status of the household head, and household morbidity and mortality. Data was collected from 11 key informants, four focus groups, 113 census households, 60 survey households and 10 case study households. Sex of the household head did not significantly affect small ruminant offtake but the trend was for more sheep offtake in male-headed households than female-headed households. Tangible sales and intangible savings and security benefits were of primary importance to all households. Socio-economic status of the household head significantly influenced the sale and slaughter of goats for consumption ($P < 0.05$). Goat rearing was more market oriented than sheep rearing. More vulnerable households relied on goat sales for income compared to their counterparts. Households did not meet all their expectations in benefits due to small flock sizes, accidents, diseases and theft. Small ruminants were easy to sell but prices fluctuated. It is recommended that ongoing and new small ruminant programmes by governmental and non-governmental organisations to provide stock for the vulnerable should focus on goats and consider management and marketing needs of farmers.

Key words: Benefits, goat rearing, headship, offtake, poverty, socio-economic status.

INTRODUCTION

Vulnerability has been conceptualized as expected poverty (Christiaensen and Subbarao, 2004), defencelessness, insecurity, exposure to shocks and stress (Chambers, 1989), and risks related to violence, health and social exclusion (Alwang et al., 2001). According to Alwang et al., 2001 the poor and near-poor are more prone to be vulnerable because of limited access to assets and less ability to respond to risks. Defining vulnerability is not within the scope of this study, but we argue that vulnerability has dimensions of health, poverty and accessibility to resources, and these dimensions give a platform for this study. The potential of small livestock to provide a means of escape from poverty for vulnerable

groups has been expressed by a range of authors (Niamir-Fuller, 1994; Saadullah et al., 1997; Kristjanson et al., 2004; Peacock, 2005; Dossa et al., 2008). Small livestock include small farm animals such as pigs, sheep, goats, poultry, rabbits, etc. The promotion of small ruminant rearing for the poor has been on the development agenda for some time, but has yielded varying results. Some authors have reported a positive impact of small ruminant programmes on the poor (Rangnekar, 1994; Saadullah et al., 1997; Bravo-Baumann, 2000; Kristjanson et al., 2004; Peacock, 2005; Dossa et al., 2008). Other authors are of the opinion that such poverty alleviation goals have not been realized (Morand-Fehr and Boyazoglu, 1999; Budisatria et al., 2010). Failure of small ruminant programmes has been attributed to the lack of understanding and failure to consider the socio-economic and physical environments within which farmers operate (Udo and Cornelissen, 1998; 1998; Kosgey et al.,

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2006; Budisatria et al., 2007; Udo et al., 2011). Of prime importance are the reasons for which farmers keep small ruminants since these influence the characteristics that should be given attention in breeding, feeding and management programmes to increase productivity (Dossa et al., 2007; Rumosa et al., 2009).

Farmers' reasons for keeping small ruminants and livestock in general have been expressed from different perspectives by different authors (Bosman et al., 1997; Moll et al., 2007; Kosgey et al., 2008). These different perspectives sum up into two: tangible physical production of animals which can be physically taken off for sale, consumed or used for social and other purposes, and intangible benefits of status (prestige), finance (savings) and insurance (security). Small ruminant benefits in this paper are analysed within this framework. In Ghana, small ruminant rearing is being promoted to alleviate poverty among vulnerable groups (MoFA, 2009). However, based on the experiences of similar programmes elsewhere cited earlier on, there is the need to first explore how being vulnerable would influence the benefits derived from small ruminants. Documentation of such information is lacking but essential for sustainable small ruminant programmes. There is also a dearth of information on the perceptions of farmers about improving their income through small ruminant rearing. The importance of income benefits to different households as compared to other benefits could give an indication of the households' inclination to improve their income through small ruminant rearing. Added to this, there is the need to elicit the extent to which expected benefits have been derived and the reasons for not deriving these benefits. Such information will deepen understanding on the potential to generate income, and sustainability of small ruminant programmes for development. A recent study in the transitional zone of Ghana showed that female-headed households (FHH) were of significantly lower socio-economic status were less likely to own small ruminants and had fewer numbers of them, and had less labour resources compared to male-headed households (MHH). FHH are, thus, more vulnerable to poverty (Duku et al., 2011).

