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# Small-scale Poultry Production in Sidama Zone: Challenges, Ethnoveterinary Practices and Coping Mechanisms

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**Abstract:** This study was conducted in Wondogenet and Shebedino Woredas of Sidama zone. The aim of the study was to assess the challenges of the existing poultry health management, ethnoveterinary practices and coping mechanisms. Two stage sampling technique of purposive and random were used. Data were collected using a pre-tested structured questionnaire. Results exhibited that small holder poultry producers were faced by challenges of diseases, predator attack and seasonal variations. Common disease problems were reported to be occurred regularly or occasionally by all respondent farmers (99.2%). Major symptoms observed during the outbreaks were diarrhea, twisting neck, dropping head and neck. Respondent farmers were take measures of apply traditional medicine (44.4%) and visit veterinary clinic (42.7%). Small holder farmers (71.7%) have a practice of using conventional human drugs of tetracycline and ampiciline for poultry treatment. Traditional medicine identified by respondent farmers to treat different kinds of diseases were lemon (*Citrus limon*) juice (52.4%), tobacco (*Nicotiana latissima* Mill) (15.2%), garlic (*Allium sativum*) (11.4%) and ginger (*Zingiber officinalis*) (9.5%). Most of these treatments were used to treat diarrhea, respiratory disease, influenza, disease cause mortality and twisting neck. Cat, Wild cat, Fox and Eagle were the major predators that attacked small holder chicken. Respondent farmers reported that about 54.6%, 55.1% and 77.9% of chicken flocks were challenged by very high disease outbreak, predator attacked and chick mortality during long rainy season, respectively. Evaluation under controlled conditions of medicinal plant products and treatments has to looked-for and tested on the efficacy rates and veterinary properties. Indeed efforts need to be done in the discovery, documentation and validation of local ethnoveterinary practices of family poultry.

**Key words:** Challenges · Coping · Ethnoveterinary · Predators · Seasons

## INTRODUCTION

Indigenous chicken have great contributions to household food security throughout the developing world. Their demand is increasing and can be marketed easily to provide source of income to families [1]. The total chicken population of Ethiopia is estimated to be 60.5 million of which 94.33% are the most dominant chicken types of the indigenous, 3.21% hybrid and 2.47% exotic [2]. Those of domestic fowl that are kept in villages, mainly under scavenging systems accounts 95% of the population while the remaining 5% are in industrial systems [3]. Major of the house hold had spent the income from the sale of eggs and chickens in direct relation to nutrition, health and education of the family [4]. Thus, in a country like Ethiopia attempts of any development actions that promotes the smallholder chicken production and productivity helps to secure food at household level.

High incidence of diseases is one of the major constraints for smallholder poultry production systems. In unprotected flocks, Moreki [5] identified NCD as one of the major challenge in family poultry which cause up to 100% mortality. In large-scale commercial poultry production it is common to vaccinate against pathogens that may harm the birds. Smallholder farmers regularly face financial constraints that make vaccination difficult to implement [6]. More ever electricity and other basic infrastructure, maintenance of the cold chain is also difficult in some remote areas. In general vaccination

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management and disease control method in the free-range family chicken production systems is difficult. Ethnoveterinary medicine (EVM), or traditional animal health care practices, is a local or indigenous knowledge and methods for caring, curing and managing livestock [7]. This knowledge is different from community to community and from region to region [8].

Ethnoveterinary medicine is widely used by family poultry keeping farmers. Giday and Ameni [9] reported that the traditional remedies are sometimes the only source of therapeutics for nearly 90% of livestock in Ethiopia of which 95% are plant origin. Major reasons for ethno veterinary research is to generate useful information to develop livestock healing practices and methods that are suited to the local environment, to be a key veterinary resource and could add useful new drug to the pharmacopoeia and contribute to biodiversity conservation [10]. Guèye [11] suggested that, for most of the resource-poor family poultry, EVM is usually the only alternative, particularly in rural and hilly areas because there are almost no veterinary services in such areas. In such cases, they can be used as a valuable options and complement the ever increasing cost of commercial synthetic veterinary products [12, 13].

