

Off take and mortality rate of Washera sheep at Yilemanadensa and Quarit districts of Amhara region, Ethiopia

Asresu Yitayew¹, Mengistie Taye², Shigdaf Mekuriaw¹, Hailu Mazengia²

¹Andassa Livestock Research Center, P.O.Box 27, Bahirdar, Ethiopia; ²College of Agriculture and Environmental sciences, Bahir Dar University, P.O. Box 79, Bahir Dar, Ethiopia

Corresponding author: asresu_y@yahoo.com

Abstract

Small ruminant production has profound value on the livelihoods of Ethiopian smallholder farmers. The study was conducted to examine off take and mortality rate of Washera sheep. Data was collected at Yilemanadensa and Quarit districts from October 2004 to April 2010. Data collected includes animal characteristics (sex, age, color, body weight and body condition), purpose of buyer's, and transaction date. The main sheep disposal reason was sale (65.8%), death (24.1%), slaughter (9.7%) and other (0.4%). There was statistically significant difference among those disposal reasons in terms of proportion of sheep disposed ($\chi^2 = 2044$, $P < 0.001$). Gross average commercial off take rate and mortality rate of sheep were 39% and 14.53%, respectively. Off take and mortality rate was high at Quarit district compared to Yilemadensa district. The highest disposal via sale and death occurred at the age of below one year. This study highlights breed conservation and improvement, fattening, reducing lamb mortality, and culling and fleshing of old ewe.

Key words: Disposal, mortality, off take.

Introduction

Washera sheep population found in the highlands of Western Amhara region, has potential for commercial mutton production for the local as well as export market and relatively high reproductive and productive performances (Mengistie *et. al.*, 2009 and 2011; Solomon *et. al.*, 2008; Chipman, 2003). The most common sheep production system of the study area is the traditional smallholder production system in which sheep are kept as an adjunct to other agricultural activities along with other livestock species. In the traditional smallholder management system the majority of people in the highlands keep small flocks and practice mixed crop-livestock agriculture. In the mixed crop-livestock production system, sheep provide cash income, meat, manure, skin and coarse wool for the smallholder farmers (Markos, 2006).

Based on preliminary survey conducted by DBARC (2002, unpublished), that reported the extent of constraints to exploit potential of the breed, community-based conservation and improvement for washera sheep was initiated including the economic worth of the different non-productive traits in selection for breeding in line Girma *et al.* (2006). Interventions in addressing indigenous breed improvement and small holder market participation need to consider off take and mortality rate with attributes of animals. Therefore, the objective of the study was to examine off take and mortality rate of sheep in the study districts.

Materials and methods

Data collection

Data were collected at Yilemanadensa and Quarit districts for more than five years from October 2004 to April 2010 by enumerators. Sheep disposal data were collected as sold, slaughtered, death and others such as scarification and gifts with its date of disposals on permanently prepared recording sheet. For those animals disposed by selling, animals attributes (sex, age, color, live body weight and body condition) and purpose of buyer's were collected. For those animals disposed by death, only animal attributes that is sex and age were collected. Age was confirmed by birth date if it was recorded or number of teeth withdraws and classified in to six categories. Color was recorded as red, white, red and white, black, and others. Sex was taken as male and female. Body condition was assessed by enumerator and gave score as poor, medium and fat. Purpose of buyer's was found as consumption, resale/profit, reproduction, growing, and others (scarification or fattening).

Data analysis

Descriptive analysis was used to analyze the relationship between the different categorical variables with Statistical Package for Social Sciences version 16.0, (SPSS 2009). Gross commercial off take rate formula employed was in line with Negassa and Jabber (2008).

The formula specified as:

$$\text{Gross commercial offtake rate in period } (t) = \frac{\text{sales}}{0.5 (\text{Opening stock} + \text{Ending stock})} * 100$$

Mortality rate estimation method developed by ILCA (1990) was adopted. The formula

$$\text{Mortality rate in period (t)} = \frac{\text{died}}{0.5(\text{Opening stock} + \text{Ending stock})} * 100$$

Result and discussion

Disposal reasons

In the study district, sheep were disposed for different reasons such as sale, slaughter, death, and others. Of the total 2053 disposed sheep, 65.8%, 24.1%, 9.7% and 0.4% were sold, died, slaughtered and others, respectively, and there was statistically significant difference ($p < 0.001$) among the categories of animal's disposal reason. The result shown sale and death that have opposite effect on producer's income were the main reasons of sheep disposals hence the study focused on commercial off take and mortality of sheep (Table 1).

