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# Questionnaire Survey of Ectoparasite Challenges and Control Campaign in Jalalaqsi District, Hiiran Region-Somalia

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## Abstract

*Goats and sheep known to have contributed significantly to family's livelihood and their productivity influenced by variety factors with main of ectoparasite. A cross-sectional study design was surveyed from April to July 2024 in the Jalalaqsi district of the Hiiran region, Somalia. A total of 109 owners of goat and sheep were questioned by using a semi-structured questionnaire. The study focused on husbandry practices, campaign awareness of ectoparasites among animal farmers, the effects of these parasites, treatment methods, an observation of the implementation practices and impact of ectoparasite control interventions in the district.*

*According to the system of production in the study area is mixed, about 31.2% of owners managing their small ruminants independently in their homes, while 55% kept their animals mixed with other domestic animals, including dogs and cats. All respondents (100%) indicated that they were aware of one or more ectoparasites affecting goats and sheep. The survey also assessed the delivery service of veterinary and the ectoparasite control campaign conducted by the Zamzam Foundation. According to the responses, 64.2% of participants treated their small ruminant's at four-week intervals, while 35.8% provided treatment at six-week intervals. Most respondents (63.3%) reported that the drugs had a positive impact but were not sustainable, while a small percentage (7.3%) indicated that the treatment did not bring any noticeable change.*

*Precisely on these findings, it is recommended to implement practices and design an appropriate annual chemical control program, develop a clear animal movement policy with strict quarantine measures, raise awareness, and promote better management practices.*

**Keywords:** *Ectoparasites, Goat, Sheep, Prevalence, Jalalaqsi District.*

## 1. Introduction

Livestock, particularly goats and sheep, play an important role in human society by supplying food, fiber, and various other products. (Adams and Ohene-Yankyera 2014; Adams et al. 2021). The livestock industry provides support to around 1,000,000,000 small holder farmers from developing countries (Alders et al. 2021).

In Somalia, there are about 56,900,000 livestock populations. Out of these, both goats and sheep are approximately 44,500,000 (Erdaw 2023) and followed by camels 7.3 million (Too et al. 2015).

According to the production system of small ruminants found in Somalia, there are two groups of systems, namely a mix of pastoralist and agro-pastoral; therefore, the small ruminants are part of mixed production systems. Pastoralist migrate from place to place in seasonally with their animals to seek an appropriate place for pasture and water are common.

In Somalia, the production of small ruminants face constraints of ectoparasites due to many factors including during the rainy season, the ectoparasites incidences increase and causes many diseases which reduces the health and productivity of small ruminants, lack of husbandry practices, availability of poor quality and quantity feed, lack of screening

ectoparasites, low knowledge of farmers or owners and lack the role of Ministry of Livestock Forestry & Range towards ectoparasites control campaign practice where the ectoparasites are the most prevalent. All these factors contribute the occurrence and increased numbers of ectoparasites that lead to lessen the production of sheep and goat In Somalia. Furthermore, these losses of production are associated to the increased feed demand and additional cost for medical treatment.

To reduce economic losses caused by ectoparasites in goat and sheep, it is essential to implement effective management and control strategies. Zamzam Foundation, a humanitarian, non-governmental, and non-profit organization established in Somalia in 1992, focuses on supporting the most vulnerable populations during times of crisis.

The foundation has initiated a program to distribute animal fodder, seeds, tools, replacement livestock, and veterinary drugs to communities severely impacted by climate change and conflict. In 2023, they extended their efforts to the Hiiran region, particularly Jalalaqsi District, by providing veterinary drugs to combat livestock diseases, with a special emphasis on controlling ectoparasites, which are most prevalent in the area.