Given the foregoing considerations, the use of EVM is obviously sustainable as it is culturally acceptable and financially and ecologically sound. Much of this precious knowledge is in danger of being lost or suppressed [14]. Hence, EVM practices that are considered by small holder poultry farmers as being common and effective are need to be identified thoroughly for further validation and certifications. The finding of this study addresses an opportunity and potential to design and implement interventions, focusing at improving poultry health and ethnoveterinary practices that enhance productivity and reduce losses of family poultry farmers. Therefore, this research was conducted to assess the challenges of existing poultry management, ethnoveterinary practices and coping mechanisms for addressing an improvement options for the challenges.

## MATERIALS AND METHODS

**Description of the Study Area:** The survey was conducted in Sidama Zone of Wondogenet and Shebedino Woredas of Southern Nation and Nationality People Regional State of Ethiopia. Wondogenet Woreda is geographically located at 07° 19.1' North latitude, 38° 30' East longitude and an altitude of 1780 meter above sea level. The area receives mean annual rain fall of 1128 mm with minimum and maximum temperature of 11 and 26°C, respectively. Population of livestock in the Woreda was 42,020 chickens, 44,486 cattle, 10,766 sheep, 7,085 goat, 5,016 donkey, 4,122 horse and 2,452 honey bee colonies. Shebedino Woreda is located 27 km far away from Hawassa city, the capital city of the region. The Woreda was situated at 6°45` and 7°45` latitude to the North and 39° and 40° longitude to the East. The altitude was 1860 meter above sea level. The minimum and maximum rain fall was 900 mm to 1500 mm, respectively. The average temperature was 20.5°C. Livestock population of the Woreda was 151,643 chickens, 198,083 cattle, 43,585 sheep, 27,862 goat, 5,946 donkey, 179 horse and 14,525 honey bee colonies.

**Sampling and Data Analysis**

**Sampling Procedures:** Two stage sampling of purposive and random were used. Two Woredas of Wondogenet and Shebedino were selected purposively based on criteria related to ease of accessibility; Woreda's situation in representing the zone and chicken production potential. Proportional to the size of Woreda were employed to select the number of Kebeles. Four kebeles from Shebedino Woreda and three kebeles from Wondogenet Woreda were selected randomly making a total of seven kebeles. Small holder poultry producers of the respondents were selected randomly in each kebele by giving equal chance for those farmers with different flock size, chicken husbandry systems and accessibility. The sample households in each rural kebeles were stratified into female and male-headed households. Thus a total of 120 family poultry owner households were interviewed using pre-tested structured questionnaires.

Secondary data were collected from Bureau of Agriculture and Rural Development. Primary data were collected through personal and household interviews. Closer visits in and around the residential quarters of selected households were made to get first hand observation of the districts. An overview discussion was held with Woredas` Bureau of Agriculture and Rural Development experts and development agents to have a brief understanding on poultry health technology and ethno veterinary practices. Trained enumerators were involved for data collection under close supervision and participation of the researcher.

**Data Analysis:** Quantitative and qualitative data sets were analyzed using statistical analysis procedures of Statistical Package for Social Sciences [15] version 20.

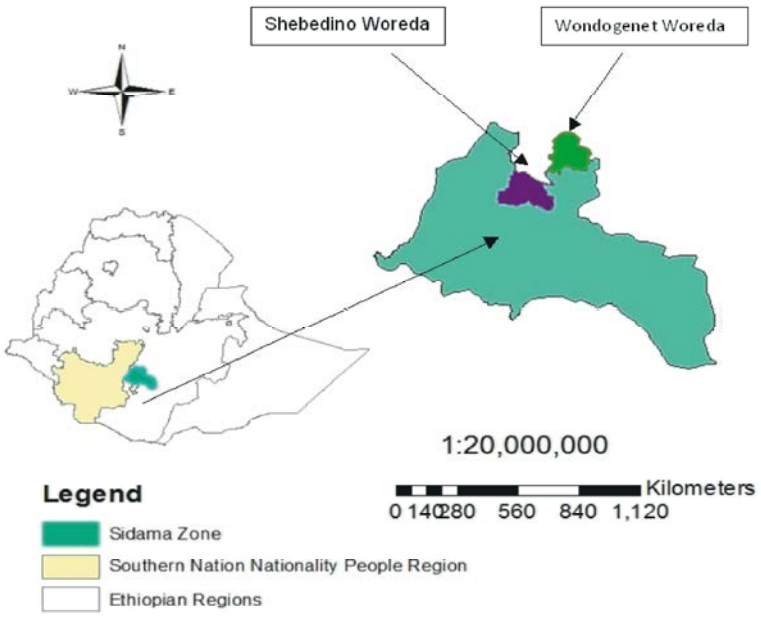


Fig. 1: Map of the study Woredas.