The study also showed that 89% of MHH were of lower socio-economic status as compared to 98% of FHH. Lower status was therefore not characteristic of FHH alone. Thus, both sex and socio-economic status of the household head as dimensions of vulnerability need to be considered in relation to small ruminant benefits, in addition to physically challenged and disease affected persons who have also been classified among the vulnerable in Ghana (GPRS, 2003). The overall objective of this paper was to investigate the influence of household vulnerability on small ruminant benefits in Ghana. The specific objectives were to examine how three pre-disposing factors of vulnerability, namely the sex of the household head, the socio-economic status of

the household head and long term morbidity and mortality, relate with benefits derived from small ruminants.

MATERIALS AND METHODS

Study area

The study was located in two villages, Kasei and Kobriti within the transitional belt of the Ejura-Sekyedumasi District of the Ashanti region of Ghana. The district lies within longitudes 1° 5' W and 1° 39' W and latitudes 7° 9' N and 7° 36' N, covers an area of 1,782.2 km² and has a bimodal rainfall pattern ranging from 1200 to 1500 mm. The district has a high concentration of smallholder crop farmers, the occupational group with the highest level of poverty in Ghana. The major livestock species reared in the zone are small ruminants (Oppong-Anane et al., 2008). The district is a major market area. Traders from all parts of the country and from neighbouring countries converge at various locations to sell goods and services and to purchase produce from farmers. The area thus has a highly mobile population which is considered as a pre-disposing factor for the transmission of HIV/AIDS (Kempe, 2001), another causal factor for vulnerability to poverty (GPRS, 2003). Considering the differences in vulnerability between MHH and FHH, between lower status and higher status households and the HIV/AIDS risk in the zone (Duku et al., 2011), household vulnerability in this study is considered from three perspectives, namely, the sex of the household head, the socio-economic status of the household head, and affliction with long term morbidity and mortality.

Characteristics of respondents in this study have been given in Duku et al. (2011), with 11% of FHH and 35% of MHH keeping small ruminants. A detailed description of the study area has been given by Duku et al. (2010).

Sampling and data collection

The two villages were purposively selected because HIV/AIDS activists in only these two villages were prepared to take part in the study. Eleven key informants were interviewed in March and April 2007 to gain insight into the socio-economic composition of the communities, livestock farming practices, gender and human health issues. A census involving all the 407 households in the study villages was conducted from May to July 2007 using a structured questionnaire, with three enumerators who were given a day's training by the major author. The census was done to collect information on household demographics, and crop and livestock production in the previous year. Maize acreage (farmers are more familiar with acreage in Ghana) was used as proxy for socio-economic status [Nyarko, Senior Animal Husbandry Officer, Ministry of Food and Agriculture (MOFA), Ejura - personal communication], with households who cultivated six acres (2.4 ha) or less considered as having a lower status and those with more being of higher status. Census information on livestock focused on current numbers of small ruminants, offtake for sale, consumption, traditional and social (dowry, marriage festivities, child naming, funeral celebrations, gifts), or religious purposes, and losses from disease, motor accidents, theft or other causes. All the 113 census households that had complete data and kept small ruminants were selected for further analysis. Census demographic data was also used to compose two male and two female focus groups, and 60 survey households, 34 of which were male headed and 26 female headed, with 36 keeping small ruminants and 24 not keeping small

Table 1. Characteristics of male- and female-headed small ruminant-keeping households.

