

Assessing Biosecurity of Small Scale Dairy Farms in Sebeta Town in Controlling Foot and Mouth Disease

Gzaw D*¹ Negessu D¹ Abebe A¹ and Oljera E²

¹Animal Health Institute, Ethiopia

²Sebeta Hawas Agricultural veterinary clinic, Ethiopia

*Corresponding author: Daniel Gizaw, Animal Health Institute, Senbeta, Ethiopia; Email: nebiyudan@gmail.com

Received Date: January 11, 2025; Published Date: January 31, 2025

Abstract

The evaluation of biosecurity measures is crucial for disease control and prevention. A study found very low overall biosecurity practices compared to the global average. The study aims to address the limited availability of reliable information on the biosecurity status of small-scale farms in Sebeta Town. The study was a cross-sectional survey that involved gathering information from dairy farms established in Sebeta Town from October 2023 to December 2023. The overall percentage of the biosecurity score of Sebeta has varied from 10 to 60%. Out of 22 dairy farms, three farms gained a percentage score of greater than or equal to 50% (ranging from 51.1 to 55.6%), thus their biosecurity status was evaluated as "Good". The remaining 19 farms attained a percentage score lower than 50% (varying from 10 to 48.9%) and therefore graded as "Poor". This information can be used to develop targeted interventions and preventive measures to improve biosecurity and reduce the risk of diseases in the dairy farming sector. It is used to enhance vaccination programs, implement proper isolation and treatment protocols for sick animals, ensure proper disposal of dead animals, improve disease monitoring and reporting, and promote cleaning and sanitizing practices are key recommendations to strengthen biosecurity measures and minimize disease transmission on dairy farms.

Keywords: Farm Biosecurity; Sebeta; Small-Scale Farms; FMD

Abbreviations

FMD: Foot and Mouth Disease; AHI: Animal Health Institute.

Introduction

The burden of infectious diseases poses a significant threat to the livelihood security of smallholder farmers in low-income countries, who are disproportionately reliant on cattle for substance, income, and overall well-being.

The mortality and morbidity of livestock due to disease outbreaks can have a direct and debilitating impact on the income and food security of farmers [1]. Furthermore, the diminished productivity that results from disease, including reduced milk yields and weight gain, can have long-term consequences for the economic viability of these agricultural enterprises. The limited accessibility of veterinary services in these regions exacerbates the problem, hindering the prevention, detection, and treatment of disease, and thereby amplifying the negative consequences for the farmers [2].

The risks associated with infectious diseases hinder the farmers' ability to diversify their livelihoods, perpetuating their dependency on cattle and exacerbating their vulnerability. Outbreaks of these diseases have a detrimental impact on both the farmers and the informal value chain actors involved in the cattle industry [1,3,4]. Implementing biosecurity measures and adopting efficient management practices on-farm can safeguard animals against both endemic and epidemic diseases [1]. Farmers can enhance livestock health by prioritizing biosecurity, which encompasses bio-exclusion to prevent disease introduction and bio-containment to limit disease spread within the farm [5]. Biosecurity consists of key components such as isolation, sanitation, and traffic control, which encompass segregation, cleaning, and disinfection [5]. FAO/OIE/WB [6] further described biosecurity as livestock quarantine, hygiene for people, equipment, and vehicles, ensuring food and water safety, managing animal health, surveillance, and reporting, as well as promoting public awareness. Controlling movement of people, vehicles and equipment in a place where animals are kept are basic biosecurity measures which reduce spread of disease through contaminated vehicles, clothing, footwear and equipment [5]. Diseases can also be spread by other means, such as wildlife, air or other vectors. So biosecurity is a cornerstone of herd health maintenance. In dairy farms, biosecurity, surveillance, resilience/immunity, biocontainment, and control of disease spread within the herd are the pillars that need to be appropriately managed to ensure the health of herd [5].

To control FMD different tools can be employed such as surveillance; vaccinations; public awareness; and enhanced biosecurity through quarantine, reduced mixing of different cohorts, improved hygiene and sanitation practices, particularly with animal examination and treatments plus handling of potentially contaminated food [6,7]. There was a notable variation in biosecurity practices among farmers, with some adhering to stringent protocols and others demonstrating laxity. Only around 40% provide protective clothing for visitors, and half introduce new animals without prior isolation [4]. Infectious diseases plays an important role in cattle profitability [1]. Livestock production, disease occurrence and awareness differ between countries, it is likely that biosecurity also differs between countries. Understanding biosecurity routines in different regions and populations is crucial for disease control [4]. Biosecurity level in developed country was also better than in limited-resource countries [2]. A higher level of biosecurity was reported by larger farms compared to hobby farms or small-scale farmers [4].