## RESULTS AND DISCUSSION

**Household Characteristics and Respondent Profiles:** Respondent house hold characteristics and profile were indicated in Table 1. The range of respondents' age were 20-67 years. The maximum age groups of the respondent farmers (37.5%) were laid within the range of 31-40 years of productive and active age groups. Out of the total respondents (N=120), 82.5% and 17.5% were male and female headed households, respectively. The average age and family size of the respondent were 40.6±0.9 years and 6.88±0.24, respectively.

Table 1: Respondent house hold characteristics and profile

| | Respondents` | |
|---|---|---|
| Age (Years) | Number | Percent |
| 20-30 | 17 | 14.2 |
| 31-40 | 45 | 37.5 |
| 41-50 | 44 | 36.7 |
| 51-60 | 9 | 7.5 |
| 61-70 | 5 | 4.2 |
| Sex (%) | | |
| Male headed | | 82.5 |
| Female headed | | 17.5 |
| Average Age (Years) | | 40.6±0.9 |
| Average Family size | | |
| Male | | 3.4 ±0.2 |
| Female | | 3.5±0.2 |
| Total | | 6.88±0.24 |

**Poultry Health and Disease Prevention Practices:** Poultry diseases seriously affect village chicken production. Common disease problems were reported to occurred regularly or occasionally in all respondent farmers (99.2%). Farmers have reported a number of deaths and suspected outbreaks based on clinical signs such as diarrhea, twisting neck, dropping head and wings, difficulty of breathing, coughing, sneezing, sleeping, swollen eyes, discharge from mouth and nose and sudden mortality. According to Sambo [16], out of eight groups of backyard poultry producers around Debre-Zeit, seven of them ranked disease as the most important constraint to chicken production.

Small holder traditional poultry producers lack resources to access veterinary care. Major symptoms observed during the outbreak were diarrhea, twisting neck, dropping head and neck. Sensitivity of disease occurrence was higher during rainy season (94.1%). Small holder farmers have practices of applying traditional medicines for poultry treatment. Poultry health and disease prevention approaches were indicated on (Table 2). During disease outbreak village poultry households explained that they apply traditional medicine (44.4%), visit veterinary clinic (42.7%) and apply both (12.8%). Moreki [5] reported that, 86.7% of family poultry holders used EVM, whereas the remainder used modern medicines (vaccines and drugs). Respondent farmers (52.1%) provide treatment for sick chicken only, while (47.9%) provide for all of the chicken. So, farmers need to

Table 2: Poultry disease prevention practices

| Parameters | Respondent`s percent |
|---|---|
| Measures taken during disease outbreak (%) | |
| Apply traditional medicine | 44.4 |
| Visit veterinary clinic | 42.7 |
| Both | 12.8 |
| Treatment provide for (%) | |
| Sick chicken only | 52.1 |
| All of the chickens | 47.9 |
| Persons provide the treatment (%) | |
| By farmers itself | 58.0 |
| By animal health personnel | 32.8 |
| By both | 9.2 |
| Effectiveness after treatment (%) | |
| All are cured | 22.6 |
| Some are cured | 77.4 |