Table 1. Disposal reasons of sheep from the flock.

Disposal reason											
Study	Total	Sold		Slaughtered		Died		Other		χ^2	Sig
Districts	sum	sum	%	sum	%	sum	%	sum	%		
Yilemanadensa	766	527	71.3	101	13.7	110	14.9	1	0.1	884.98	***
Quarit	1315	821	62.5	99	7.5	387	29.4	8	0.6	1221.47	***
Overall	2053	1348	65.8	200	9.7	496	24.1	9	0.4	2044.81	***

*** $p < 0.001$, N= Number of observation, % = Percentage.

Offtake rate

Gross commercial off take rate of sheep at Yilemandensa and Quarit district was 39% which is higher than the national figure (Negassa and Jabber, 2008) but lower than sub-Saharan Africa countries (Markos, 2006). Gross average commercial off take rate of sheep was higher at Quarit (45.82%) than Yilemanadensa (32.96%) for the reason limited source of income and/or lesser household income that oblige farmers to supply sheep to the market rather than consuming it.

Sex and age group for sale

Cross tabulation analysis revealed that 58.4% of sheep were sold at the age of less than six months followed by age between six months and one year, 19.4%, regard less of sex categories (Table 2). The number of sheep that are sold decreased as the age of sheep increased. The age of male sheep supplied to the market was less than three years old. The result indicated that mostly farmers supplied young animals (less than one year) for local market which is an

Table 2. Distribution of sex and age group of sale.

Districts and sex group	Total sum	A≤0.5		0.5<A≤1		1<A≤2		2<A≤3		3<A≤4		A>4		χ2	Sig.
		sun	%	Sum	%	sum	%	sum	%	sum	%	sum	%		
Yilemanadensa															
Male	248	180	72.6	59	23.8	8	3.2	1	0.4	-	-	-	-	331.77	***
Female	273	164	60.1	36	13.2	27	9.9	21	7.7	15	5.5	10	3.6	379.46	***
Subtotal	522	345	66.1	95	18.2	35	6.7	22	4.2	15	2.9	10	1.9	973.22	***
Quarit															
Male	360	249	69.2	82	22.8	23	6.4	6	1.7	-	-	-	-	409.89	***
Female	447	183	40.9	80	17.9	66	14.8	42	9.4	39	8.7	37	8.3	209.36	***
Subtotal	811	434	53.5	163	20.1	89	11.0	49	6.0	39	4.8	37	4.6	876.82	***
Male	608	429	70.6	141	23.2	31	5.1	7	1.2	-	-	-	-	740.24	***
Female	720	347	48.2	116	16.1	93	12.9	63	8.8	54	7.5	47	6.5	543.40	***
Overall	1333	779	58.4	258	19.4	124	9.3	71	5.3	54	4.1	47	3.5	1813.05	***

A = Age in year, % = percentage, *** $p < 0.001$.

Table 3. Purpose of buyers across the study districts.

Study district	Total sum	Reproduction		Resale		Consumption		Growing		Other		χ ²	Sig.
		sum	%	sum	%	sum	%	sum	%	sum	%		
Yilmanadensa	442	38	5.0	379	85.7	10	2.3	-	-	15	3.4	873.93	***
Quarit	772	297	38.5	176	22.8	198	25.6	98	12.7	3	0.4	316.10	***
Overall	1214	335	27.9	555	45.7	208	17.1	98	8.1	18	1.5	735.93	***

*** $p < .001$.

Mortality rate

In the study districts, overall mortality rate of sheep was 14.53%. Mortality rate at Yilemadensa and Quarit district was 21.47% and 6.72%, respectively (Table 5). Sheep mortality at Quarit was threefold higher than Yilemanadensa district given the same health intervention during the study period. Markos (2006) noted that mortality rate of sheep ranges from 8-50%. This implies mortality rate of sheep at Yilemanadensa was so low.

Sex and age group of death

Mortality rate across age categories was inconsistent. Mortality rate (45.4%) was high at the age of less than six months regardless of sex groups. Likewise, mortality for female and male sheep was varied. This is might be because of male sheep sale or slaughter at early age while female rear for long period for breeding purpose. The mortality rate of male sheep (55.6%) and (86.8%) was occurred below six months old age at Yilemandensa and Quarit, respectively. Mortality rate of female sheep (33.7%) was high at the age of less than six months at Quarit district. While at Yilemadensa, higher female sheep mortality (27.7%) was occurred above four years old age. The result revealed that lamb and old ewe was vulnerable group of animals.

