ADOPTION OF BIOSECURITY MEASURES BY LAYER SMALLHOLDERS

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ABSTRAK

Terdapat indikasi bahwa kesadaran peternak ayam ras petelur terhadap biosekuriti masih rendah. Makalah ini bertujuan untuk menentukan tingkat adopsi peternak ayam ras petelur di Sulawesi Selatan dalam berbagai tindakan biosekuriti. Kabupaten Sidenreng Rappang (Sidrap) dipilih sebagai lokasi penelitian karena terkenal sebagai pusat peternakan ayam ras petelur. Jumlah sampel adalah 60 responden. Sampel dipilih secara acak dari dua kecamatan yang paling banyak peternaknya yaitu Baranti dan Maritengae. Data dikumpulkan menggunakan kuesioner terstruktur dan wawancara. Data ditabulasi dan dianalisis menggunakan metode skoring status biosekuriti. Status biosekuriti digunakan untuk mengetahui tingkat adopsi biosekuriti. Status biosekuriti diperoleh berdasarkan penerapan tindakan biosekuriti yang terdiri dari 9 tahap yaitu: input peternakan, lalu lintas ke peternakan, jarak dari sumber penyakit dengan kandang, keadaan peternakan, biosekuriti pada pagar peternakan, biosekuriti antara pagar dan kandang, biosekuriti di pintu kandang, lalu lintas dalam kandang dan kerentanan terhadap penyakit. Berdasarkan indeks adopsi, hasil penelitian menunjukan bahwa adopsi biosekuriti pada peternak ayam ras petelur di Sulawesi Selatan diklasifikasikan sebagai *parsial adopter.*

Kata kunci: adopsi biosekuriti, peternak, ayam ras petelur

ABSTRACT

It was indicated that layer smallholders awareness of biosecurity was low. This paper aimed to determine the level of adoption within the South Sulawesi layer smallholders of a range of standard biosecurity measures. Sidenreng Rappang (Sidrap) regency was chosen as a location of the research, because it was famous as a central of layer smallholders. Total sample was 60 respondents. The sample was chosen through random sampling from two districts which were the most populous of layer smallholders, namely Baranti and Maritengae. Data were collected using structured questionnaires and depth-interview. The data were tabulated and analysed using a simple method of scoring with regard to their biosecurity status. The status of biosecurity was used to know the level of biosecurity adoption. Biosecurity status was obtained based on the adoption of biosecurity measures which consisted of 9 stages: farm inputs, traffic onto farms, distance from sources of pathogens to shed, exposure of farm, biosecurity at farm boundary, biosecurity between farm boundary and shed, biosecurity at the shed door, traffic into the shed and susceptibility of the flock. Using adoption index, this research revealed that biosecurity adoption of layer smallholders in South Sulawesi was classified into a “partial adopter”.

Keywords: *adoption of biosecurity, smallholder, layer*

INTRODUCTION

Biosecurity is security from transmission of infectious diseases, parasites and pests. Biosecurity has focus on maintaining or improving the health status of animal and preventing the introduction of new disease pathogens by assessing all possible risks to animal health (Satyanarayana *et al*., 2008; Zavala, 2011; Australian Biosecurity Co-operative Research Centre, 2009; Fraser *et al*., 2010; Iqbal, 2009; Dorea *et al*., 2010; Julien and Thomson, 2011; Fasina *et al*., 2011). Most animal health programs will increase their odds of success (Msoffe *et al*., 2009).

Biosecurity has three major components: isolation, traffic control and sanitation. Biosecurity should be increased to reduce disease outbreak. Biosecurity will not only maintain the good environment but also minimize infectious

and zoonotic diseases and subsequently increase public health (Sharma, 2010).

Adoption is a process of receiving an innovation, hopefully there is a change in cognitive, affective, and psychomotoric to any body who get innovation from extension worker. Farmers need a different time to adopt an innovation. There are five of adoption stage: awareness, interest, evaluation, trial and error, and the last is adoption (Ban and Hawkins, 1999).

