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Submission date: 07-Apr-2022 08:24AM (UTC+0700)
Submission ID: 1803863277
File name: biosecurity_policy_in_Bone_Regency,_South_Sulawesi_Province.pdf (313.38K)
Word count: 2647
Character count: 14878

IOP Conference Series: Earth and Environmental Science

PAPER · OPEN ACCESS

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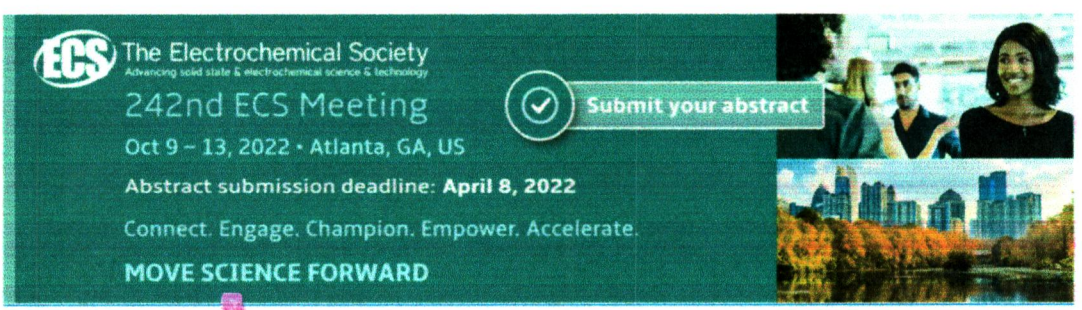
To cite this article: V S Lestari *et al* 2022 *IOP Conf. Ser.: Earth Environ. Sci.* **1001** 012023



A case study on the opinion of smallholder cattle farmers regarding biosecurity policy in Bone Regency, South Sulawesi Province

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Abstract. Biosecurity is a measure used by cattle farmers in the prevention of infectious diseases transmission to provide healthy meat to consumers while remaining eco-friendly. Therefore, this study aims at determining the opinions of smallholder cattle farmers regarding biosecurity policies in Bone Regency. This study was conducted in 2021, with a total of 115 beef cattle farmers selected through purposive sampling. The primary and secondary data sources were obtained by observation and in-depth interviews using a questionnaire. Also, the data were processed using the SPSS software version 23 and analyzed descriptively. The results show that biosecurity is essential (79.13%) and should be implemented to improve animal health (47.83%). In addition, 85.22% of beef cattle farmers agreed to apply biosecurity with the aid of proper guidance while 93.04% were willing to join the animal health service.

1. Introduction

Indonesia is an agricultural country, with 60% of the population employed in this field. Furthermore, livestock, which is a part of this sector, provides a significant amount of animal protein, such as meat, eggs, and milk. In Indonesia, beef cattle are reared by traditional, semi-intensive, and intensive systems to produce meat. Breeders also raise this animal for fattening and providing breeds. The business of beef cattle farming is quite promising due to the increasing demand for beef, in conjunction with the rapid population growth and economic level. This trade may also result in environmental pollution if cattle dung containing feces and urine is not managed properly. Therefore, eco-friendly and sustainable-based farmsare highly recommended to obtain healthy livestock and to control pollution from cattle. This process would further enable the consumption of wholesome animal products, which is beneficial to the health of humans.

According to [1], beef is an essential animal protein source, which is required to fulfill the dietary and nutritional needs of the community. In 2020, the domestic meat production of 422,533 tons did not match the nationwide demand of consumers, which was 717,150 tons [2]. Consequently, a meat balance deficit of 294,617 tons is expected, with imports totaled at 21.41 tons.