Table 4. Cross tabulation of purpose of buyer's with animal characteristics.

Animal characteristics	Reproduction		Resale		Consumption		Growing		Others	
	Yilemanadensa	Quarit	Yilemanadensa	Quarit	Yilemanadensa	Quarit	Yilemanadensa	Quarit	Yilemanadensa	Quarit
	%	%	%	%	%	%	%	%	%	%
Age (N)	39	294	396	175	11	195	-	98	15	3
A \leq 0.5	41.0	43.5	65.7	69.1	72.7	42.1	-	83.7	73.3	33.3
0.5 < A \leq 1	20.5	15.6	19.7	20.0	18.2	28.7	-	13.3	13.3	33.3
1 < A \leq 2	20.5	19.4	6.1	4.6	9.1	7.7	-	3.1	6.7	33.3
2 < A \leq 3	10.3	7.1	4.0	3.4	-	7.2	-	-	-	-
3 < A \leq 4	-	10.5	3.0	2.3	-	7.7	-	-	6.7	-
A > 4	7.7	3.4	1.5	0.6	-	6.7	-	-	-	-
Sex (N)	39	295	396	176	11	197	-	98	15	3
Male	35.9	8.8	48.0	69.3	45.5	53.8	-	91.8	60.0	66.7
Female	64.1	91.2	52.0	30.7	54.5	46.2	-	8.2	40.0	33.3
Color (N)	39	294	392	174	11	194	-	97	15	-
Red	43.6	26.5	36.5	24.7	27.3	23.2	-	22.7	46.7	-
White	5.1	13.9	8.9	17.2	9.1	12.9	-	16.5	13.3	-
Red and white	46.2	56.8	45.2	50.6	54.5	59.3	-	57.7	33.3	-
Black	-	1.0	1.8	3.4	-	2.6	--	1.0	-	-
Others	5.1	1.7	7.7	4.0	9.1	2.1	-	2.1	6.7	-
Body condition (N)	38	288	342	170	11	195	-	98	15	3
Medium	97.4	13.2	90.0	27.1	100	22.1	-	24.5	80.0	-
Fat	2.6	86.8	10.0	72.9	-	77.9	-	75.5	20.0	100

A = Age in year, N= Number of observation, % = Percentage.

Table 5. Sheep mortality in age and sex wise across districts.

Districts and Sex group	Total sum	Age categories												χ^2	Sig.
		A≤ 0.5		0.5<A≤ 1		1<A≤ 2		2<A≤ 3		3<A≤ 4		A> 4			
		sum	%	sum	%	sum	%	sum	%	sum	%	sum	%		
Yilmanadensa															
Male	27	15	55.6	5	18.5	4	14.8	3	11.14	-	-	-	-	13.74	***
Female	83	17	20.5	10	12	10	12	3	3.6	20	24.1	23	27.7	20.16	***
Subtotal	110	32	29.1	15	13.6	14	12.7	3	2.7	23	20.9	23	20.9	27.02	***
Quarit															
Male	114	99	86.8	13	11.4	1	0.9	1	0.9	-	-	-	-	235.90	***
Female	255	86	33.7	36	14.1	39	15.3	28	11	29	11.8	37	14.5	55.73	***
Subtotal	372	187	50.3	49	13.2	40	10.8	30	8.1	29	7.8	37	9.9	306.71	***
Male	141	114	80.9	18	12.8	5	3.5	1	0.7	3	2.1	-	-	332.58	***
Female	338	103	30.5	46	13.6	49	14.5	31	9.2	49	14.5	60	17.8	54.095	***
Overall	482	219	45.4	64	13.3	54	11.2	33	6.8	52	10.8	60	12.4	294.34	***

A = Age in year, % = Percentage, *** p<0.001

Monthly mortality

The prevalence of death across months and between districts was not uniform as indicated in Figure 1. Higher mortality rate of sheep was occurred in January and August at Quarit and Yilemandensa, respectively. And each study district has specific justification. That is high disease prevalence (e.g. Pasteurellosis) and feed shortage at Quarit and Yilemandensa, respectively (personal communication). As the figure indicated, mortality rate was varied during dry and wet season between the study districts. Mortality rate was high at Quarit during dry season (i.e., from December to June) while at Yilemadensa it was high during wet season (i.e., from July to November).