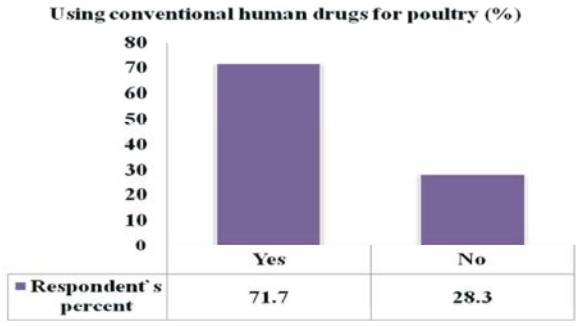


Fig. 2: Proportion of farmers who use conventional human drugs to treat chickens

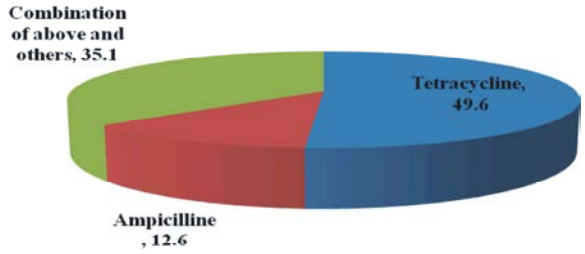


Fig. 3: Types of human drugs used for poultry treatment.

be aware of how to treat and prevent poultry diseases. Respondent farmers of (58.0%) were provide treatment by themselves and (32.8%) by animal health personnel. Traditional medicines used by village poultry household respondents during poultry disease outbreak to treat infected chickens were reported to be effective (22.6%) and sometimes effective (77.4%).This indicates a further study of validation and certification of those best curing EVM practices.

Most of the small holder farmers (71.7%) have a practice of using conventional human drugs for poultry treatment (Fig. 2). Respondent farmers of 49.6% were used tetracycline and 12.6% ampiciline that fabricated for human drugs for poultry treatments (Fig. 3).

These conventional human drugs were used for treating diarrhea, respiratory disease and cough. About 23.3% of the respondent farmer's chickens were cured completely (Table 3). The administration of the drugs was with feed, water or both. In agreement with this, Sambo [16] found administration of tetracycline (accessed directly from pharmacies) to chickens was reported in all the back-yard producer focus groups. Majority of the respondents have no awareness how to use the appropriate dose of some antibiotics which prepared for humans. They reported that they use them by adjusting the dose according to their perception and the severity of the illness. Previous studies have also indicated the use of human antibiotic preparations, like amoxicillin [11].

**Traditional Medicines used for Small Holder Poultry Treatments:** Small holder farmers have a practice of applying traditional medicines for poultry treatments. Ethiopian farmers and pastoralists rely on traditional knowledge and practices of using plants, to control livestock diseases [9, 17]. Ethiopians have used traditional medicines for many centuries, due to cultural acceptability, efficacy against certain diseases and economic affordability [18, 19].

Herbal medicines used for small holder poultry treatment was showed in Table 4. Major primary sources of traditional medicine types were lemon juice (52.4%), tobacco (15.2%), garlic (11.4%) and ginger (9.5%). Most of these medicinal plants were used to treat diarrhea, respiratory disease, influenza, sudden mortality and twisting neck. The ways of preparation of the treatment were by squeezing, grinding or both. It can be administered with water or feed and either through mouth or nostrils. In accordance to this, Sambo [16] also showed that garlic was used by scavenging chicken producers to treat respiratory infections. Tekle [20] has indicated that EVM preparations were applied through oral administration accounted for (58.3%), followed by topical application (29.17%). Different ways can be used to administer Ethnoveterinary medicines like drenching, bath, fumigation, spray, injection and topical application [21]. The effectiveness of herbal medicines used by village poultry household respondents during poultry disease outbreak to treat infected chickens were reported to be excellent (11.3%) and good (88.7%). In South Africa Ranwedzi [22] reported the use of traditional remedies like *Aloe vossii* Reynolds and tobacco leaves to treat family chickens that were infected by NCD. Moreki [23] in Botswana also indicated that, the bursal of fabricius of

Table 3: Types of conventional human drugs used for poultry.