Sidenreng Rappang (Sidrap regency) is famous as the most populous of layer farms in South Sulawesi. Sidrap regency consists of 11 districts which supply meat and eggs to consumers in South Sulawesi. Total layer smallholders in Sidrap regency was 1,334 with the population 3,439,556 chickens (Dinas Peternakan Kabupaten Sidenreng Rappang, 2011). In 2005, Sidrap regency became one of six regencies in South Sulawesi which suffer from Avian influenza outbreak and affects to several loss from their layer farms (Kristanti, 2009). It is indicated that some layer smallholders do not aware with biosecurity measures in their farms.

The study was undertaken with the following objective to determine the level of adoption within the South Sulawesi layer smallholders of a range of standard biosecurity measures.

MATERIALS AND METHODS

This research was conducted for a month in May 2010. Sinreng Rappang (Sidrap) regency was choosen as a location of the research, because Sidrap regency was famous as a central of layer smallholders in South Sulawesi. Total sample was 60. The sample was choosen from two districts with the most populous layer smallholders, namely Maritengngae and Baranti which had total population of 601 layer farmers. Arikunto (2002) stated that 10% of the population could be used as a sample if the population was greater than 100. Data were collected using structured questionnaires and depth-interview. The data were analyzed using a simple method of scoring with regard to their biosecurity status.

Layer smallholders biosecurity status was adopted from Patrick and Jubb (2010). A large number of biosecurity risks and biosecurity measures have been identified and combined into nine stages, namely: farm inputs, traffic onto farm, distance from source of pathogens to shed, exposure of farm, biosecurity at farm boundary, biosecurity between farm boundary and shed, biosecurity at the shed door, traffic into shed and susceptibility of flock. Farm biosecurity model was described in Figure 1.

The farm biosecurity status score (FBSS)

a.Scoring indicators

The first step in generating a FBSS was to score each individual biosecurity indicator. Actually there were 65 indicators. Most of the indicators have been allocated scores ranging from 1 to 3 (1 being low biosecurity, 2 being medium biosecurity and 3 being high biosecurity). The minimum score one could score was 0 and maximum score was 195.

b. Scoring stages

These individual biosecurity indicators can be grouped into the nine biosecurity stages (as defined in Figure 1). Each can be scored by summing the scores of the individual indicators in each stage. The score will be influenced by the number of indicators in the stage. This measure gave every indicator an equal value, and therefore, the stages with more indicators were intrinsically more important.

c. Scoring farms

A farm biosecurity score can be calculated by summing the stage scores (FBSS). The FBSS was the simplest method and makes no judgment with regard to the importance of each variable. It valued every individual risk variable equally.

d. Adoption level

The adoption level of the respondents was measured by making use of adoption index (Karthikeyan, 1994 in Rahman, 2007).

Adoption index = (Respondent total score/ Total possible score) x 100

Depending upon the extent of adoption of biosecurity measures the respondents were categorized as follows: (1) Low adopters (up to 33%); (2) Partial adopters (34-66%) and (3) High adopters (67-100%).

RESULTS AND DISCUSSION

Characteristics of Layer Smallholders

Layer farmers' characteristics are presented in Table 1. It is indicated that most of layer smallholders were males (96.67%) only 3.33% were females. This showed that the role of women