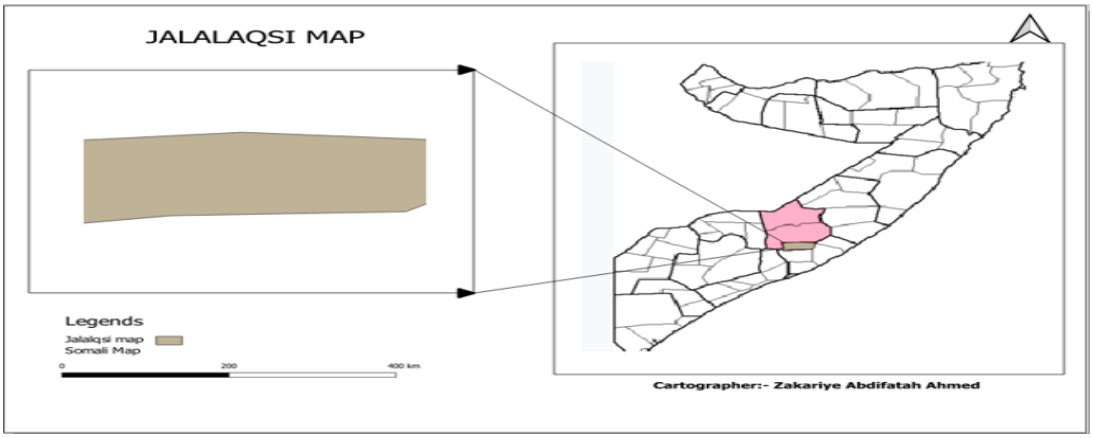
The aim of this study survey was to assess the problems and the impact of the control program and its implementation practices, evaluate the awareness status of owners about the consequences of ectoparasites and their control, this data is important because the results of this study contribute to make an objective decision on ectoparasites control strategy.

## 2. Materials and Methods

### 2.1. Study Area

The survey was conducted at Jalalaqsi District which is a town in the south-central Hiiran region of Somalia. It is located on the Shebelle River, between Jowhar and Buuloburde with a latitude of 3.3851 and longitude 45.5960E.

In Jalalaqsi, summers are brief, extremely hot, and generally cloudy, while winters are warm with partial cloud cover. The area experiences humid, dry, and windy conditions throughout the year. Temperatures usually range between 70°F and 101°F, with extremes rarely falling below 67°F or exceeding 103°F (Billi and Sebhat 2022).




*(QGIS, 2024)*

### 2.2. Sample Size and Sampling Technique

Up to now, there was no previous study conducted in jalalaqsi district related to the study evaluation of ectoparasites' goats and sheep and farmer's awareness followed by campaign treatment of Zamzam foundation. So, the number of interviewed farmers was decided based on Sloven's formula, a total of 109 questionnaires samples were distributed to the farmers drawn from the population size of 150 and margin of error (e) 5% and Sample random sampling was used to select sample locations, descriptive statistics was used to analyzed data. So, the number of the farmers needed to assess the knowledge and to observe the problems and ectoparasites control practices was 109 respondents.

### 2.3. Study Design and Data Management Analysis

The study was conducted from April to July-2024 in a cross sectional study design. A simple Semi-structured questionnaire paper format was arranged to mark the objectives of this study. A

total of 109 owners' goat and sheep were randomly selected from three different village localities: 37, 36 and 36 respondents were from Hantiwadaag, Horseed and Tawakal villages respectively.

Microsoft excel data sheet was entered the collected raw data and then analyzed by using Statistical software (SPSS version 20) and the information was concluded by dividing positive/negative samples for the total number of the farmers interviewed.

## 3. Results and Interpretation

The questionnaire survey was administrated to 109 owners of small ruminants which comprised 94/109 (86.2%) male and 15/109 (13.8%) female participants.

The educational background of the owners was interviewed in individuals showed that 49/109 (44.9) were illiterates, 30/109 (27.5) were able to read and write, 18/109 (16.5) had elementary school's education and finally12/109 (11.1%) had completed secondary school. Out of the total 109 interviewed 95/109(87.1%) were married, 3/109(2.8%) and 3/109(2.8%) 8/109(7.3%), widowed, divorced and single respectively (Table 1).

**Table 1.** *Demographic feature of the farmers*

| Demographic | Variables | No of Respondents | Percentage |
|---|---|---|---|
| Sex | Male | 94 | 86.2 |
| | Female | 15 | 13.8 |
| Educational Status | Illiterate | 49 | 44.9 |
| | Read & Write | 30 | 27.5 |
| | Primary school | 18 | 16.5 |
| | Secondary school | 12 | 11.1 |
| Marital Status | Single | 8 | 7.3 |
| | Married | 95 | 87.1 |
| | Divorced | 3 | 2.8 |
| | Widowed | 3 | 2.8 |
| Location | Hantiwadaag | 37 | 33.8 |
| | Horseed | 36 | 33.1 |
| | Tawakal | 36 | 33.1 |