Variable	Female-headed households (n = 9)	Male-headed households (n = 104)	Z -test	P value
Household size	5.2 (± 2.2; 5)	5.7 (± 2.8; 6)	-0.278	0.78
Dependency ratio*	124.7 (± 114.1; 80)	113.1(± 108.3; 100)	-0.134	0.89
Number of active adults	2.8 (± 1.6; 3)	2.7 (± 1.3; 2)	-0.061	0.95
Number of children	2.3 (± 1.5 3)	2.4 (± 1.7; 2)	-0.118	0.91
Number elderly	0.2 (± 0.4; 0)	0.2 (± 0.5; 0)	-0.304	0.76
Age of household head	48.1 (± 12.6; 44)	47.3 (± 14.9; 45)	-0.435	0.66
Sheep flock size	0.7 (± 1.4; 0)	2.4 (± 4.5; 0)	-1.001	0.32
Goat flock size	6.8 (± 6.5; 5)	7.1 (± 5.4; 6)	-0.56	0.58
			$\chi^2_{(1, 113)}$	
Education of head				
No formal	78	72		1.00
Some formal	22	29		
Economic status				
Lower	100	82		0.35
Higher	0	18		

*Dependency ratio is the number of dependents (aged 0 to 14 years and above 64 years) as a proportion of those of working age (15 to 64 years). Data is shown as mean (± SD, median) or percentage (n = 113).

ruminants. MHH were selected by stratified random sampling based on socio-economic status and the presence of small ruminants.

All nine FHH who kept small ruminants during the census and four others who started later were purposively selected for the household survey. In the household survey, the 36 households keeping small ruminants (23 MHH and 13 FHH) were interviewed using both structured and semi-structured questions, on the expected and derived benefits from small ruminants and 24 households without small ruminants were asked to give reasons for not keeping them. A case study of four households with histories of long term morbidity (two or more months) and six households with mortality of a household member preceded by prolonged illness (one year or more) were also conducted to establish their perceptions on the role small ruminants played during affliction and death of the member and the aftermath.

Data analyses

Data from key informant interviews, focus group discussions and the case study were transcribed verbatim and analyzed manually. Responses to semi-structured questions in the household survey were also analyzed manually. Census and household survey data were entered into SPSS (version 15) and analyzed with SPSS. Small ruminant offtake was investigated using 113 census households comprising 104 MHH and 9 FHH and 94 lower status and 19 higher status households identified as having complete data on offtake. The Mann Whitney U test was used to compare mean offtake between MHH and FHH, and between households with lower and higher status. The relationship between small ruminant offtake and sex of the household head on one hand and socio-economic status of the head on the other was investigated from the census data, with bivariate chi-squared analysis, using Fisher's exact test where cell count assumptions were not met. Four offtake categories were used namely sale, consumption, traditional and social use, and religious use. All tests were considered statistically significant at the $P < 0.05$ level. Expected and derived benefits from

small ruminants elicited from the 36 small ruminant survey households were presented graphically using Microsoft Excel. The perceptions of case households were summarised as text.

RESULTS

Characteristics of small ruminant-keeping households

Table 1 presents the characteristics of male- and female-headed census households that kept small ruminants. There were no significant differences in socio-demographic characteristics of MHH and FHH. Between households with lower status heads and those with higher status heads, only age of the household head and village location showed significant differences (Table 2). Kasei household heads were older and more were of lower status, probably due to their inability to cultivate large maize acreages. Kasei is an older settlement compared to Kobriti. All heads of FHH included in the analysis as having complete offtake data were of lower status.

Relationship between sex and socio-economic status of the household head and small ruminant offtake

Some key informants and focus group participants were of the opinion that households had a common aim for rearing small ruminants irrespective of the sex or socio-economic status of the head. Others were of the opinion

Table 2. Characteristics of small ruminant keeping households with lower status and higher status heads.

Variable	Households with lower status heads (n = 94)	Households with higher status heads (n = 19)	Z -test	P value
Household size	5.7 (± 2.8; 6)	5.6 (± 2.3; 5)	-0.015	0.99
Dependency ratio	111.9 (± 105.0; 100)	124.1 (± 125.8; 100)	-0.418	0.68
Number of active adults	2.7 (± 1.3; 2)	2.7 (± 1.2; 2)	-0.089	0.93
Number of children	2.4 (± 1.8; 2)	2.7 (± 1.4; 3)	-0.818	0.41
Number elderly	0.2 (± 0.5; 0)	0.1 (± 0.2; 0)	-1.569	0.12
Age of household head	49.0 (± 15.0; 45)	39.2 (± 9.9; 40)	-2.844	0.00
Sheep flock size	2.3 (± 4.5; 0)	2.4 (± 3.7; 1)	-1.295	0.20
Goat flock size	7.3 (± 5.4; 6)	5.9 (± 5.7; 5)	-1.282	0.20
			$\chi^2_{(1, 113)}$	
Village location				
Kasei	79	16	28.836	0.00
Kobriti	21	84		
Education of head				
No formal	69	89	3.280	0.07
Some formal	31	11		
Sex of head				
Male	90	100		0.36
Female	10	0		

