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Adoption of biosecurity measures among the livestock farmers in Dimoria development block of Kamrup (M), Assam

[1]Saurav Dutta, [1]Lalmalsawmi Rokhum, [2]Janmoni Shyam, [2]Monosri Johari, [3]Leema Bora, [2]Sadananda Payeng, [1]Nayandeep Kalita, [1]Richamoni Deuri, [1]Polash D Boro and [1]Kukil Saikia

[1]PG Scholar, Department of Veterinary Extension Education, CVSc, AAU, Khanapara, Assam, India

[2]Assistant Professor, Department of Veterinary Extension Education, CVSc, AAU, Khanapara, Assam, India

[3]Senior Extension Specialist, Associate Directorate of Extension Education, AAU, Khanapara, Assam, India

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Corresponding Author: Saurav Dutta

Abstract

Farm biosecurity is crucial for preventing diseses and maintaining animal health. The present study was conducted to assess the biosecurity practices adopted by the livestock farmers in Dimoria development block of Kamrup (M), Assam, India, using a standardized scoring system. Three numbers of villages *viz*, Bortari, Borghuli and Keotpara were selected purposively and a total of 40 livestock farmers from each village were selected purposively making the total sample size of 120 farmers. It was observed that among the different aspects of biosecurity, 50 per cent of the respondents provided fence around the farm premises, regularly cleaned their animal sheds and farm utensils like feeders/drinkers. More than 50 per cent of the respondents vaccinated their livestock regularly, informed or contacted veterinarian /paravets during disease occurrence and death of animals, while they scored low in provision of foot dip/bath before entering farm premises, quarantine of newly purchased animals, quarantine of sick animals, deworming schedule followed for different species kept, use of disinfectant in farm, changing of clothes and slippers before entering farm premises, restrict/ prohibit entry of other visitor/vendors to farm premises, safe disposal of dead animals and manure. Noteably the farmers with higher education, high annual income tended to have adopted better biosecurity. This study highlighted the need for improvement in biosecurity measures on livestock farms inorder to enhance animal health and reduce disease risk in the region.

Keywords: Biosecurity, livestock farmers, quarantine, awareness

Introduction

Biosecurity as per WOAH (World Organisation for Animal Health) is a set of management and physical measures designed to reduce the risk of introduction, establishment and spread of animal diseases, infections or infestations to, from and within an animal population. Biosecurity measures not only prevent entry and establishment of infection but also boost the animal's immune response (Ingvartsen and Moyes, 2013) [5]. External biosecurity practices include controlling visitor and personnel movement, using personal protective equipment and decontamination procedures, limiting traffic, regulating animal and product imports, disinfecting incoming materials, and preventing contamination through feed, water, vermin, or birds. Internal biosecurity measures aim to minimize the spread of diseases within a controlled environment. Key practices include cleaning and disinfecting facilities, barn-specific personal protective equipment (PPE), managing stocking densities, following all-in-all-out procedures, and separating susceptible or diseased individuals (Owen, 2017; Dewul and van Immerseel, 2019, Huber *et al*., 2022) [8, 3, 4]. Effective implementation of both external and internal biosecurity measures in livestock farms can reduce the risk of disease transmission from infected animals, contaminated equipment, and people such as farm workers, visitors, and animal health professionals. Following biosecurity measures not only helps in prevention of diseases but it also helps in production of healthy products which are fit for human consumption and also increases the value and shelf life of the products (Naidu *et al*. 2023) [1]. Viltrop *et al*. 2022 [13] in their study on Biosecurity Levels and Farm Characteristics of African Swine Fever Outbreak and Unaffected Farms in Estonia reported factors associated with the 'outbreak' status of a herd included unsafe contacts with the outside farm environment, such as lack of fencing, lack of or poor disinfection barriers at the entrance of the farm territory for people and vehicles, poor safety procedures for changing clothes before entering the pig facility, contacts with other domestic animals, and entering of unnecessary vehicles on the territory of the farm. Absence of biosecurity practices in livestock farms can result in increase of incidences like high mortality rate, reduced profit and loss of investment.

The livestock sector contributes significantly to the livelihoods of farmers in Assam by providing income, food security and draught power for crop production, making it an integral part of the rural farming system but with growing urban populations the livestock sector is increasing both in cities and in the surrounding areas (Mohakud *et.al*,

2020) [6]. With the growing population and decreasing land holding, farming methods have become more intensive now a-days which poses significant threat of disease outbreak among animals and birds (Panda *et.al*,2024) [9]. In order to get optium output from the livestock in terms of meat, milk and egg, biosecurity measures have to be followed to prevent occurance of diseases and to maintain good health status of the herd which will ultimately prevent the economic losses occurring due to the treatment of animals suffering from disease outbreaks. Therefore, based on the above background information, the broad objective of this study was to ascertain the biosecurity measures adopted by livestock farmers in Dimoria Developmental Block of Kamrup(M), Assam.