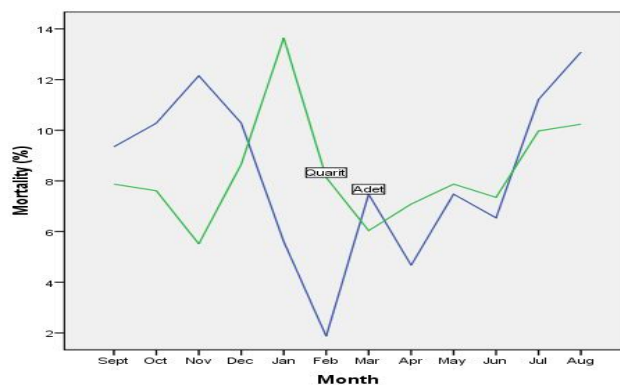


Figure 1. Monthly mortality across the study districts.

Conclusion and recommendation

Commercial offtake rate was high that promotes commercialization process of small holder farmers in the study districts. Both commercial offtake and mortality rate specifically lamb mortality were high at Quarit district compared to Yilemanadensa district. About 45 and 75% of mortality and offtake rate, respectively, was carried out at the age of less than six months. At this age, sheep are preferred for the export markets even if at farmer's management they are below the minimum weight requirement. In contrast, this might have counter effect on selection. Farmers could gain benefit from introducing and promoting of modern sheep fattening technologies together with conservation and improvement of breed. Moreover, reduction of lamb mortality and

promotion of culling and fleshing of old ewe practices can enhance the return from sheep production.

References

- Asfaw Negassa and Jabbar M. 2008. Livestock ownership, commercial off take rates and their determinants in Ethiopia. Research report 9 ILRI (International Livestock Research Institute), Nairobi, Kenya.
- Chipman, J. 2003. Observations on the potential of Dangila sheep for improved food security around Quarit and Adet, West Gojjam, northwestern Ethiopia. A Field Study Hosted by International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia.
- DBARC (Debre Birhan Agricultural Research Centre). 2003. Survey and monitoring of on-farm flocks of Dangila/Washera sheep Types in West Gojjam zone of the Amhara region.
- ILCA (International Livestock Centre for Africa) working paper 1. Livestock systems research manual Volume 1, December 1990, Addis Ababa, Ethiopia.
- Girma Tesfahun Kassie, Clemens B. A.Wolly, Awudu Abdulai, Adam G. Drucker, and Workneh Ayalew. 2006. Farmer's preferences of phenotypic traits in cattle production and marketing: A case study in central Ethiopia. P.61-70. Institutional arrangements and challenges in market-oriented livestock agriculture in Ethiopia. Proceedings of the 14th annual conference of the Ethiopian Society of Animal production (ESAP) held in Addis Ababa, Ethiopia, September 5-7, 2006.
- Markos Tibbo. 2006. Productivity and health of indigenous sheep breeds and crossbreds in the central Ethiopia Highlands. Faculty of veterinary medicine and animal science department of animal breeding and genetics Uppsala. Doctoral thesis. Swedish university of agricultural sciences. Sweden.
- Mengistie Taye, Girma Abebe, Solomon Gizaw, Sisay Lemma, Abebe Mekoya and Markos Tibbo. 2009. Growth performances of Washera sheep under smallholder management systems in Yilmanadensa and Quarit districts, Ethiopia. Trop Anim Health Prod. DOI 10.1007/s11250-009-9473-x.
- Mengisite Taye, Girma Abebe, Sisay Lemma, Solomon Gizaw, Abebe Mekoya and Marikos Tibbo. 2011. Reproductive performances and survival of Washera Sheep

under traditional Management Systems at Yilmanadensa and Quarit Districts of the Amhara National Regional Stte, Ethiopia. Journal of Animal and veterinary Advances 10 (9):1158-1165.

SPSS for windows, 2009. Statistical Package for Social Science (SPSS). Release 16.0.

The Apasche software foundation.

Solomon Gizawa, Aynalem Haile and Tadelle Dessie. 2010. Breeding objectives and breeding plans for subsistence and market-oriented Washera sheep production in Ethiopia. Eth. J. Anim. Prod. 10(1):1-18.