Data is shown as mean (± SD, median) or percentage (n = 113).

that less endowed households such as FHH and those with lower status heads would sell most of their animals, whereas MHH and those with higher status heads would sell some and slaughter some for consumption. The savings and security benefit is however paramount to all household types. Key informants and focus groups were again of the opinion that sheep are more often used for funerals and religious purposes and that the latter is the responsibility of the household head especially in Moslem households, but most female heads cannot provide sheep for this purpose and may substitute with goats. Also for traditional and social purposes apart from dowry payment, goats could be used in place of sheep, though this does not represent the ideal situation. They claimed, for instance, that using goats in child naming made the children stubborn just like the goat. The census indicated sheep offtake for sale, consumption, religious, and traditional and social purposes in MHH and only sheep sales in FHH. Both household types however recorded goat offtake in all offtake categories studied. No significant difference in both sheep and goat offtake between MHH and FHH was found (Table 3). This was confirmed by the chi-squared test also showing a lack of association between small ruminant offtake and sex of the household head. The mean number of small ruminants in different offtake categories according to the

socio-economic status of the household head is presented in Table 4. There were no significant differences in sheep numbers taken off for these purposes between household types.

Chi square confirmed the lack of association between household head status and sheep offtake categories. Lower status households however sold and consumed significantly more goats than higher status households. Goat offtake for religious, traditional and social purposes were not influenced by the socio-economic status of the household head. Key informants and focus group participants claimed that goats are more hardy and prolific and are preferred for urgent cash needs and income generation in general since goats give quicker turnover and more goats are sold than sheep. In the census, over 30% of goat offtake was sold in both MHH and FHH, compared to around 10% for sheep (Table 3). Goat offtake was generally higher than sheep offtake in terms of animal numbers and households involved. Informants said there was ready market for small ruminants, especially goats, though prices are higher in November to December and during festive occasions compared to May to June which coincided with the planting season when farmers needed money to fund their cropping activities. Prices ranged from GHC50 to 100 for sheep and GHC30 to 50 for goats (GHC1 is

Table 3. Mean small ruminant numbers for different offtake categories in male- and female-headed households (\pm SD; median).

Variable	Female-headed households	Male-headed households	Z-test	P value
No. of households	9	104		
Sheep				
Sold	0.1 (\pm 0.3; 0)	0.5 (\pm 1.4; 0)	-0.662	0.51
Consumed	0 (\pm 0; 0)	0.1 (\pm 0.6; 0)	-0.969	0.33
Religious purposes	0 (\pm 0; 0)	0.3 (\pm 0.6; 0)	-1.567	0.12
Traditional and social purposes	0 (\pm 0; 0)	0.2 (\pm 0.7; 0)	-1.216	0.22
Proportion of sheep offtake sold	11.1 (\pm 33.3; 0)	9.7 (\pm 22.0; 0)	-0.391	0.70
Goats				
Sold	2.0 (\pm 3.4; 1)	1.7 (\pm 2.1; 1)	-0.174	0.86
Consumed	0.6 (\pm 0.7; 0)	0.4 (\pm 1.0; 0)	-1.263	0.21
Religious purposes	0.9 (\pm 1.3; 1)	0.9 (\pm 1.0; 1)	-0.286	0.78
Traditional and social purposes	0.6 (\pm 1.3; 0)	0.5 (\pm 1.1; 0)	-0.303	0.76
Proportion of goat offtake sold	31.1 (\pm 36.5; 25)	30.7 (\pm 31.3; 33)	-0.067	0.95

Table 4. Mean small ruminant numbers in different offtake categories in households having heads of lower or higher socio-economic status (\pm SD; median).