Materials and Methods

The present study was conducted with an aim to evaluate the adoption level of biosecurity measures for disease prevention and control by livestock farmers. For the present study, 120 nos of farmers, farm women, rural youth enagaged in livestock rearing who attended the Participatory Rural Appraisal (PRA) Camp conducted by Department of Veterinary Extension Education, College of Veterinary Science, AAU, Khanapara on the month of January and February 2025 at Bortari, Borghuli and Keotpara villages under Dimoria Development Block, Kamrup (M) were selected purposively. A total of 40 livestock farmers from each village were selected purposively making the total sample size of 120 farmers. For selecting the farmers in the ultimate sample, the criterion of having a minimum experience of 10 years in livestock farming was considered. The data was collected by direct interview method with the help of semi-structured interview schedule. The collected data was analyzed using suitable statistical tools.

The socio personal and socio economic profile such as age, sex, family type, marital status, occupation, education, family size, herd size, landholding, annual income from livestock and poultry, annual income from other sources, and total annual income were assessed and considered as independent variable. For assessing the various factors affecting the overall adoption of biosecurity measures, correlation was done.

Results and Discussion

Socio-personal variables

It was observed that majority of the respondents were males (61%). All of the respondents had nuclear type of families, followed by 76.66 per cent married. This finding is in line with the study of Tasie *et al.* 2020 [11]**.** Among all the respondents most of them had only high school education (76.66%). 30.83 per cent of the respondents had undergone training on livestock farming. Large majority 71.66 per cent major occupation was agricultural farming as depicted in Table 1.

Table 1: Frequency distribution of the respondents on the basis of socio-personal variables

S.L. No.		Variables	Number of respondents
1.	Sex	Male	65(54.16)
		Female	55(45.84)
2.	Family type	Nuclear	120(100)
		Joint	0(0.00)
3.	Marital status	Married	92(76.66)
		Unmarried	22(18.34)
		Widow	6(5.00)
4.	Education	Illiterate	9(7.50)
		High school	92(76.66)
		Higher secondary	3(2.50)
		B.A.	16(13.34)
5.	Training	Yes	37(30.83)
		No	83(69.17)
6.	Occupation	Agricultural Farming	86(71.66)
		Government service	9(7.50)
		Housewife	19(15.83)
		Poshusakhi	6(5.00)

Figures in parenthesis indicates percentage

Socio-economic variable

In perusal of table 2, Majority (65.00%) of the respondents were in the medium age group followed by equal numbers (17.50%) of respondents in low and high group and and their mean was 40.83 with a standard deviation of ±10.93. Large majority (76.66%) had medium level of education followed by 73.33 per cent respodents having medium size family type. Majority (73.33%) had medium herd size. 80 per cent of the respondents had medium land holding with a mean value of 5.21 and a standard deviation of ±5.39. Majority (87.50%) had medium annual income from livestock and poultry farming. Among annual income from other sources, majority (75.00%) had medium income ranging from Rs 2,000-2,50,000 with a mean value of Rs. 43,130 and a standard deviation of ±Rs. 53,651.82

Table 2: Descriptive statistics of the respondents on the basis of socio-economic variable

Variables	Mean	Standard Deviation	Range	Low	Medium	High
Age	40.83	10.93	17-65	21(17.50)	78(65.00)	21(17.50)
Education	2.06	0.60	1-4	14(11.67)	92(76.66)	14(11.67)
Family size	4.62	1.69	1-9	14(11.67)	88(73.33)	18(15.00)
Herd size	11.36	7.28	2-32	13(10.83)	88(73.33)	19(15.84)
Landholding	5.21	5.39	1-22	0(0.00)	96(80.00)	24(20.00)
Annual Income from livestock and poultry farming	32840	63588.59	1000-3,00,000	0(0.00)	105(87.50)	15(12.5)
Annual Income from other sources	43130	53651.82	2000- 2,50,000	0(0.00)	90(75.00)	30(25.00)
Total Annual income	75970	100454.87	6000- 5,50,000	0(0.00)	100(83.34)	20(16.66)

Figures in parenthesis indicates percentage

Adoption of biosecurity measures in livestock farms

The respondents were administered thirteen basic questions related to biosecurity measures to be adopted in their respective livestock farms by using three point continuum