There were few studies on biosecurity in small-scale dairy farms in Ethiopia. Biosecurity assessment in central cattle feedlots in Ethiopia [8] and in small-scale commercial poultry

farms [9] in and around Mekelle and by Yitbarek, et al. [10] in Debre Markos in poultry farm and in Bishoftu by Ismael, et al. [11]. These studies reported a poor implementation of biosecurity measures by the farmers, along with the different constraints and challenges expressed by the farmers such as cost, usefulness, importance, workload and lack of clarity and knowledge. biosecurity score varied from 27.2 to 60% in dairy farms in Ethiopia [12]. Very low biosecurity measures were reported by (Alemayehu [8] in export-oriented feedlots in Ethiopia. Various routes such as live-infected animals, trucks and other vehicles, people, aerosols, fomites, or wildlife or insect vectors were sources of infectious agents [6]. By combining these approaches, farmers can significantly reduce the risk of disease outbreaks, protect their livestock, and promote sustainable farming practices in the application of biosecurity.

Maintaining effective biosecurity measures is of utmost importance in small-scale dairy farms to prevent disease transmission and uphold the productivity of dairy animals. However, several challenges hinder the implementation of proper biosecurity protocols in these farms, including a lack of adequate training, insufficient farm design or facilities, and a lack of standardized biosecurity measures. Collecting and analyzing data on biosecurity levels in small-scale dairy farms can provide valuable insights for conducting future assessments of animal disease risks [2]. The objective of this study is to assess the on-farm biosecurity routines implemented in dairy farms located in Sebeta Town, South west Ethiopia through a systematic investigation and evaluating the current biosecurity practices employed by dairy farmers in Sebeta Town.

Materials and Methods

Study Area

The assessment of on-farm biosecurity was conducted in Sebeta Town, which is located in the South West Shoa zone of central Ethiopia (Figure 1). The selection of farms for the study was based on the criterion of having crossbred dairy farms that were enclosed. This study focused on collecting information about on-farm biosecurity practices through the use of a questionnaire.

The study was a cross-sectional survey that involved gathering information from dairy farms established in Sebeta Town from October 2023 to December 2023. Dairy farms were identified using the official registry of dairy farms obtained from the Agricultural offices and located with the help of local veterinary professionals until all farms were included. Those farms that have more than two dairy cows were included. Among dairy farm owners 22 farm owners were requested to participate in the study and the required

information was gathered after obtaining their verbal and informed consent. These farmers who were willing to assess their farms against standard questionnaires of biosecurity were interviewed. The structured questionnaire was administered to dairy farm owners or attendants to gather

information about on-farm biosecurity practices. After identifying the sample farms, face-to-face interviews were conducted with the farmers or farm managers as part of the data collection process. This involved personally visiting each selected farm.