Variable	Lower status	Higher status	Z-test	P value
No. of households	94	19		
Sheep				
Sold	0.5 (\pm 1.4; 0)	0.6 (\pm 1.2; 0)	-0.485	0.63
Consumed	0.1 (\pm 0.3; 0)	0.3 (\pm 1.2; 0)	-0.530	0.60
Religious purposes	0.2 (\pm 0.5; 0)	0.4 (\pm 0.7; 0)	-0.806	0.42
Traditional and social purposes	0.2 (\pm 0.7; 0)	0.1 (\pm 0.3; 0)	-0.437	0.66
Proportion of sheep offtake sold	9.7 (\pm 23.3; 0)	10.5 (\pm 21.7; 0)	-0.398	0.69
Goats				
Sold	1.9 (\pm 2.3; 1)	1.0 (\pm 1.6; 0)	-1.949	0.05
Consumed	0.5 (\pm 1.0; 0)	0.1 (\pm 0.5; 0)	-2.063	0.04
Religious purposes	1.0 (\pm 1.1; 1)	0.6 (\pm 0.8; 0)	-1.565	0.12
Traditional and social purposes	0.5 (\pm 1.1; 0)	0.5 (\pm 1.4; 0)	-0.735	0.46
Proportion of goat offtake sold	33.2 (\pm 31.2; 33)	18.9 (\pm 31.2; 0)	-1.663	0.10

equivalent to \$0.596). Farmers either sent their sheep and goats to the local market or sold to traders and butchers who came to their homes. Farmers use cash income from small ruminant sales mainly to pay school fees, medical bills, to support crop farming and to supplement household feeding.

Distribution of expected and derived small ruminant benefits by sex and socio-economic status of the household head

Analysis of the household survey data revealed that all

the 36 small ruminant households had goats, but only 22% had sheep (30.4% of MHH and 7.7% of FHH had sheep). Figure 1 shows both tangible and intangible benefits that survey farmers expected and derived from small ruminants. Figure 1a and 1b show the distribution based on the sex of the household head and socio-economic status of the household head respectively. In all household types studied, tangible income and intangible savings and security benefits from both sheep and goats were mentioned more frequently than other benefits, more so for goats than sheep due to the higher number of goat keepers. Consumption benefits from goats were more prominent than from sheep and also

