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Influence of male or female headship on the keeping and care of small ruminants: the case of the transitional zone of Ghana

S Duku*' **, L L Price*, H Tobi**** and A van der Zijpp***

** Wageningen University, Animal Production Systems Group, P.O. Box 338, 6700 AH Wageningen, The Netherlands*
*** Department of Crop and Soil Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*
**** Wageningen University, Sociology of Consumers and Households, Department of Social Sciences, Postbus 8130, 6700 EW Wageningen, The Netherlands*
***** Wageningen University, Research Methodology, Department of Social Sciences, Wageningen, The Netherlands*
Stephanie.duku@wur.nl ; stefduku@yahoo.com

Abstract

The study was undertaken in the Ejura-Sekyedumasi District of Ghana to investigate how household headship characteristics and labour availability relate with the household's decision to keep and spend time on small ruminants. Key informants were interviewed prior to a census of all the 407 households in two villages, to collect demographic, crop, and livestock data, which was used in bivariate and logistic regression analyses. A subsequent time use study involved a stratified sample of 24 households, and the t- test was used to compare households.

In general, female-headed households (FHH) were of lower socio-economic status, and had fewer adult household members and less livestock, compared to male-headed households (MHH). The final logistic regression model had a 77.1% success rate in predicting households keeping small ruminants, with socio-economic status and sex of the household head, presence of poultry and the number of active adults as significant predictors. Characteristics of FHH that kept small ruminants were not significantly different from their male counterparts, but the former spent less time feeding their animals. The odds of keeping small ruminants were ultimately 2.1 times higher for male-headed households. The low socio-economic status of most FHH with less labour availability is a disincentive for small ruminant rearing.

Keywords: economic status, female-headed, household, male-headed, time use

Introduction

Considerable attention has been drawn to the importance of small ruminants for poverty alleviation among vulnerable groups (see for instance Saadullah et al 1997; Kristjanson et al 2004; Peacock 2005; Dossa et al 2008). Poverty and vulnerability studies have revealed a gender dimension in contemporary literature, though not without debate. Studies have reported linkages between women on one hand and female-headed households (FHH) on the other hand with poverty and vulnerability. Buvinic and Gupta (1997) reviewed empirical evidence on the relationship between female headship and poverty and concluded that gender-related differences and household structural factors caused FHH to be overrepresented among the poor. A note of caution has however been sounded in equating FHH with poverty and vulnerability (Lloyd and Gage-Brandon 1993; Baden et al 1994; Mookodi 2000; Niehof 2004; Awumbila 2006). It is argued that FHH are not necessarily worse-off, and that certain categories of female heads are more likely to be poorer than other heads (Lloyd and Gage-Brandon 1993; Baden et al 1994; Mookodi 2000; Niehof 2004; Awumbila 2006).

Moreover the need to recognize intra-household differences rather than the household as one unit has

been advocated in many studies (Baden et al 1994; Curry 1996; Dossa et al 2008, to cite a few). It has been claimed that resources are not pooled or are not equally accessible within the household (Baden et al 1994; Awumbila 2006). In addition, it has been argued that the concept of 'headship' gives the impression of a sole income earner and decision maker, which may not be the case (Rosenhouse 1989; Dossa et al 2008; Mookodi 2000). Niehof (2004), on the other hand sees the household as the locus of livelihood generation for its members, with the responsibility of managing resources to meet their primary needs. This, she argues, gives the household a functional definition, as well as a moral dimension to share resources and care for dependants, though not ruling out the need to also look at intra-household organization and benefit sharing. The well-documented concept of 'division of labour' within the household also gives credence to the notion of a household as the unit of livelihood generation. The gendered nature of division of labour, with women having heavier time burdens compared to men, has also been adequately documented.

In Ghana, agricultural production is centred around the household, and particularly so for small ruminant production, which relies mostly on household labour. Small ruminants in a household are managed as one herd irrespective of who owns which animal. The keeping of small ruminants is therefore expected to be influenced by household labour availability and division, and other household characteristics. Female-headed households (FHH) in Ghana have been reported to be smaller on the average compared to male-headed households (MHH), but with higher dependency ratios, with two-thirds of FHH having no adult males, and half of them containing no other adults. In contrast, most MHH have other adults (Baden et al 1994; Awumbila 2006). Thus, FHH are more likely to have labour constraints. It is worth mentioning that in Ghana, being a woman has generally been equated with greater poverty and vulnerability, and higher workloads (Baden et al 1994; Awumbila 2006; Wrigley-Asante 2008). This means that a female household head, being a woman, and having the responsibility of a household head, would be even more likely to be poor, vulnerable, and time-constrained. For a household to adopt small ruminant rearing in Ghana as a means for income generation is thus expected to be linked with headship characteristics, labour availability and household labour allocation. There is, however, a dearth of information on this linkage in Ghana, which could guide the promotion of small ruminant rearing among crop farmers, who have been identified with high poverty levels.