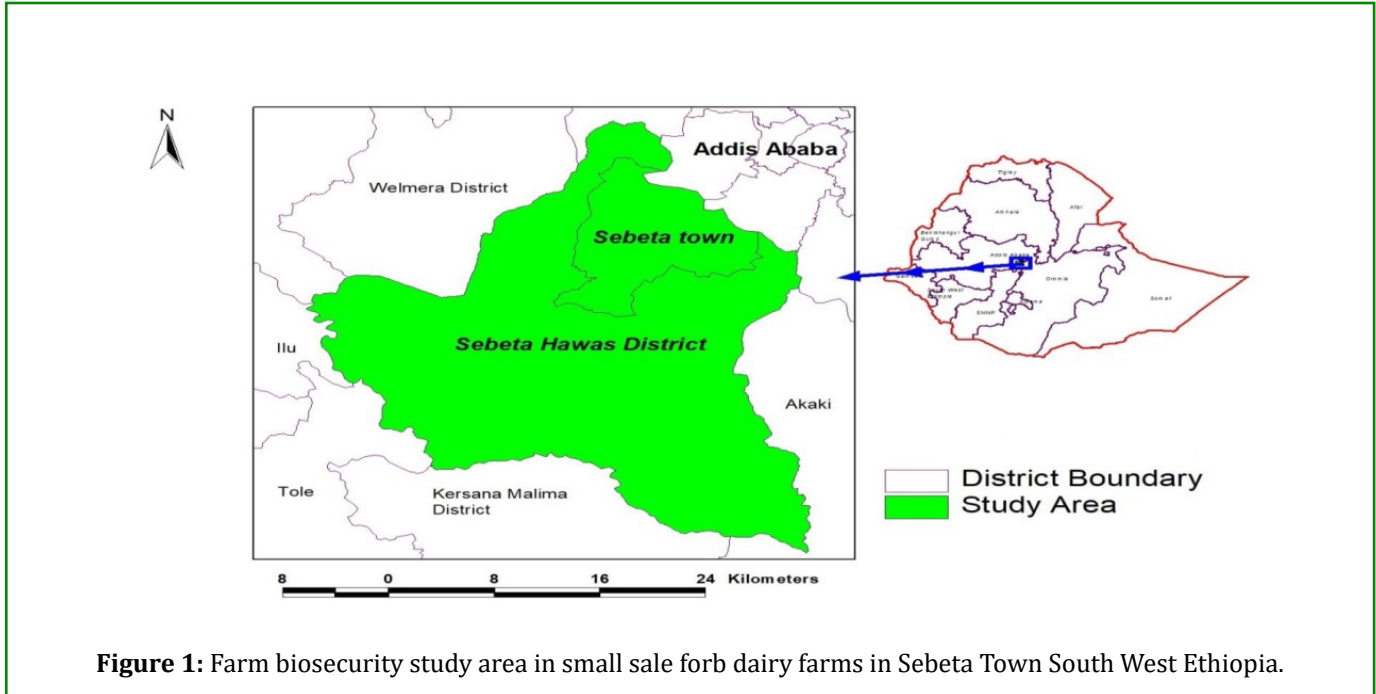


Figure 1: Farm biosecurity study area in small sale forb dairy farms in Sebeta Town South West Ethiopia.

Please remember the following information

It involves determining whether biosecurity measures such as livestock quarantine, animal movements, people, equipment and vehicle hygiene, feed and water safety, animal health management, surveillance and reporting, and public awareness were implemented. Understanding cattle diseases, especially foot and mouth disease (FMD).

Data Analysis: The data collected through the questionnaire responses and on-site assessments were compiled and analysed using descriptive statistics such as farm respondents, where the farmers were given more than two response alternatives, and the responses were dichotomised into one group representing 'higher biosecurity' and another representing 'lower biosecurity'. Based on the questionnaire score earned by each farm it changed to percentage and if it is above or equal to 50% a farm was said to have "Good biosecurity" and below 50% as "Poor biosecurity" [2,4].

Ethical Clearance

The owners or managers of each farm were informed about the aim of the study, and verbal and informed consent was obtained from each respondent. Participation in a study was voluntary, and respondents were free to withdraw from the study at any time. The interview was anonymous, and data

remained confidential throughout the study.

Result

A small-scale dairy farm in Sebeta Town was assessed against the main principles of biosecurity measures accordingly 22 farms were included in the assessment. Based on the questionnaire response the level of on-farm biosecurity varied considerably between farms. The results were summarized and presented in (Table 1). 8 farms reported introducing new animals into their farms directly (36.4%). Only 27.3% (6 out of 22) farms responded by practising the isolation or quarantine of new animals before adding them to their farm. 7 farms reported isolating sick animals from the herd, representing 31.8% of the farms. Only 31.82% (7 out of 22) farms assess the health of incoming animals. There were 27.3 % (6 out of 22) farmers tracking animal movements onto and off the farm.

All the farmers responded no animals were reintroduced into the farm since selling carried on the farm. No farmers tested their animals for specific diseases regularly unless tested by the researcher for another purpose on their own. No farmers interviewed had a biosecurity plan in place, indicating a high risk for disease transmission. A low percentage of farms reported practicing the isolation/quarantine of new animals, and isolation of sick animals.