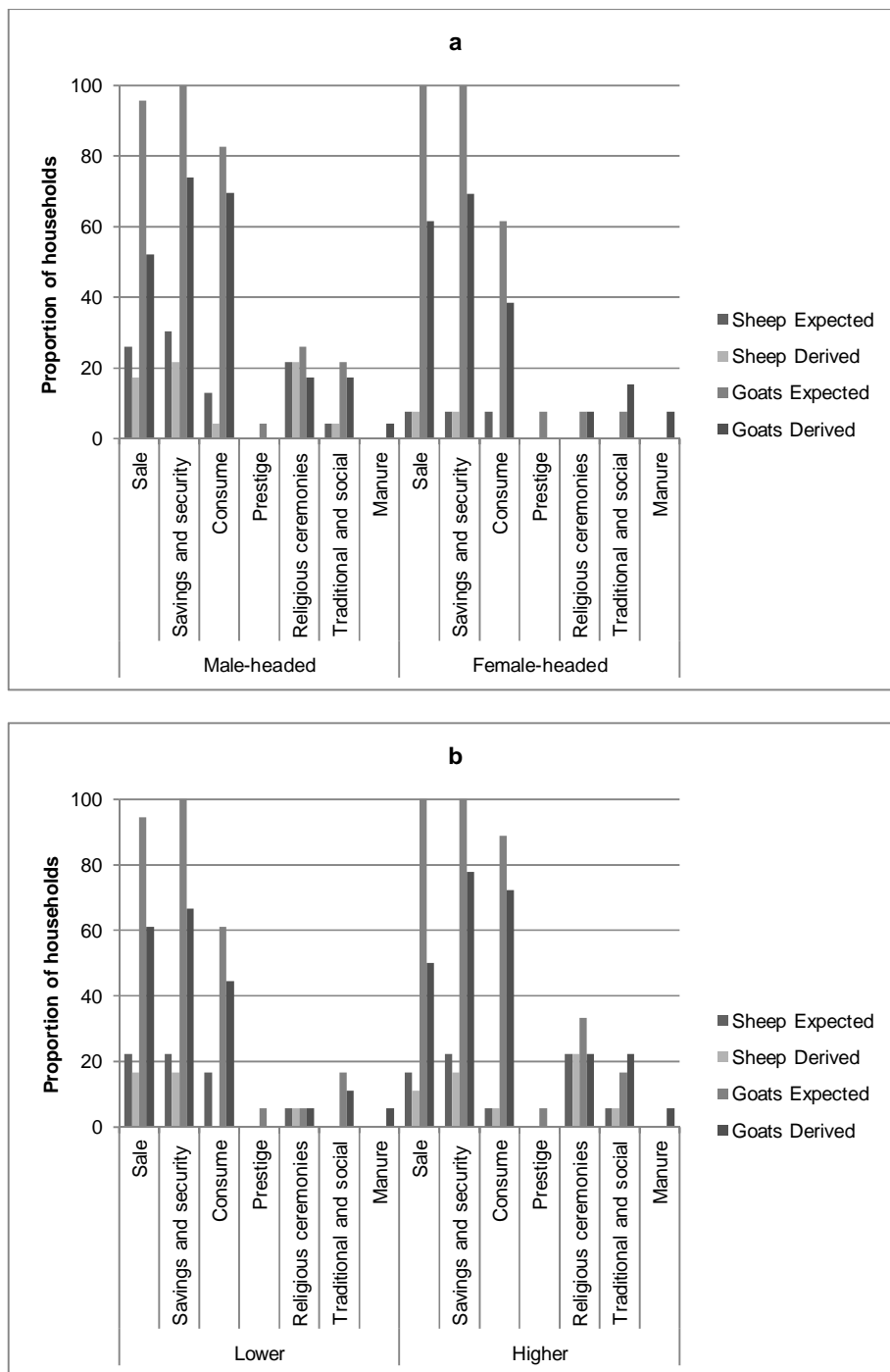


Figure 1. Proportions of household types and their expected and derived benefits from sheep and goats.

more relevant for MHH and higher status households than FHH and lower status households respectively. The patterns of distribution of other sheep and goat benefits namely, religious, traditional and social, manure and

prestige were similar for MHH and higher status households on one hand and FHH and lower status households on the other. Prestige and manure benefits were minimal to absent. Derived income, savings and security, and

consumption benefits from goats were conspicuously less than expectations of all household types. Households attributed this to low stock numbers. Discussions by focus groups highlighted the problems in small ruminant rearing as lack of proper care which led to theft of animals, diseases and knocking down of animals by vehicles. As one participant put it,

“If you do not have a pen, just say I have no animals. It means people will steal the animals”.

The impression was created by some participants that most farmers gave little attention to their small ruminants compared to crops, though small ruminant rearing was more profitable than crop farming. As another participant put it,

“There are more benefits in animals than crop farming a hundred times over and I will say it again”

Some participants were of the opinion that luck played a role in being successful in small ruminant rearing, with some people having more luck than others, even within the household. The need for funds to purchase stock for rearing was confirmed by key informants and focus groups. Some focus group participants attributed the non-rearing of small ruminants to ignorance of the benefits or laziness, and others on early returns in (arable) crop farming compared to small ruminants.

Reasons for not keeping small ruminants

Twenty four survey households did not have small ruminants. Sixteen of these households previously reared small ruminants but had stopped. Reasons they gave (and frequency) were theft of animals (7), relocation of the household (5), death of animals due to disease (3), selling due to urgent cash needs (2), and relocation of animals due to cropping activities close to the village (1). Two households gave more than one reason for discontinuing the rearing of small ruminants. Eight households that had never kept small ruminants gave the reasons (and frequency) as lack of funds to purchase stock (5), no pen (1), and fear of not being lucky with small ruminants (1). One household gave more than one reason for not rearing small ruminants and two gave no tangible reason.