This paper seeks to explore the linkages between household headship, characteristics of the household head, household labour availability, the small ruminant keeping status of the household, and the time spent on small ruminant activities among crop farmers, to inform the promotion of small ruminant rearing for income generation among vulnerable households.

The objectives of this study were, therefore, to test the following hypotheses:

· There is no difference in socio-economic status between male-headed households and female-headed households among crop farmers.
· Household headship is not related to small ruminant keeping in the household.
· There is no difference in time spent on small ruminant activities between male-headed households and female-headed households.

Materials and methods

Study area

The study was undertaken in two villages, Kasei and Kobriti, in the Ejura-Sekyedumasi District of the Ashanti Region of Ghana. These two villages were purposively selected through a mini survey in 2006, based on their location in the transitional zone, being rural but accessible, having sufficient numbers of small ruminant-keeping households to allow for comparison between sex and economic status groups, and being willing to take part in the study. The district experiences both forest and savannah climatic conditions with both forest and savannah vegetation, and has a high concentration of smallholder crop

farmers (Ministry of Food and Agriculture n.d.), considered nationwide as the occupational group with the highest incidence of poverty. The major crops such as maize, cowpea, groundnuts, rice, cassava, yam, garden eggs, pepper, and okra are produced mostly for sale. The main kinds of livestock kept are cattle, sheep, goats, and poultry, and about 60% of livestock farmers keep small ruminants.

Sampling strategy and data collection

The study commenced with the interviewing of six male and five female key informants between March and April 2007, using snowball sampling, to collect information on crop and livestock farming practices, gender issues and socio-economic composition of the communities. A census was then conducted from May, 2007 to July 2007 by administering a structured questionnaire to the heads of all the 407 households in the selected communities on demographics of household members, crop acreages in the previous year (2006), presence and number of small ruminants and other livestock, years of experience in small ruminant rearing, and major and minor occupations of the household head. This information was collected to investigate the characteristics of MHH and FHH. After this, a stratified sample of 24 small ruminant keeping households was selected for a time use study, using a semi structured questionnaire, to elicit how much time each household used for small ruminant activities, with a one week recall period. Stratification was done by household headship, and socio-economic status, using maize acreage as a proxy for socio-economic status (Nyarko, Senior Animal Husbandry Officer, Ministry of Food and Agriculture, Ejura - personal communication). Female-headed households were purposively selected in the time use study due to small numbers of such households keeping small ruminants. In male-headed households, married heads and their spouses were interviewed jointly.

Statistical analyses

To explore the association of household characteristics with male or female headship on one hand and small ruminant keeping on the other, bivariate associations were investigated, using census information from 402 households that had complete data, out of the 407 households. Variables considered were sex of the household head, education of the household head, religion, economic status of the household head, lineage, major and minor occupations of the household head, the presence of other livestock, and village location at a nominal measurement level and household size, dependency ratio, number of active adults, children and elderly people in the household, age of the household head, number of poultry, and maize acreage at an interval or ratio measurement level. Differences between groups on nominal and interval or ratio variables were investigated using Mann-Whitney U tests. Associations between nominal variables were investigated using chi-square tests and association between interval and ratio variables were assessed using Pearson correlations. All tests were considered statistically significant at the $P< 0.05$ level.

The variables that were statistically significantly associated with small ruminant keeping in the bivariate analyses were then used in a logistic regression models to determine the relationship between the dependent Y (here the chance of keeping small ruminants) and independent variables X by means of the mathematical expression:

$$P(Y) = \frac{1}{1+e^{-(\beta 0+\beta 1X1+\beta 2X2+\ldots+\beta nXn+ei)}}$$

Where:

β0 is the constant of the equation,
β1, β2, ……. βn are coefficients of the corresponding predictor variables and
e is the base of natural logarithms.
Exp(bi) is the odds ratio, that reflects the change in the odds of a household keeping small ruminants, with a unit change in a predictor variable, when all other factors remain constant.