Question for Biosecurity	A Number of Farms Responded		
	No of farm	NO %	Yes%
Frequency of new animal introduction into the farm	22	14 (63.6)	8(36.4)
Isolating/quarantining new animals on arrival at the farm	22	16(72.7)	6(27.3)
Isolating sick animals from a herd	22	15(68.2)	7(31.8)
Have protocol for controlling animal movements onto and off the farm	22	17(77.3)	5(22.7)
Frequency of selling or giving away of animals out of the farm	22	12(54.5)	10(45.5)
How do you ensure the health of animals entering the farm	22	15(68.2)	7(31.8)
Have a system to track animal movements onto and off-farm	22	16(72.7)	6(27.3)
How do you manage animal transport to and from the farm	22	14 (63.6)	8(36.4)
Is there reintroduction of animals after contact with other animals	22	22(100)	0(0)
Use of artificial insemination (AI)	22	10(45.5)	12(54.5)
Use bull for breeding?	22	12(54.5)	10(45.5)
Is bull borrowed/own	10	8(80)	2(20)
Health condition of the bull? Checkup/no checkup	10	8(80)	2(80)
Testing animals for specific diseases of concern	22	22(100)	0(0)
Have a biosecurity plan in place for the farm	22	21(95.5)	1(4.5)
Mean		73.1	26.9
Mean + SD		73.1±16.3	26.9±16.3

Table 1: Biosecurity question related to livestock quarantine and animal movement in small-scale dairy farms of Sebeta Haws, Southwest Shoa.

Control of Movement of People, Equipment and Vehicle

The biosecurity practices related to people, equipment, and vehicle hygiene in farms were described in (Table 2). Majority of farms (72.7%) had implemented a controlled access zone for people, equipment, and vehicles entering the farm. This includes fencing the farm and avoiding some visitors. Only (9.1%) reported that veterinarians and artificial inseminators used farm-specific boots. No farm obtained regular training on biosecurity measures and protocols. No farm had systems in place for ongoing education and communication about biosecurity practices.

All the farms (100%) had implemented entry restrictions to control visitors using fences however, there was usually incidental entry. No farm maintained a proper record or system for recording visitors, vehicles, and deliveries entering the farm. Access control 10 (45.5%) and cloth changing 16 (72.7%) were practised as preventive measures. No farm used disinfectant and Quarantine as biosecurity measures.

The design of building facilities with biosecurity principles varies. The majority of farms have wood-type facilities

17(77.3%), followed by wire mesh facilities 3 (13.6%). This suggests a mix of construction materials used without considering biosecurity requirements.

Only a small percentage of farms 7(31.8%) reported having a restricted access zone for equipment and vehicles entering the farm. The majority of farms (90.9%) reported relying on veterinary care for their animals, while a smaller portion 2 (9.1%) provide health care using their resources. This highlights the importance of professional veterinary services in ensuring animal well-being.

Quality Check of Stock Feed and Water

No farm conducted quality checks of their stock feed and water. Only 3 (13.6%) farms reported having measures in place to control pests and wildlife that can transmit diseases.

There were 5 (22.7%) farms reported that their feed storage areas were protected from pests and wildlife. This indicates the importance of safeguarding feed storage areas to prevent contamination and preserve feed quality described in Table 3.

Question For Biosecurity on People, Equipment and Vehicle Hygiene	A Number of Farm Responded		
	No of Farms	No (%)	Yes (%)
Have a controlled access zone for people, equipment and vehicles entering a farm	22	6 (27.3)	16(72.7)
If control access to your farm? Which one (e.g., visitor policy, signage)	22	5(22.7)	17(77.3)
On a farm, do veterinarians use farm-specific boots?	22	20(90.9)	2(9.1)
Does the artificial insemination technician come to the farm?	22	6 (27.3)	16(72.7)
Regularly training on biosecurity measures and protocols?	22	17(77.3)	5(22.7)
System for ongoing education and communication about biosecurity practices?	22	22(100)	0(0)
Have a controlled access zone for people's equipment and vehicles entering the enterprise.	22	7(31.8)	15(68.2)
A logbook or system for recording visitors, vehicles, and deliveries entering the farm?	22	21(95.5)	1(4.5)
Have a dipping tank to enter into the dairy house?	22	22(100)	0(0)
Handwashing facilities and easily accessible for workers and visitors?	22	19(86.4)	3(13.6)
Training on proper hygiene practices, including handwashing and wearing appropriate protective clothing?	22	22(100)	0(0)
Are building facilities designed to apply biosecurity principles?	22	13(59.1)	9(40.9)
What type of separation exist?	22	20(90.9)	2(9.1)
Brick type		19(86.4)	3(13.6)
Wire mesh		5(22.7)	17(77.3)
Wood type			
Restricted access zone equipment and vehicles entering enterprise?	22	15(68.2)	7(31.8)
Health care for your animals?	22	20(90.9)	2(9.1)
Own		2 (9.1)	20(90.9)
Vet			
How to prevent contamination on farm?	22	12(54.5)	10(45.5)
Access control		22(100)	0(0)
Disinfection		22(100)	0(0)
Quarantine		6(27.3)	16(72.7)
Cloth changing		18(86.4)	4(13.6)
Nothing			
How do you control visitor to your farm?	22	22(100)	0(0)
Entry restriction		0(0)	22(100)
Taking some measure			
Mean		51.9	32.7
Mean \pm SD		51.9 \pm 39.3	32.7 \pm 34.2