Low cattle productivity can be triggered by a variety of reasons, including sickness, which influences the effectiveness of beef cattle farms. Diseases that affect livestock are known to diminish meat yield and animal productivity due to poor nutritional absorption [3]. Therefore, farmers are promoted to employ good livestock-rearing practices. According to [4], effective cattlerearing requires

three primary pillars, namely breeding, feeding, and management. Biosecurity is oneof the factors in management, which is required to prevent disease transmission within and across farms [5]. Furthermore, biosecurity is a set of activities designed to prevent disease from infiltrating or spreading beyond the farm. The components of this variable include 1). Sanitation, which is a hygiene program that aims at preventing the entry and spread of harmful germs by watering the cage floor regularly, using a disinfectant to kill microorganisms, and cleaning the cage, cattle feed, as well as drinking containers to prevent contamination. 2). Isolation: This is an act of rearing livestock in a controlled environment to protect the animals from germs that may be present outside the cage and farm. Specifically, constructing a safety fence to protect the cage from wild animals and visitors. The location of residential houses, cages, quarantine cages, and ration warehouses are also properly arranged. 3). Traffic control of humans, animals, equipment, and vehicles arriving and departing the farm as well as preventing the influx of unauthorized individuals and vehicles in the livestock area [6].

According to the Indonesian Government Regulation No. 47 of 2014 Article 36, biosafety and biosecurity should be implemented in nurseries, cultivation areas, conservation units, veterinary laboratories, animal shelters, markets, slaughterhouses, transportation equipment, and health service locations [7]. Furthermore, Article 37 demonstrates the community's ability to participate in biosecurity actions mentionedin Articles 33 to 36. Therefore, the community particularly breeders, is obligated to partake in the process inorder to assist the government in the proper rearing of cattle.

Bone Regency is one of the top beef cattle producers in South Sulawesi Province and the third-largest in Indonesia. Hence, this region has the duty of maintaining the cattle output to fulfill the people's demands. After the Awang Pone District incident killed scores of cattle in an instant during the Anthrax disease epidemic in 2000, the chairman of the Livestock Service Office in this regency urged the cattle breeders to actively participate in the immunization campaign [8]. Based on the facts, this study aims to determine the opinion of beef cattle farmers on biosecurity policies in Bone Regency, South Sulawesi Province.

2. Methods and materials

This study was conducted in Bone Regency, which produces the highest amount of beef cattle in South Sulawesi Province and ranks third in the country behind East and Central Java. The survey was initiated in 2021, with 115 Balinese livestock ranchers and the cautious selection of three districts, namely Bengo, Barebbo, and Lappariaja. Furthermore, the primary data was obtained through observation and questionnaire interviews, while the secondary data was acquired from the Department of Animal Husbandry reports and other libraries. The SPSS Version 23 program was used to analyze the data. Moreover, farmers' perspectives onthe execution of biosafety policies on their farms were used as variables. The meaning of biosecurity, its components and application on farms was explained to farmers before being asked four questions. These inquiries included 1: is it crucial to apply biosecurity to farms? 2: should cattle farmers implement biosecurity? 3: do farmers want to utilize biosecurity? and 4: do farmers want to voluntarily join the animal health service. In addition, the Guttman scale was used to answer each question, with a value of 1 in the affirmative case and 0 in the negative situation [9]. The data was quantitatively and descriptively examined using mean values and percentages.

3.Results and discussion

3.1. Characteristics of Cattle farmers

The majority of the respondents were male (92.17%) because beef cattle farming requires strength to collect grass, bath cattle, as well as clean the dung and urine in cattle sheds. This finding was due to the fact that the beef cattle industry necessitates a considerable amount of labor, and men are generally more capable of working than women. However, this does not rule out the potential of women succeeding in this field [10]. The majority of the respondents were also in the productive age category (58.26%) of 41-50 years. In addition, a productive age creates a better work yield, where young people are more agile and likely to learn about animal husbandry.