The present observations of (Table 2) had manifested that the majority of small ruminant's production system is mixed with 34/109 (31.2%) participants management small ruminants independent in their own single house, 15/109(13.8%) reared by mixed small ruminants together and regarding to the answers of 60/109(55%) goats and sheep had been reared with other domestic animals including cat and dog. These goats and sheep were mixed in different locality areas such as grazing, watering point and market place showed by 90/109(82.6%) respondents. With the consider of the knowledge of animal owners on the ectoparasite problems, 100/109(91.7%) respondents knew that ectoparasites are serious problems and plainly showed that they knew one or more ectoparasites that effect small ruminant, 60/109(55%) of interviewed owners knew that lice, flea, tick and mange as ectoparasites of small ruminants (sheep and goats).And 39/109(35.8%) and 10/109(9.2%) of owners respondents knew that (Tick and Lice) and flea effect the sheep and goats respectively. Nevertheless (45%) of the owners did not have enough knowledge on mange mite. During the survey, 100/109(91.7%) owners responded that the ectoparasite were serious problem that effect the small ruminants (sheep and goats) health and production. And also replied that ectoparasites causes emaciation, itching, poor growth, and death if left untreated due to heavy infestations. In addition to owners responded that ticks, 40/109(36.7%) causes major problems to the sheep and goats when compared to other ectoparsites (lice, flea and mange mite).

**Table 2.** *Awareness level of respondents and System of production*

| Variables | | No of Respondents | Percentage |
|---|---|---|---|
| Rearing Goats and Sheep | In Single house | 34 | 31.2 |
| | Mixed goat & sheep together | 15 | 13.8 |
| | Goats and Sheep with other animals | 60 | 55 |
| Mixing with Other domestic animals in district areas | Mixed | 90 | 82.6 |
| | Not Mixed | 19 | 17.4 |

| | | | |
|---|---|---|---|
| Responses on Knowledge of ectoparasites | Lice, Flea, Tick and Mange | 60 | 55 |
| | Tick and Lice | 39 | 35.8 |
| | Flea | 10 | 9.2 |
| Complain on ectoparasite Problem | Ectoparasite are serious problems | 100 | 91.7 |
| | Ectoparasite are not serious problems | 9 | 8.3 |
| Complain on type ectoparasite problems | Lice | 20 | 18.3 |
| | Flea | 24 | 22 |
| | Tick | 40 | 36.7 |
| | Mange and Flea | 25 | 23 |
| Knowledge on effectiveness of treatment options | Spraying | 14 | 12.8 |
| | Dipping | 15 | 13.8 |
| | Never done about treatment | 80 | 73.4 |

According to the availability of veterinary service regular, 60/109(55%) of owners' sheep and goats replied that veterinary services were not available in the study area and also (35.8%) of respondents replied that veterinary services were not regular but available. Out ofthe 109interviewed owner, 24(22%) of respondents did not treated their goats sheep and due to not know about the control campaign. Few of the owners 10/109(9.2%) did not treat their animals but knew the control campaign while majority owners (68.8%) treated their goats and sheep. During the control campaign, 60/109(55.1%) of the owners did not use any treatment option other than chemicals, whereas (27.5%) used as traditional treatment of topical application of oil while 19/109(17.4%) used water as a treatment option (Table 3).

**Table 3.** *Availability of veterinary drugs and other alternative*

| Variables | No of Respondents | Percentage |
|---|---|---|
| Availability of regular Veterinary services | | |
| Regular and available | 10 | 9.2 |
| Available but not regular | 39 | 35.8 |
| Not available | 60 | 55 |
| Treatment of goats and sheep during control campaign | | |
| Treated their goats and sheep | 75 | 68.8 |
| Did not treat but Knew the campaign control | 10 | 9.2 |
| Did not know the campaign and not treated | 24 | 22 |
| Use of other treatment option other than using chemicals | | |
| Washing with water as treatment option | 19 | 17.4 |
| Topical application of oil | 30 | 27.5 |
| Did not use any treatment option other than chemicals | 60 | 55.1 |

During the survey of interval period of treatment was observed. According to (Table 4) the response of owners 70/109(64.2%) were treated their small ruminants (sheep and goats) at four weeks period interval. Whereas 39/109(35.8%) of the owners given and treated their sheep and goat at six interval period treatment. According to the treatment options during the control program, majority (87.2%) of owners used treatment as spraying. Out of 109, 69(63.3%) replied that the control campaign treatment for ectoparsites was good but not sustainable. But 8/109(7.3%) of respondents responded that the treatment did not bring any change to their animals and someof respondents replied that the treatment campaign was quite well. In the study area, the owners (81.7%) did not sell the skin of their sheep and goats but given as free while few of them 20/109(18.3%) sold the skin to get income