Table 2: Biosecurity on the movement of people, equipment and vehicle hygiene in small-scale dairy farms of Sebeta Haws Southwest Shoa.

Question on Feed and Water Safety	Farms Responded		
	No Farms	No (%)	Yes (%)
Have you ever done a quality check of stock feed?	22	22(100)	0(0)
Have you ever done a quality check of your water?)	22	22(100)	0(0)
Are measures in place to control pests and wildlife that can transmit diseases?	22	19(86.40)	3(13.6)
Are feed storage areas protected from pests and wildlife?	22	17(77.3)	5(22.7)

Table 3: Biosecurity on feed and water safety in small-scale dairy farms of Sebeta Haws Southwest Shoa.

Biosecurity Measures Related to Animal Health Management, Surveillance

The majority of farms 17 (77.3%) reported not having vaccination programs for Foot-and-Mouth Disease (FMD). FMD is a highly contagious viral disease that affects cloven-hoofed animals. Vaccination is an essential preventive measure to reduce the risk of FMD outbreaks and mitigate its impact on animal health and trade. The low percentage of farms implementing vaccination programs suggests a potential gap in disease prevention strategies. About half of the surveyed farms 12 (54.5%) reported that sick or diseased animals are isolated and treated promptly. A significant portion of farms 10 (45.5%) did not have proper isolation

and treatment protocols in place, which increased the risk of disease transmission within the herd. The majority of farms 12 (54.5%) reported disposing of dead animals properly to prevent disease spread. Less than half of the surveyed farms 15 (68.2%) immediately reported outbreaks of FMD to nearby animal health offices. Almost all (90.9%) of farms reported cleaning cow stalls frequently enough to prevent manure contamination of udders. Similarly, disinfecting pens that have housed sick cattle between each cases was reported by 9(40.9%) of farms. While 3(13.6%) of farms reported providing training on biosecurity to farmers, traders, and agency staff, a significant proportion of 19 (86.4%) indicated the absence of such training (Table 4).

Questions On Animal Management, Surveillance and Reporting	Number of Farms Responded		
	No. farm	No (%)	Yes (%)
Have vaccination programs for FMD.	22	17(77.3)	5(22.7)
Are sick or diseased animals isolated and treated promptly?	22	10(45.5)	12(54.5)
Are dead animals disposed of properly to prevent disease spread?	22	10(45.5)	12(54.5)
Regularly monitor for diseases like (FMD)?	22	15(68.2)	7(31.8)
Immediately reporting outbreaks (FMD)?	22	7(31.8)	15(68.2)
Are cow stalls cleaned frequently enough to prevent manure contamination of udders?	22	1(4.5)	21(95.5)
Disinfect pens that have housed sick cattle between each case.	22	13(59.1)	9(40.9)
Have a designated area for housing sick cattle?	22	14(63.6)	8(36.4)
Clean and sanitize the calving pen after each use.	22	0(0)	22(100)
Are dead animals removed hygienic way?	22	17(77.3)	5(22.7)
Have you ever given training on biosecurity farmers, traders, and agency staff?	22	19(86.4)	3(13.6)
Are you aware that some animal diseases can also infect humans?	22	8(36.4)	14(63.6)
Do you know FMD clinical sign?	22	5(22.7)	17(77.3)
Do you know that the FMD is contagious?	22	5(22.7)	17(77.3)
Is there a health checkup for animals on your farm?	22	19(86.4)	3(13.6)
Is there a health checkup for persons working on the farm?	22	21(95.5)	1(4.5)

Table 4: Biosecurity on animal health management, surveillance and reporting in small-scale dairy farms of Sebeta Haws Southwest Shoa.