Furthermore, the respondents' educational level was dominated by elementary school graduates (55.65%). Therefore, these farmers have a relatively low literacy level, making technological innovation difficult to accept. Firmansyah and Sunyigono (2020) also stated that these individuals had difficulty in accepting new technologies, which would assist inaccomplishing their tasks. However, the effects of low education on their knowledge level are mitigated if these farmers acquire new information. The number of family dependents was also < 5 (74.78%), hence, this group was classified as small scale, in accordance with the government's family planning program. Conversely, the members of a large family can be used as human resources according to their abilities.

The majority of respondents had < 10 years of cattle rearing experience (60.0%), which may slow down the decision-making process. According to [11], farmers with more expertise may better comprehend the conditions that exist in running a good and proper cattle company. However, those with little business experience are unfamiliar with the characteristics and conditions of the cattle industry.

In addition, the bulk of respondents (42.61%) owned between 0.25 and 0.50 hectares of land. Based on the respondent's farming system, the majority (87.83%) also combine various forms of agriculture, with farming as their main livelihood and raising beef cattle as their secondary business.

3.2. Beef cattle farms and the environment

The environmental problems associated with beef cattle production and its effects on overall beef sustainability have become of national and international concern [12]. Moreover, the expansion of the cattle industry, specifically feedlots generates waste, such as feces [13]. Wet manure and urine also accumulate quickly in cattle sheds [14].

Based on the study reports, the distance between the majority of houses and the cattle shed was less than 0.250km (49.57%). This situation contradicts appropriate breeding recommendations, which stipulate that this distance should be at least 250 m [15].

Cattle weighing 454 kg can produce 30 kg of feces and urine waste daily [16]. Based on this study, small-scale livestock, typically five heads, account for the majority ownership (79.13%). This means the amount of manure and urine collectedevery day would be an average of 150 kg. This waste product should be cleaned daily to prevent odor and groundwater pollution, which contaminate the environment. In addition, cattle waste must be processed to provide additional revenue.

3.3. Farmer's opinion on biosecurity policy

Although several biosecurity variables, such as sanitation and traffic management were neglected in the daily lives of farmers, Table 1 shows that 79.13% believe this factor is essential. This finding is in line with [17], which stated that the majority of manufacturers viewed the proposed biosafety practices as beneficial. However, the usefulness of the practice and its implementation were not necessarily correlated and vice versa. Kuster et al. (2015) also noted that biosecurity measures, which increase disease awareness among farmers, were rated as highly essential and effective in livestock farms.

Table 1. Farmer's opinion on biosecurity policy.

Questions	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Is biosecurity important?	91	79.13	24	20.87
Do farmers have to implementbiosecurity?	55	47.83	60	52.17
If biosecurity guidelines are provided, are farmers willing to apply them?	98	85.22	17	14.78
Do farmers want to voluntarily join the Animal Health Service?	107	93.04	8	6.96

Furthermore, 47.83% of farmers agreed that biosecurity should be implemented, while 52.17% disagreed because they did not encounter difficulties throughout the breeding process. According to [18], the experiences of individual farmers' were cited as the most influential factor in the implementation of biosecurity measures, specifically those who experienced infectious disease outbreaks on their farms due to insufficient biosecurity. A report stated that these measures would not have been appreciated if these individuals had not experienced a similar negative situation. These experiences further motivated farmers to seek additional information to obtain a better understanding of issues, such as infectious disease.

The majority of farmers (85.22%) also stated that they would implement biosecurity on their farms if guidance or technical instructions were provided. These guidelines or instruction can beconducted through the provision of training and advice as well as the support of governmental elements, such as the local livestock service office and private sector. According to [19], biosecurity training is essential for farmers and should be conducted byveterinarians through the face-to-face format.

Approximately, 93.04% of farmers volunteered to join the animal health service, which is an important social capital in developing societies. This is also a characteristic of rural communities that value cooperation. According to [20], the majority of farmers (84%) also displayed a strong inclination to adopt the opinion of veterinarians on biosecurity issues.