| Drug type | Name of the drug | Used to treat | Way of administration | Dosage | Effectiveness |
|---|---|---|---|---|---|
| 1 | Tetracycline (76.6%); Ampicilline (19.5); Amoxicillin (3.9%) | Diarrhea (55.8%) Respiratory disease (20.9%) Cough and dropping head (12.5%) | With water (43.3%) With feed (34.9%) Both (4.7%) | 1 capsule for 1 bird (43%) 0.5 capsule for 1 bird (31.4%) 1 capsule for 3 bird (14%) 1 capsule for 4 bird (10.5%) | Partially cured (76.6%) Completely cured (23.3%) |
| 2 | Tetracycline (6.2%); Ampicilline (2.5); No second drug used (91.4%) | Diarrhea (5.8%) Respiratory (2.7%) Influenza (1.2%) No second drug used (86%) | With water (12.8%) With feed (1.2%) Both (4.7%) | 1 capsule for 1 bird (9.4%) 1 capsule for 2 bird (4.7%) No second drug used (86%) No second drug used (86%) | Partially cured (14%) No second drug used (86%) |

Table 4: Traditional medicines used for small holder poultry treatment

| Type one traditional medicines (Common/Scientific name) | Respondent % | Used to treat | Way of preparation | Way of administration |
|---|---|---|---|---|
| Lemon juice/*Citrus limon* | 52.4 | Diarrhea, respiratory disease, influenza, disease cause sudden mortality and twisting neck | by squeezing | through mouth |
| Tobacco/*Nicotiana latissima Mill* | 15.2 | Diarrhea and influenza | by grinding | through nostril |
| Garlic/*Allium sativum* | 11.4 | Diarrhea, respiratory disease and influenza | by grinding and squeezing | with water and feed |
| Ginger/*Zingiber officinalis* | 9.5 | Diarrhea and respiratory disease | by grinding and squeezing | with feed |
| Effectiveness | | | | |
| Excellent | 11.3 | | | |
| Good | 88.7 | | | |
| Type two traditional medicines | | | | |
| Lemon juice/*Citrus limon* | 32.2 | Diarrhea and respiratory disease | by squeezing | through mouth |
| Garlic/*Allium sativum* | 25.4 | Diarrhea, respiratory disease and influenza | by grinding | with feed |
| Tobacco/*Nicotiana latissima Mill* | 20.3 | Diarrhea and influenza | by grinding | through nostril, with water |
| Ginger/*Zingiber officinalis* | 10.2 | Respiratory disease and diarrhea | by grinding, squashing | with feed |
| Effectiveness | | | | |
| Excellent | 3.4 | | | |
| Good | 96.6 | | | |
| Type three traditional medicines | | | | |
| Garlic/*Allium sativum* | 6.7 | Diarrhea and influenza | by grinding and squeezing | with feed, smelling |
| Tobacco/*Nicotiana latissima Mill* | 3.3 | Diarrhea | by grinding | with water |
| Lemon juice/*Citrus limon* | 0.8 | Respiratory disease | squeezing | through mouth |
| Didn't used | 87.5 | | | |
| Effectiveness | | | | |
| Good | 12.5 | | | |
| Didn't used | 87.5 | | | |

Table 5: Access to veterinary services

| | | Means of applications (%) | | |
|---|---|---|---|---|
| Medical services get from veterinary clinic (%) | Respondent`s percent | Injection | With feed and water | No |
| Vaccination | 14.3 | 54.3 | - | 23.9 |
| Drug | 18.5 | 59.1 | 22.6 | 18.3 |
| Both | 45.4 | | | |
| Didn`t get any | 21.8 | | | |

birds infected with infectious bursa disease (IBD) were usually cut and dressed with salt or a mixture of salt and snuff (powdered tobacco) in order to stop bleeding.

Traditional medicine type one were used for indigenous chicken (61.3%), exotic and indigenous chicken (20.8%), exotic chicken (4.7%) and cross chickens (1.9%). Similarly, traditional medicine type two were used for (67.8%) of indigenous chicken, (22.0%) exotic and indigenous chicken, (5.1%) cross chickens and (5.1%) all type of chickens. Furthermore, investigations under controlled conditions of such plant products and treatments are looked-for tested on the efficacy rates and veterinary properties.