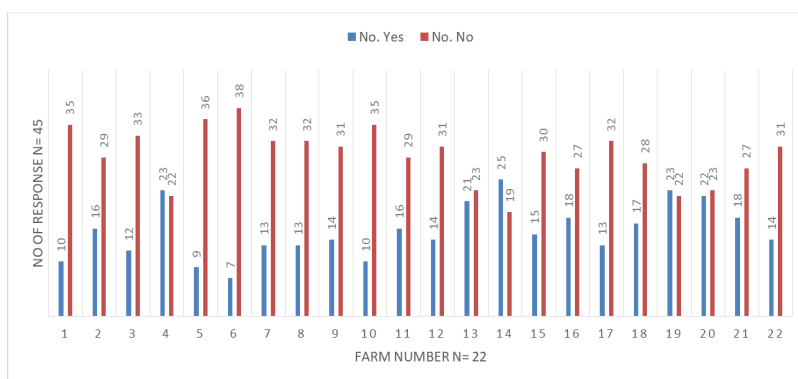


Figure 2: Farmers' response against 45 biosecurity standards in small-scale dairy farms of Sebeta Haws Southwest Shoa.

Farm ID	Biosecurity Score	Yes%	Biosecurity level
1	10	22.2	Poor
2	16	35.6	Poor
3	12	26.7	Poor
4	23	51.1	Good
5	9	20	Poor
6	7	15.6	Poor
7	13	28.9	Poor
8	13	28.9	Poor
9	14	31.1	Poor
10	10	22.2	Poor
11	16	35.6	Poor
12	14	31.1	Poor
13	21	46.7	Poor
14	25	55.6	Good
15	15	33.3	Poor
16	18	40	Poor
17	13	28.9	Poor
18	17	37.8	Poor
19	23	51.1	Good
20	22	48.9	Poor
21	18	40	Poor
22	14	31.1	Poor

Table 5: Biosecurity score, percentage and level implemented in small-scale dairy farms of Sebeta Haws Southwest Shoa.

Discussion

A total of 22 Small-scale dairy farms in Sebeta Town, Southwest Shoa, were assessed against basic principles of biosecurity principle. The overall percentage of the biosecurity score of Sebeta has varied from 10 to 60%. Out of 22 dairy farms, three farms gained a percentage score of greater than or equal to 50% (ranging from 51.1 to 55.6%), thus their biosecurity status was evaluated as "Good". The remaining 19 farms attained a percentage score lower than 50% (varying from 10 to 48.9%) and therefore graded as "Poor". A low biosecurity score of 27.2% was reported in dairy cows in Ethiopia [12]. Out of the total number of farms that responded, 36.4% of farms reported introducing new animals into their farms. Only 27.3% of farms isolated or quarantined new animals after adding to the farm. This may impose a high risk of transmission of infectious diseases like FMD. The introduction of new cattle poses a risk of entering disease into a herd. A similar study indicates that 50% of farmers buying live animals introduced these directly into the herd without prior isolation [4]. In a similar study in

Uganda, 79% of farms introduce new cattle directly into the herd [3].

In our study, only 31.8% of farms isolated sick animals from the herd. A similar proportion also assesses the health of incoming animals. There were 27.3 % (6 out of 22) farmers tracking animal movements onto and off the farm. All the farmers responded that no animals were reintroduced into the farm since selling carried on the farm. No farmers tested their animals for specific diseases regularly unless tested by a researcher or for other purposes. No farmers interviewed had a biosecurity plan in place which indicated a high risk for disease transmission. Furthermore, a low percentage of farms reported practicing the isolation/quarantine of new animals, and isolation of sick animals, which might expose the animals to contagious diseases. The introduction of new cattle is one of the most important biosecurity risks for dairy farms [13], keeping a closed herd is the most effective biosecurity measure. On the other hand, low biosecurity practices in a feedlot in Ethiopia were reported [8]. The introduction of new cattle through purchase is the most cited risk factor for the introduction of disease pathogens in a herd.