The model was built using a backward stepwise procedure. The adequacy of the model was assessed as 'goodness of fit', using the Hosmer and Lemeshow Test, the Cox and Snell R Square, and the

Nagelkerke R Square. The overall adequacy of the model, the sensitivity of the model to identify small ruminant households, and the specificity of the model to identify households without small ruminants were also calculated.

The time used for small ruminant activities were calculated in minutes and converted into hours using the Excel programme (Microsoft Corporation), and then entered into SPSS (version 15) to compare time used by MHH and FHH, as well as households with lower and higher status heads, using the Mann-Whitney U test. Two households that turned out to be outliers were not included in the analysis.

Results and discussion

Characteristics of male-headed households and female-headed households

Characteristics of male-headed and female-headed households, based on the census data, are presented in Table 1. Male-headed households cultivated larger acreages of maize. Having used maize acreage as proxy for socio-economic status in this study as earlier mentioned, significantly more female household heads were found to be of lower socio-economic status compared to male heads of household ((98% vs. 89%). This finding is in agreement with those of other authors (Buvinic and Gupta 1997; Catagay 1998; Wrigley-Asante 2008). Discussions with key informants and focus groups revealed that cultivating less maize acreage due to inadequate capital is characteristic of farmers of lower socio-economic status. The lower maize acreage cultivated by FHH in this study compares with that of Curry et al (1996) in Kenya, where FHH and MHH cultivated 1.1 ha and 4.5 ha respectively. Male-headed households had significantly bigger household sizes and more active adults, but there was no significant difference in dependency ratio, the number of children and elderly people, and age of the household head between male-headed and female-headed households. Significant differences were found in the proportion of male-headed and female-headed households with respect to village location, lineage, major occupation of the household head, and the presence of small ruminants and poultry in the household. Compared to male-headed households, a higher proportion of female-headed households were in Kasei (93% vs. 73%), among matrilineal groups (44% vs. 18%), had no small ruminants (89% vs. 65%), and had no poultry (77% vs. 45%), respectively. Eighty six percent of male heads were involved in farming as a major occupation compared to 77% of female heads (Table 1). The significantly higher proportions of female heads having neither small ruminants nor poultry are also an indication of their lack of resources. All but one female head without small ruminants also had no previous experience in their rearing, irrespective of their marital status. Better off farmers raise capital from livestock sales to fund cropping activities as well as re-invest profits from crops in livestock. Moreover, the fewer adult household members in FHH compared to MHH also shows that the former are disadvantaged with respect to labour resources or missed income, that could be invested in small ruminants.

Table 1. Household characteristics associated with male and female headship. Data is shown as mean (± SD, median) or percentage (n = 402).

Variable	Female-headed households (n = 97)	Male-headed households (n =305)	Test statistic	P value
			Z	
Household size	3.7 (±2.1, 4)	4.7 (±2.6, 4)	-3.1	<0.001
Dependency ratio	107.6 (±113.5, 75)	96.4 (±96.0, 100)	-0.2	0.87
Number of active adults	1.9 (±1.3, 1)	2.3 (±1.2, 2)	-3.5	<0.001
Age of household head	43.8 (±14.0, 42)	44.4 (±15.5, 41)	-0.1	0.96
Maize acreage	1.3 (±2.2, 1)	2.8 (±3.4, 2)	-5.9	<0.001
Number of small ruminants	1.7 (±7.5, 0)	4.1 (±10.5, 0)	-4.4	<0.001
Number of poultry	3.6 (±8.2, 0)	10.6 (±14.7, 6)	-5.4	<0.001

			$\chi^2_{(1, 402)}$	
Village location			16.94	<0.001
Kasei	93	73		
Kobriti	7	27		
Formal education of head			2.00	0.16
Yes	29	37		
Religion			13.89	<0.001
Christian	67	46		
Moslem	21	39		
Other	12	15		
Lower economic status (maize acreage)			7.45	0.01
Yes	98	89		
Lineage			28.50	<0.001
Matrilineal	44	18		
Patrilineal	56	82		
Farming as head's major occupation			4.0	0.05
Yes	77	86		
Head has minor occupation			0.27	0.60
Yes	9	11		
Small ruminants present			20.46	<0.001
Yes	11	35		
Poultry present			31.61	<0.001
Yes	23	55		

Household characteristics associated with keeping or not keeping small ruminants

Table 2 shows the association between the small ruminant-keeping status of a household and household characteristics, based on the census data. Households that kept small ruminants had significantly larger household sizes, more active adults and children, higher dependency ratios, cultivated larger acreages of maize, kept higher numbers of poultry, and the heads were significantly older. There was no significant difference in the number of aged people between households that had small ruminants and those that had none. Household head characteristics having a significant association with household small ruminant keeping status were sex, socio-economic status, lineage, and major occupation. Village location and the presence of poultry also had a significant association with small ruminant keeping. The educational status of the head, religion and having or not having a secondary occupation had no association with the keeping of small ruminants (Table 2).