**Table 4.** *Spraying and dipping activities*

| **Variables** | **No of Respondents** | **Percentage** |
|---|---|---|
| How many times of treatments during the control practices | | |
| One times | 80 | 73.4 |
| Two times | 29 | 26.6 |
| Interval of Treatment | | |
| Four weeks | 70 | 64.2 |
| Six weeks | 39 | 39 |
| Use of treatment option during control program | | |

| | | |
|---|---|---|
| Dipping | 14 | 12.8 |
| Spraying | 95 | 87.2 |
| Response on the impact of control campaign | | |
| Good impact but not sustainable | 69 | 63.3 |
| Well | 32 | 29.4 |
| No change have brought | 8 | 7.3 |
| Concerning Use of Sheep and Goat | | |
| Did not sell but free given | 89 | 81.7 |
| Sell to get cash income | 20 | 18.3 |

## 4. Discussion

The questionnaire survey aimed to gather information regarding husbandry practices, the awareness of ectoparasites among the owners, the effects these parasites have on the animals, treatment methods employed, and the impact of ectoparasite control interventions in jalalaqsi district. The Zamzam Foundation's ectoparasite control campaign was assessed as part of the study, and while the campaign was appreciated, there was a consensus that more needs to be done to ensure sustainable results.

According to the husbandry practices, the system of production was found to be mixed. A minority (31.2%) of livestock owners managed their small ruminants independently at home, while the majority (55%) kept their animals in mixed herds along with other domestic animals, such as dogs and cats. The latter practice presents unique challenges in controlling ectoparasites, as the commingling of various animal species creates opportunities for parasites to spread more readily. This is particularly concerning given the fact that all respondents (100%) indicated awareness of the existence of one or more ectoparasites affecting their sheep and goats.

The survey further explored the treatment schedules implemented by Zamzam's foundation. The majority (64.2%) reported treating their animals at four-week intervals, while a smaller group (35.8%) adhered to six-week intervals. The difference in treatment frequency could have significant implications for the effectiveness of control programs, as ectoparasite life cycles vary, and consistent treatment is necessary to break the cycle of infestation. Most respondents (63.3%) indicated that the drugs used had a positive impact on controlling parasites, although the treatments were often not sustainable in the long run. This suggests that while treatments are effective in the short term, long-term control requires more comprehensive approaches. A small proportion of respondents (7.3%) reported no noticeable improvement following treatment, further illustrating the limitations of current practices.

The findings suggest that the current level of intervention, while beneficial, is insufficient to achieve long-term ectoparasite control. The irregularity and limited scope of these campaigns may contribute to the reported recurrence of infestations

## 5. Conclusion and Recommendations

The questionnaire survey revealed that 9.2% of respondents had access to regular modern veterinary services, and 68.8% were treated their goats and sheep. Despite some variations, nearly all participants were aware of the existence of ectoparasites in goats and sheep. However, they consistently expressed concerns about ectoparasite problems, with many reporting re-infestation after treatment programs. The survey also indicated that most small ruminant owners housed their goatsand sheepmixed with other animals and allowed them to mix with animals in different locality.

Additionally, they lacked regular veterinary services, sufficient knowledge about the effectiveness of treatment options, and awareness of the appropriate treatment intervals and procedures necessary to eliminate ectoparasites completely. They were also unclear about the correct amount of solution needed to thoroughly treat all body parts of the animals for effective ectoparasite control. Based on these findings, the following recommendations are made:-

- The ministry of livestock forestry & range should develop and execute an effective proper campaign of chemical control, it is crucial to consider the efficiency of intervals, increase the frequency of applications, and employ efficient chemical application methods. This strategy should be implemented by the responsible Veterinary extension services to reduce the burden of ectoparasites.

- Launch awareness campaigns to educate the broader community about the impact of ectoparasites on livestock health and productivity, highlighting the importance of regular treatment and control measures.
- A clear policy on animal movement should be established, and quarantine measures should be practiced for new introduced animals before they are integrated into the main flock.

## AUTHORS CONTRIBUTION

ZAA designed the study. ZAA and HMS performed the methodology. AAS carried out the data analysis. ZAA composed the manuscript. All the authors checked and approved the final manuscript.

## COMPETING OF INTEREST

The authors confirm that they have no conflicts of interest related to this work

## ETHICS APPROVAL

Not applicable

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