The majority of farms (72.7%) had implemented a controlled access zone for people, equipment, and vehicles entering the farm. Almost all the farms had implemented entry restrictions to control visitors using fences however, there was usually incidental entry. This includes fencing the farm and avoiding some visitors. Only (9.1%) reported that veterinarians use farm-specific boots which is also true for artificial insemination technicians who came to the farm. No regular training on biosecurity measures and protocols was obtained. Stalian reported that regular training was a good practice for preventing the spread of disease in their study. No farm had systems in place for ongoing education and communication about biosecurity practices. This may involve visitor policies, signage, or other measures to ensure that only authorized individuals access the farm premises. No farm maintains a proper record or a logbook or system for recording visitors, vehicles, and deliveries entering the farm. Access control 10 (45.5%) and cloth changing 16 (72.7%) were practised as preventive measures. Less than 40% of the farmers reported that they provide protective clothing for visitors [5]. No farm used disinfectant and Quarantine as biosecurity measures which would have been effective against an infectious agent. A similar study indicates the use of disinfectant was found very poor where only 40% of the farms [4]. The design of building facilities with biosecurity principles varies. The majority of farms have wood-type facilities 17(77.3%), followed by wire mesh facilities 3 (13.6%). This suggests a mix of construction materials used while considering biosecurity requirements. Only a small percentage of farms 7(31.8%) reported having a restricted access zone for equipment and vehicles entering

the enterprise. The majority of farms (90.9%) reported relying on veterinary care for their animals, while a smaller portion 2 (9.1%) provide health care using their resources. This highlights the importance of professional veterinary services in ensuring animal well-being.

No farm conducted quality checks of their stock feed and water. This feed and water provided to animals meets appropriate standards in terms of nutritional value, and absence of contaminants. Regular quality checks help prevent the introduction of harmful substances into the animal's diet, which can have negative health effects and potentially compromise biosecurity. Ensuring the safety and cleanliness of water is crucial for the health of farm animals, as waterborne pathogens can cause diseases and impact productivity. Only 3 (13.6%) farms reported having measures in place to control pests and wildlife that can transmit diseases. Pests and wildlife can introduce pathogens into the farm environment, posing a risk to animal health. Implementing measures such as pest control programs, fencing, and deterrents helps minimize the presence of disease-carrying pests and wildlife, reducing the likelihood of disease transmission. There were 5 (22.7%) farms reported that their feed storage areas were protected from pests and wildlife. This indicates the importance of safeguarding feed storage areas to prevent contamination and preserve feed quality. Effective measures such as secure storage structures, appropriate hygiene practices, and pest control strategies contribute to maintaining the integrity of stored feed and minimizing the risk of disease introduction. These practices contribute to minimizing the risk of disease outbreaks, promoting animal well-being, and preserving the overall biosecurity of the farm.

The majority of farms 17 (77.3%) reported not having vaccination programs for Foot-and-Mouth Disease (FMD). FMD is a highly contagious viral disease that affects cloven-hoofed animals. Vaccination is an essential preventive measure to reduce the risk of FMD outbreaks and mitigate its impact on animal health and trade. The PCP for FMD encourages enhanced biosecurity through control of animal and product movements by quarantine, reduced mixing of different cohorts, improved hygiene and sanitation practices, particularly with animal examination and Windsor [7].

The low percentage of farms implementing vaccination programs suggests a potential gap in disease prevention strategies. About half of the surveyed farms 12 (54.5%) reported that sick or diseased animals are isolated and treated promptly. A significant portion of farms 10 (45.5%) do not have proper isolation and treatment protocols in place, which can increase the risk of disease transmission within the herd. The majority of farms 12 (54.5%) reported disposing of dead animals properly to prevent disease

spread. More than half of the surveyed farms 15 (68.2%) immediately reported outbreaks of FMD to nearby animal health offices. Unlike other studies reported only 16% (Alemayehu and Leta 2014). Almost all (90.9%) of farms reported cleaning cow stalls frequently enough to prevent manure contamination of udders. Similarly, disinfecting pens that have housed sick cattle between each cases was reported by 9(40.9%) of farms. While 3(13.6%) of farms reported providing training on biosecurity to farmers, traders, and agency staff, a significant proportion of 19 (86.4%) indicated the absence of such training. Enhancing vaccination programs, implementing proper isolation and treatment protocols for sick animals, ensuring proper disposal of dead animals, improving disease monitoring and reporting, and promoting cleaning and sanitizing practices can contribute to stronger biosecurity measures and better disease prevention and control on farms.