Perceptions of households with a history of affliction with long term morbidity and mortality on the benefits of small ruminants

Six out of ten households with histories of affliction with long term morbidity and mortality raised income from goat

sales to care for the sick. Though animal losses sometimes occurred through theft and accidents as a result of inadequate care during sickness of a family member, 75% of such goat keeping households perceived small ruminant rearing to be less labour intensive than growing crops, and therefore easier for the sick and homebound.

DISCUSSION

The prime importance of sales, savings and security benefits in this study agrees with the findings of Dossa et al. (2007) from Benin. The significantly higher goat sales by lower status households (Table 4) amplify the importance of goats for urgent cash needs as confirmed by key informants and focus groups. Lower status households by definition in this study cultivate few acres of maize, the major crop, and are more likely to have few assets compared to higher status households, and hence the need to rely more on goat sales, compared to higher status households. The sustainability of high goat sales by households however needs to be investigated. The non-significant relationship between small ruminant offtake and sex of the household head may reflect the absence of significant differences in the characteristics of these household types (Tables 1 and 3). This finding shows some relationship with that of Duku et al. (2011) on the lack of significant difference in household characteristics between MHH and FHH, once they both kept small ruminants. Preference of sheep for religious purposes especially among Moslems agrees with the finding of Budisatria et al. (2007) in Indonesia. Goats may be used for religious purposes in place of sheep, especially for those households that cannot afford the cost of sheep such as most FHH. Comparing the census data (Tables 3 and 4) with the household survey data (Figures 1a and 1b), goat offtake for consumption did not show a clear trend between MHH and FHH on one hand and lower and higher status households on the other. There seems to be more flexibility with the slaughter of goats for consumption compared to sheep, irrespective of the sex or status of the household head. Raising small ruminants for prestige seems not to be an important benefit for farmers in the study area probably due to proximity to urban areas where capital goods that show wealth could be purchased. This confirms the view of Moll et al. (2007), that using livestock as an indicator of status is relevant in situations where markets for durable goods indicative of wealth do not exist.

On the use of manure, Defoer et al. (2000) stated that a flock size of about 21 mature small ruminants, confined most of the year would be required to produce 2.5 tons of manure needed for 1 ha of cotton under conditions similar to that of the study area. Thus, the current flock size of less than 10 in all household types studied, coupled with distant farm lands would act together to

discourage farmers from using manure on croplands, except in home gardens. Home gardens could be an important source of food and forage for the sick and home-bound. Theft and losses due to accidents could be avoided by providing adequate housing for stock. Housing stock, even for part of the day, requires adequate feeding which demands labour, a scarce resource in disease-affected and other vulnerable groups such as FHH. This is confirmed in the finding of Duku et al. (2011) that FHH spent less time feeding small ruminants, and fed more crop peels which required less time to handle, though less nutritious compared to leafy feeds (Duku et al., 2010). Formation of farmer groups and the strengthening of existing ones could address the problem of seasonal price fluctuations, as well as provide farmers with other advantages as suggested by De Vries (2008). In the view of Udo et al. (2011), keeping small animals which include small ruminants is an appreciated secondary activity, only providing small income to rural households with a low potential for substantial increases through intensification. Labour is a major resource for such households. We argue that, despite the labour demands associated with intensification of small ruminant keeping, a gradual shift in that direction could still be a good livelihood option for labour-constrained vulnerable households compared to cropping.

Three-quarters of households with a history of disease affliction perceived small ruminant rearing to be less labour intensive than growing crops, and therefore easier for the sick and homebound.

CONCLUSIONS AND RECOMMENDATIONS

The dependence on small ruminants, especially goats, for income increases as households become more vulnerable. Sustainability of small ruminant income and other benefits is however compromised by small flock sizes, theft, accidents, other losses, poor farmer attitude and fluctuating market prices. Providing assistance for farmers to go into small ruminant rearing for income generation as initiated by MOFA and Non Governmental Organizations (NGOs) such as Heifer International should therefore be focused on goats and packages to help farmers to stock, pen, feed and market their animals. Farmers should be sensitized to have a better attitude to small ruminant rearing as an easier livelihood option for labour-constrained households compared to cropping. An investigation into the sustainability of high goat sales by households is recommended.

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