4. Conclusions

The results of this study established that biosecurity is important for farmers since the health of livestock can be improved. Furthermore, healthy, well-maintained, and eco-friendly cattle will produce wholesome meat. Farmers are also expected to apply this system if a technical guide or manual is available and voluntarily cooperate with the livestock health service unit.

Acknowledgements

The authors are grateful to the Ministry of Education, Culture, Research, and Technology for funding this study through the 2021 PDUPT (Higher Education Basic Research) scheme.

References

[1] Sugeng Y B 2003 *Sapi Potong* (Jakarta: Penebar Swadaya)
[2] Kementerian Perdagangan Republik Indonesia 2020 *Analisis Perkembangan Harga Bahan Pangan Pokok di Pasar Domestik dan Internasional* (Indonesia: Pusat Pengkajian Perdagangan Dalam Negeri Badan Pengkajian dan Pengembangan Perdagangan Kementerian Perdagangan Republik Indonesia)
[3] Triakoso N 2009 *Aspek Klinik dan Penularan pada Pengendalian Penyakit Ternak* (Surabaya: Departemen Klinik Veteriner PKH Universitas Airlangga)
[4] Amam and Harsita P A 2019 *Jurnal Sain Peternakan Indonesia* **14** 4
[5] Sahlstrom L, Virtanen J, Kyyro J and Lyytikainnen T 2014 *Prev. Vet. Med.* **117** 59
[6] Lestari V S, Prawira D P, Sirajuddin S N, Saleh I M and Prahesti K I 2020 *Biosekuriti: Persepsi dan Aplikasinya di Peternakan Rakyat* (Makassar: UNHAS Press)
[7] Pemerintah Indonesia 2014 *Peraturan Pemerintah Republik Indonesia Nomor 47 Tahun 2014 tentang Pengendalian dan Penanggulangan Penyakit Hewan* (Jakarta: Pemerintah Indonesia)
[8] Mahyuddin 2012 *Kabupaten Bone Waspadai Anthrax* (Watampone: Tribun News https://www.tribunnews.com/regional/2012/08/29/kabupaten-bone-waspadai-anthrax)
[9] Riduwan 2008 *Skala Pengukuran Variabel-Variabel Penelitian* (Bandung: Penerbit Alfabeta)
[10] Firmansyah M D and Sunyigono A K 2020 *Agriscience* **1** 2
[11] Rotz C A, Hiablie S A, Place S and Thoma G 2019 *Agricultural Systems* **169** 1
[12] Setyaningrum A, Amrullah N and Yuwono P 2019 *IOP Conf. Series: Earth and Environmental Science* **372** 012038
[13] Tucker R, McDonald S, O'Keefe M, Craddock and Galloway J 2015 *Beef Cattle Feedlots : Waste Management and Utilisation* (North Sydney: Meat & Livestock Australia Ltd)

[14] Sihombing D T H 2000 *Teknik Pengelolaan Limbah Kegiatan/Usaha Peternakan* (Bogor: Pusat Penelitian Lingkungan Hidup Lembaga Penelitian, Institut Pertanian Bogor)
[15] Fathurrohman A, Hari S M A and Adam M A 2015 *Jurnal Ilmu-Ilmu Peternakan* **25** 36
[16] Brennan M L and Christley R M 2013 *BMC Veterinary Research* **9** 1
[17] Kuster K, Cousin M-E, Jemmi T, Schüpbach-Regula G and Magouras I 2015 *PLoS* ONE **10** e0144533
[18] Moya S, Tirado F, Espluga J, Ciaravino G, Armengol R, Diéguez J, Yus E, Benavides B, Casal J and Allepuz A 2020 *Transbound Emerg. Dis.* **67** 698
[19] Lahuerta M A, Brennan M L, Finney G, O'Hagan M J H and Jack C 2018 *Ir Vet J.* **171** 14
[20] Noremark M, Lewerin S S, Ernholm L and Frossling J 2016 *Front. Vet. Sci.* **3** 1

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