Conclusion

The implementation of basic biosecurity principles in small-scale dairy farms in Sebeta Town was found to be very low based on the study findings. However, improving biosecurity practices in these farms is crucial to effectively prevent the transmission of infectious diseases among dairy animals. To enhance biosecurity and strengthen disease prevention and control on farms, the following recommendations can be considered: improving the implementation of basic biosecurity principles in small-scale dairy farms in Sebeta Town which will be effective for disease prevention and control. Enhancing vaccination programs, implementing proper isolation and treatment protocols for sick animals, ensuring proper disposal of dead animals, improving disease monitoring and reporting, and promoting cleaning and sanitizing practices are key recommendations to strengthen biosecurity measures and minimize disease transmission on dairy farms.

Acknowledgement

We are very much grateful to the Animal Health Institute (AHI) support of this study. We extend our gratitude to the farm owners who positively participate on interviewing during data collection. We want to express our gratitude to the district veterinary professionals for their tremendous support data collection. We also want to thank the livestock owners for permitting us to sample their animals.

Reference

1. Bert B, Véronique R, Steven S, Anna CB, et al. (2020) A Risk-Based Scoring System to Quantify Biosecurity in Cattle Production. Preventive Veterinary Medicine 179: 104992.

2. Sahlstrom, Leena, Terhi V, Jonna K, Tapani L (2014) Biosecurity on Finnish Cattle, Pig and Sheep Farms-Results from a Questionnaire. *Preventive Veterinary Medicine* 117(1): 59-67.
3. Wolff CS, Boqvist K, Stahl C, Masembe, Sternberg LS (2017) Biosecurity Aspects of Cattle Production in Western Uganda, and Associations with Seroprevalence of Brucellosis, Salmonellosis and Bovine Viral Diarrhoea. *BMC Veterinary Research* 13(1): 382.
4. Nöremark MJ, Frossling SS, Lewerin (2010) Application of Routines That Contribute to On-Farm Biosecurity as Reported by Swedish Livestock Farmers. *Transboundary and Emerging Diseases* 57(4).
5. Wu, Xiangju, Lei C, Chao S, Yue H, et al. (2023) Biosecurity and Water, Sanitation, and Hygiene (WASH) Interventions in Animal Agricultural Settings for Reducing Infection Burden, Antibiotic Use, and Antibiotic Resistance: A One Health Systematic Review. *Virologica Sinica* 38(3): 459-469.
6. FAO/OIE/WB (2010) Good Practices for Biosecurity in the Pig Sector-Issues and Options in Developing and Transition Countries. *FAO Animal Production and Health*, pp: 169.
7. Peter WA (2017) How To Implement Farm Biosecurity : The Role of Government and Private Sector. *OIE Regional Commision*, pp: 1-19.
8. Alemayehu, Gezahegn, Samson L (2014) Biosecurity Practices in Central Ethiopian Cattle Feedlots: Its Implication for Live Cattle Export. *International Journal of Livestock Production* 5(11): 181-87.
9. Tadesse B (2014) Prevalence of the Major Infectious Animal Diseases Affecting Livestock Trade Industry in Ethiopia. *Journal of Biology, Agriculture and Healthcare*.
10. Yitbarek MB, Mersso BT, Wosen AM (2016) Disease Management and Biosecurity Measures of Small-Scale Commercial Poultry Farms in and around Debre Markos, Amhara Region, Ethiopia. *Journal of Veterinary Medicine and Animal Health*.
11. Abdulbari I, Adem A, Shihun S, Asamenew T, et al. (2021) Assessment of Biosecurity Status in Commercial Chicken Farms Found in Bishoftu Town, Oromia Regional State. Francesca M (Ed.), *Veterinary Medicine International, Ethiopia*, pp: 1-9.
12. Mohammedsham H, Shihun S, Bamlaku A, Michael YA, et al. (2022) Assessment of Biosecurity Status in Dairy Cow Farms. *Bulletin of the National Research Centre* 46(1): 152.
13. Baraitareanu S (2020) Dairy Farms Biosecurity to Protect against Infectious Diseases and Antibiotics Overuse.