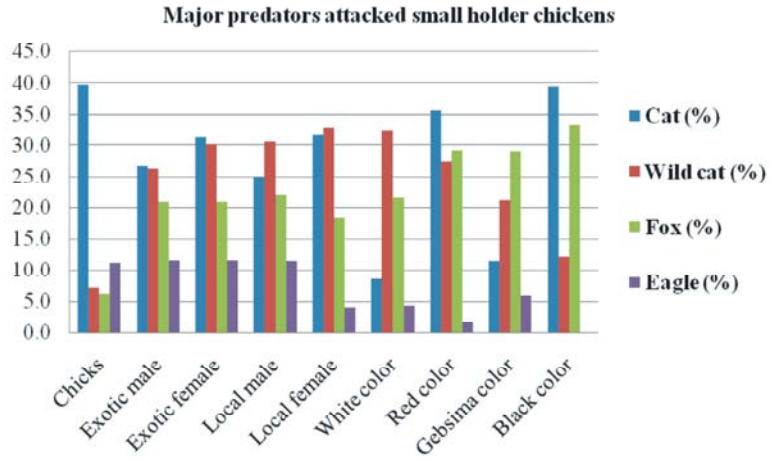


Fig. 4: Major predators that attacked small holders farmers chickens

Table 6: Average number of chickens attacked by predators in Wondogenet and Shebedino Woredas

| | Wondogenet (n=41) | | Shebedino (n=79) | | Total (N=120) | | |
|---|---|---|---|---|---|---|---|
| Attacked chicken type | % | Mean±SE | % | Mean±SE | % | Mean±SE | Sign |
| Exotic chicken | 38.3 | 7.72±1.76 | 61.7 | 2.62±0.24 | 100.0 | 4.57±0.77 | ** |
| Local chicken | 28.3 | 7.0±0.50 | 71.7 | 4.64±0.19 | 100.0 | 5.31±0.22 | ** |
| White color | 33.6 | 1.82±0.63 | 66.4 | 1.66±0.15 | 100.0 | 1.71±0.23 | ns |
| Red color | 34.2 | 1.9±0.40 | 65.8 | 0.89±0.09 | 100.0 | 1.23±0.16 | ** |
| *Gebsima* color | 33.6 | 0.70±0.29 | 66.4 | 0.97±0.12 | 100.0 | 0.88±0.12 | ns |
| Black color | 33.6 | 0.13±0.08 | 66.4 | 0.65±0.10 | 100.0 | 0.47±0.08 | ** |

Table 7: Predator control methods.

| | Control methods | | | | | |
|---|---|---|---|---|---|---|
| Chicken types | Constructing house (%) | Keeping in to house (%) | Looking for them (%) | Using trap (%) | Rearing dog (%) | Fencing (%) |
| Chicks | 27.8 | 20.6 | 20.7 | 1.0 | 8.4 | 7.2 |
| Exotic male | 11.6 | 20.9 | 22.0 | 9.3 | 23.3 | 4.6 |
| Exotic female | 11.6 | 25.6 | 21.0 | 9.4 | 18.6 | 9.3 |
| Local male | 29.5 | 15.2 | 16.3 | 9.6 | 12.5 | 4.8 |
| Local female | 27.9 | 19.2 | 20.1 | 8.7 | 11.6 | 7.6 |
| White color | 26.4 | 26.4 | 9.8 | 13.9 | 16.7 | 5.8 |
| Red color | 20.4 | 29.7 | 9.4 | 14.1 | 17.2 | 4.8 |
| Gebsima color | 18.9 | 24.6 | 11.4 | 17.0 | 18.9 | 5.7 |
| Black color | 29.4 | 35.3 | 8.8 | 8.8 | 11.7 | 5.9 |

Medical Services Get from Veterinary Clinic: Veterinary service was not accessible for most small holder farmers of the developing world. Only (14.3%) of respondent farmers reported to get veterinary services like vaccination, whereas (18.5%) of respondent farmers reported to get drugs. About 21.8% of the respondent was not getting any veterinary services.

**Chickens Attacked by Predators:** The average number of chicken attacked by predators are presented in Table 6. Significantly higher (P<0.01) number of exotic and local chicken were attacked by predators in Wondogenet Woreda than Shebedino. There is no significant difference (P>0.05) among white and `*gebsima*` color chicken that attacked by predators between the two Woredas.