(Always-3, Sometimes-2, Never-1). Majority (50.00%) of the respondents regularly provided fencing around the farm premises followed by 31.67 per cent occasionally and 18.33 per cent never provided fencing. None of the respondents had the regular practise of providing footdip/bath outside their farm premises. Similar findings were also reported by Singh *et al.* 2023 [10] and Moje *et al.* 2023 [7] where majority of the respondents did not have the provision of a footbath at the entrance of the pig farm and cattle farm respectively. Majority of the farmers sometimes quarantined their newly purchase animals followed by 30 per cent occasionally and only 24.17 per cent always had the practices of doing it after purchase of animals from the nearby areas/market or any other farms. Similar findings were also reported by Lestari *et al*. 2022 [12] wherein only 45.00 per cent of the farms practice quarantining new stock before combining it with other stock. 46.66 per cent of the farmers sometimes kept their sick animals separately for observation followed by 29.17 per cent never practised it and only 24.17 regularly quarantined their sick animals. Similar findings were also reported by Naidu *et al*. 2023 [1] where only 29 per cent of the farmers isolated their sick animals from the herd. Moje *et al.* 2023 [7] also reported that only 32.90 per cent of the respondents separated their sick animals in their farms. Majority 45.83 per cent sometimes dewormed their animals followed by 28.33 per cent never dewormed their animals and rest 25.84 per cent dewormed their animals regularly. 61.66 per cent of the respondents regularly vaccinated their animals. Majority (46.66%) sometimes constructed separate sheds for different species of animals maintained followed by 28.24 per cent did not construct separate sheds and only 25 per cent always constructed separate sheds for different species of animals reared. Large majority (86.66%) of the respondents inform or contact veterinarian /paravets during disease occurrence and death of animals followed by 16.34 per cent sometimes contacted the field vets or paravets during disease outbreaks/deaths. Regular cleaning of the farm and farm utensils like feeders/drinkers were practised by 50.00 per cent of the respondents. Only 30.00 per cent disinfected their farm premises regularly. Only a few respondents 8.34 per cent changed their clothes and slippers before entering farm premises followed by 9.17 per cent respondents restrict/prohibited entry of other visitor/vendors to their farm premises. Regarding safe disposal of dead animals and manure only 10.00 per cent regularly performed the practise. Similar findings were also reported by Singh *et al*. 2023 [10] wherein only 15.00 per cent of the respondents reported the safe disposal of manure and dead pigs.

Table 3: Frequency distribution of the respondents on the basis of adoption of biosecurity measures in livestock farms

S.L. No.	Parameters	Always	Sometimes	Never
1.	Providing fencing around the farm premises	60(50.00)	22(18.33)	38(31.67)
2.	Provision of foot dip/bath before entering farm premises	0(0.00)	37(30.83)	83(69.17)
3.	Quarantine of newly purchased animals	29(24.17)	55(45.83)	36(30.00)
4.	Quarantine of sick animals	29(24.17)	56(46.66)	35(29.17)
5.	Deworming schedule followed for different species kept	31(25.84)	55(45.83)	34(28.33)
6.	Vaccination schedule followed for different species kept	74(61.66)	24(20.00)	22 (18.34)
7.	Separate sheds for different breeds	30(25.00)	56(46.66)	34(28.34)
8.	Inform or contact veterinarian /paravets during disease occurrence and death of animals	104(86.66)	16(13.34)	0(0.00)
9.	Regular cleaning of the farm and farm utensils like feeders/drinkers	60(50.00)	35(29.16)	25(20.84)
10.	Use of disinfectant in farm	36(30.00)	66(55.00)	18(15.00)
11.	Changing of clothes and slippers before entering farm premises	10(8.34)	48(40.00)	62(51.66)
12.	Restrict/ prohibit entry of other visitor/vendors to farm premises	11(9.17)	50(41.66)	59(49.17)
13.	Safe disposal of dead animals and manure	12(10.00)	21(17.50)	87(72.50)

Figure in parentheses indicate percentage

Relational analysis between adoption of biosecurity measures with socio-economic variable

In perusal of Table 4. the correlation outcomes demonstrated that several factors positively influenced farmers adoption of biosecurity measures, including education level, annual income from livestock and poultry farming, and total annual income which all had a positive effect. This indicates that factors like education helps farmers to understand regarding the benefits of adopting biosecurity measures and higher returns from livestock farming both encourage and motivate them for investments in order to increase their farms biosecurity. Similar findings were also reported by Alam *et al.* 2025 [2].

Table 4: Relational analysis between adoption of biosecurity measures with socio-economic variable

S.l No.	Independent variables	R value
1.	Age	0.088^{NS}
2.	Education	0.201^{*}
3.	Family size	0.099^{NS}
4.	Herd size	0.103^{NS}
5.	Land holding	0.143^{NS}
6.	Income from livestock and poultry	0.209^{*}
7.	Income from other sources	0.119^{NS}
8.	Total income	0.214^{*}

NS Non-significant * Significant at 5% level of probability

Conclusion

Biosecurity plays a very important role in prevention and control of the diseases. The level of adoption of most of the biosecurity measures was very low in their farms in the study area making the livestock species vulnerable to disease outbreaks. The above study demonstrates the need for awareness and education of livestock farmers in the region on biosecurity measures which is critical in terms of preventing and controlling diseases that affect both animals and humans. Further the study also has demonstrated the importance of having veterinary extension services in rural settings, through which trainings and practical examples can be provided to the various stakeholders related to livestock farming in order to make them aware of the biosecurity risks that can occur and how to undertake measures to mitigate the risks associated with them. The results of the study revealed that a large portion of livestock farmers were not adequately bio-secured, indicating further scope of improvement in knowledge regarding biosecurity measures. Further studies/research can be recommended to better understand the factors influencing biosecurity practices on their livestock farms.

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