The significant relationships found between small ruminant keeping and socio-economic status, sex of the household head, lineage, and crop farming as a major occupation are not in agreement with the finding of Dossa et al (2008) in Benin. They found in their study that households with fewer economic options were more likely to keep small ruminants, while in this study, the odds of keeping small ruminants were higher for households with higher status heads. This difference could be attributed to differences in economic status of respondents in the two studies, with those in the current study having a much lower status. This is further supported in that the key informants in our Ghana study mentioned the lack of capital to purchase stock and construct pens as the major reason for not keeping small ruminants. Also in Dossa et al's study, though sex of the household head per say was not significantly associated with the keeping of small ruminants, women were more likely to own small ruminants, as a means of empowerment.

Table 2. Household characteristics associated with keeping or not keeping small ruminants. Data is shown as mean (± SD, median) or percentage (n = 402).

Variable	Households without small ruminants (n = 283)	Households with small ruminants (n = 119)	Test statistic	P value
			Z	
Household size	3.9 (±2.2, 4)	5.7 (±2.8, 6)	-6.0	<0.001
Dependency ratio	94.0 (±97.2, 75)	111.3 (±107.3, 100)	-1.9	0.05
Number of active adults	2.0 (±1.1, 2)	2.8 (±1.3, 2)	-5.8	<0.001
Age of household head	42.8 (±15.3, 40)	47.5 (±14.4, 45)	-3.1	<0.001
Maize acreage	1.8 (±2.9, 1)	3.8 (±3.4, 3)	-7.6	<0.001
Number of poultry	5.2 (±9.1, 0)	17.7 (±18.3, 14)	-9.4	<0.001
			$\chi^2_{(1, 402)}$	
Village location			8.863	<0.001
Kasei	82	68		
Kobriti	18	32		
Sex of head			20.460	<0.001
Male	70	91		
Female	30	9		
Education of head			2.913	0.09
No formal	63	71		
Some formal	37	29		
Religion			4.644	0.10
Christian	53	46		
Moslem	31	42		
Other	16	12		
Lower economic status (maize acreage)			26.067	<0.001
Yes	96	80		
Lineage			10.540	<0.001
Matrilineal	29	13		
Patrilineal	71	87		
Farming as head's major occupation			9.237	<0.001
Yes	80	92		
Head has minor occupation			0.009	0.92
Yes	11	11		
Poultry present			94.618	<0.001
Yes	32	85		

All household variables with a significant relationship with small ruminant keeping were entered in a logistic regression model with the exception of the number of poultry owned, since this was adequately reflected in the categorical variable, 'presence of poultry' having the highest chi-squared value. The final model included the variables: number of active adults, presence of poultry, sex of head and economic status of head (Table 3). The 77.1% success rate of the final model to predict the keeping of small ruminants in this study is similar to the 78% obtained by Dossa et al (2008).

The number of active adults was the strongest continuous variable predictor of keeping small ruminants

(odds ratio, 1.54), which means that a unit increase in the number of active adults in the household increased the odds that a household would keep small ruminants by a factor of 1.54. Sellen (2003) also showed that the number of adults in the household was a good predictor of herd size in Tropical Livestock Units. The presence of poultry (odds ratio, 9.36) was the strongest categorical predictor of keeping small ruminants, meaning that the odds of keeping small ruminants is 9.36 times higher for households with poultry than for households without poultry. The odds of keeping small ruminants were 2.1 times higher for male-headed households (Table 3).

Table 3. Household variables in the final logistic regression model predicting the keeping of small ruminants (n = 402).