**Major Types of Predator Attacked Chicken:** Small holder farmers were faced a problem of predator attacked. Major predators that attacked small holder chicken reported by farmers were Cat, Wild cat, Fox and Eagle. About (39.6%) of respondents` farmer chicks were attacked largely by Cat. Types of chicken that attacked by Wild cat were local female (32.8%) and that of white color chicken (32.5%).

Table 8: Seasonal disease occurrence and predator challenges of small holder poultry producer

| | Severity of the constraints | | | | |
|---|---|---|---|---|---|
| Constraint at different seasons | No | Very high | High | To some extent | Little |
| Disease outbreak | | | | | |
| Short-rainy season | 0 | 27.5 | 27.5 | 24.2 | 20.8 |
| Short-dry season | 0 | 5.9 | 50.4 | 34.5 | 9.2 |
| Long-rainy season | 0 | 54.6 | 7.6 | 34.5 | 3.3 |
| Long-dry season | 3.4 | 10.9 | 16 | 16 | 53.8 |
| Predator attack | | | | | |
| Short-rainy season | 2.6 | 3.4 | 19.7 | 46.2 | 28.2 |
| Short-dry season | 3.4 | 12 | 30.8 | 34.2 | 19.7 |
| Long-rainy season | 2.5 | 55.1 | 15.3 | 16.9 | 10.2 |
| Long-dry season | 8.5 | 15.4 | 23.1 | 29.1 | 23.9 |
| Chick mortality | | | | | |
| Short-rainy season | 1.8 | 4.4 | 36.3 | 28.3 | 29.2 |
| Short-dry season | 0.9 | 9.7 | 34.5 | 46.9 | 8 |
| Long-rainy season | 0.9 | 77.9 | 10.6 | 6.2 | 4.4 |
| Long-dry season | 9.7 | 3.5 | 10.6 | 31.9 | 44.2 |
| Poor hatchability | | | | | |
| Short-rainy season | 14.7 | 19.8 | 18.1 | 37.9 | 9.5 |
| Short-dry season | 15.5 | 2.6 | 51.7 | 22.4 | 7.8 |
| Long-rainy season | 5.2 | 65.5 | 10.3 | 14.4 | 4.3 |
| Long-dry season | 7.8 | 6.9 | 9.5 | 11.2 | 64.7 |

Fox were largely attacked black color (33.3%), red color (29.1%) and `*Gebsima*` color (28.9%). Eagle was attacked mostly chicks (11.2%), exotic chicken (11.6%) and local male (11.4%).

**Predator Control Methods:** Small holder farmers were practiced various types of predator control methods. Predators that attacked chicks were controlled by house construction (27.8%), share with family house (20.6%) and looking for them (20.7%). Exotic female were also largely controlled by share with family house (25.6%) and by looking for them (21.0%). Similarly, local females were controlled by constructing house (27.9%), share with family house (19.2%) and looking for them (20.1%).

**Seasonal Disease and Predator Challenges of Small Holder Poultry Producer:** Small holder poultry producer farmers were faced constraints at different seasons of the year. During long rainy season, among the respondent farmers of (54.6%), (55.1%) and (77.9%) were challenged by very high disease outbreak, predator attacked and chick mortality, respectively. During this season, hatchability was also very poor (65.5% of respondents). Similarly, Sambo [16] indicated the adverse effects of seasonal variation that faced scavenging chicken, in which early morning dew (observed throughout the wet season) was believed the most important risk factor for disease occurrence. On the other hand, some farmers simply identified the wet season as increasing risk.

## CONCLUSION

The challenges that small holder poultry producers faced were disease, predator attack and seasonal variations. Disease problem was the major one. Family poultry are largely owned and managed by most of resource-poor farmers. EVM is important for protecting and curing the health of family poultry because it is cheap, readily available and cost effective. Implement interventions, aiming at improving poultry health and ethnoveterinary practices like herbal medicine might enhance productivity and reduce losses of family poultry. Evaluation under controlled conditions of such plant products and treatments are looked-for and tested on the efficacy rates and veterinary properties. Indeed a further studies need to be conducted on validation and certification of those best curing EVM practices. Effort needs to be done in the discovery, documentation and validation of local ethnoveterinary practices of family poultry.

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