Predictor variable	**B (Coefficient)**	**SE of B**	**Wald's χ^2**	**df**	**p**	**Odds Ratio**
Number of active adults	0.430	0.111	15.050	1	<0.001	1.54
Poultry present (1 = yes)	2.236	0.302	54.974	1	<0.001	9.36
Sex of head (1 = male)	0.762	0.396	3.707	1	0.05	2.14
Economic status of head (1 = higher)	1.400	0.426	10.820	1	<0.001	4.06
Test			χ^2	df	p	
Overall model evaluation (Model χ^2)			135.785	4	<0.001	
Hosmer and Lemeshow Goodness of fit			4.517	7	0.72	
Cases correctly classified = 77.1 %						

FHH seem to be at a disadvantage. On the other hand, the lack of significant difference in characteristics between MHH and FHH, once they both kept small ruminants, could be an indication that small ruminant rearing could be a means of empowerment and longer term security to bring FHH at par with MHH in terms of socio-economic status. The bargaining power of women within the household has been reported to increase with the rearing of small livestock, as well as their status and well-being (Bravo-Baumann 2000; Valdivia 2001).

Time use for small ruminant activities

On the household level, there is reporting of spending more time cutting fodder than on all other small ruminant activities, and this was much more in FHH, though not significantly different from that of MHH. Paradoxically, FHH spent less time feeding small ruminants than MHH (2 hours vs. 3 hour, n= 22, p = 0.04). One explanation for this discrepancy could be the lower labour availability in FHH. Both MHH and FHH had a similar mean number of adult females (2.09 vs. 2.08), but different adult males (1.61 vs. 0.58) respectively. Baden et al (1994) established that two-thirds of FHH had no adult males, and half of them contained no other adults apart from the household head. The heavier time burdens of women have also been extensively reported (see for example, Haddad 1991; Baden et al 1994; Niehof 2004; Wrigley-Asante 2008; Mupawaenda et al 2009). According to Dolphyne (1991), African women are responsible for cooking and all house- keeping duties and the involvement of mature males in such duties is met with ridicule from society in most cases. It has been indicated that in Ghana, apart from running of errands in which males of all age groups are highly involved, a higher proportion of females in all age groups partake in all other housekeeping activities, and also spend more time on these activities compared to males (Ghana Statistical Service 2008). These activities include fetching firewood, fetching water, washing clothes and dishes, cleaning, caring for children and cooking, with the last two taking most of the time (two hours and 1hr 16mins per day respectively). Duku et al (2010) reported the remark of one key informant that men have more time to spend on their animals than women, because the latter have many household chores. Heavier time burdens and non-availability of labour in FHH alone cannot, however, explain why they spent more time in cutting forage but less time feeding, compared to MHH. Knowing the predominant feeds fed by MHH and FHH could also provide insight into the different feeding times. For the same respondents as in this study, Duku et al (2010) established that FHH fed mostly crop peels. Feeding peels may not require as much time as cut fodder, which may require tying and hanging, though peels are less nutritious compared to leafy forages. The small sample size in the time

use study might have resulted in a lack of power to identify statistically significant differences.

There were no significant differences between male-headed and female-headed households in reported time spent on collecting crop by-products, feed processing, watering, tethering, or cleaning pens. Average total time spent on small ruminants was 12.5 hours in female-headed households and 10.5 hours in male headed households (n= 22, p=.34).

Conclusions and recommendations

- The study has established that a higher proportion of FHH is of lower socio-economic status and has less labour compared to MHH. This could explain why less FHH keep small ruminants.
- FHH that keep small ruminants spend less time feeding their animals, compared to MHH. The already heavy work burden on female heads as women on the one hand, and lack of male work support on the other, are probable reasons for this outcome.
- The study has, however, not established whether FHH with ruminants attained a higher socio-economic status through small ruminant keeping, or could afford to keep small ruminants because of their higher status. This can only be established through a longitudinal study.
- It is also important to know if women perceive small ruminants as a means to generate income and provision of long term security.
- The study has policy implications for using small ruminant keeping as an option for poverty alleviation. Small ruminant programs such as distributing goats on credit to farmers, instituted by Heifer International, a non governmental organization (NGO), and The Ministry of Food and Agriculture, need to be scaled up to empower more vulnerable people, especially women heads of household and women in general. Such programs should, however, have labour saving components such as promotion of cultivated multipurpose trees and shrubs (CMTS) establishment close to the homestead, and regular veterinary care. Provision of a reliable water supply and promotion of affordable alternative fuel technologies would also cut down on the burden of women and children to enhance adequate attention for their small ruminants.

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Go to top