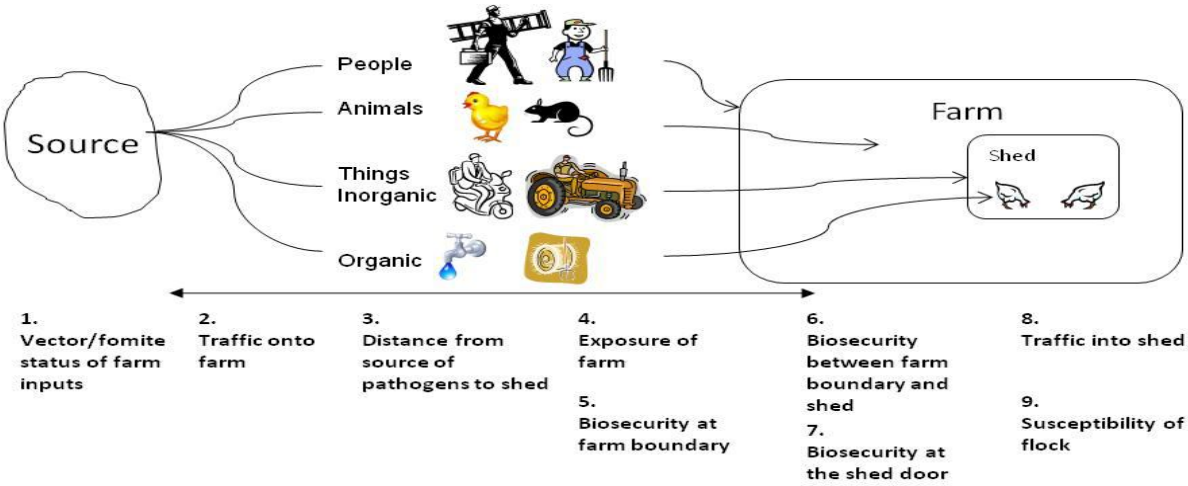

Figure 1: A model of Poultry Farm Biosecurity Showing Nine Areas where Biosecurity May be Assessed (Patrick and Jubb, 2010)

farmers in poultry raising was small.

Regarding to the age of respondents, the range of 41-55 years indicated that majority of the respondents were young (65.0%). It can therefore be implied that the layer smallholders were middle aged and might still have energy to cope with the rigorous of layer activities. Vincent *et al*. (2011) stated that layer activities consisted of feeding and watering, brooding, repair in poultry house, buying and transporting chicks, collecting eggs, selling culls, and marketing.

Majority (93.33%) of the respondents had formal education, of which 51.67% were graduated from senior high school. The result showed that the educational level of layer smallholders was fairly high in the study area, with the mean value was 10.20 years. Most respondents (58.33%) were generally had 5-10 years of experience in raising layer, with the mean value was 8.2 years. The holding type of respondents mostly were independent (95.0%), only 5.0% of respondents depended on company partnership who supported all of layer chicken needs, such as day old chick (DOC), feeds, vaccines, technical assistance and marketing chicken products. Table 1 also showed that most of respondents (86.67%) was dominated by small scale farms which raised layer chicken less than 10,000 birds, with the mean value was 5.875 birds. Majority of respondents (68.33%) had household size between 4 and 6 persons, with the mean value was 4.1 persons.

Farm Biosecurity Status Score (FBSS)

Table 2 showed that layer smallholders in Sidrap regency have a higher biosecurity score for all risk stages except biosecurity at farm gate to the shed and traffic onto the shed being 7.1 and 4.0, respectively. This finding collaborated with Patrick and Jubb (2010) research that layer smalholders in West Jawa and Bali have a higher biosecurity score for all risk stages except biosecurity at farm gate to the shed and traffic onto the shed being 9.7 and 9.4 for biosecurity at farm gate to shed in Bali and West Jawa, while traffic into shed was 4.2 and 4.1, respectively. This indicated that biosecurity at farm gate to shed and traffic onto the shed in layer smallholders in Sidrap regency shoud be enhanced.

The low level of biosecurity at farm gate to shed was evident from the following factors: (1) very few smallholders have farm gate to prevent people or animals entering the farm area; (2) few signs in use banning entry to the farm area; and (3) very few smallholders have a sanitary tub for feet washing (foot bath) before entering the poultry area. This was consistent with the findings of Nerkar *et al.* (2010) that layer farms in India lack of foot bath system.

The low level of biosecurity score for traffic onto the shed caused by many people was able to enter the shed and rodents. This was evident from some consumers bought eggs directly in the shed. It was known that human activities were the main route for the spread of the virus (Bleich *et al*.,

Table 1. Characteristics of Layer Smallholders

No	Item	Frequency (person)	Percentage (%)
1	Age (year)		
	<40	12	20.00
	41-55	39	65.00
	>55	9	15.00
2	Gender		
	Females	2	3.33
	Males	58	96.67
3	Educational status (year)		
	No formal education	4	6.67
	Primary education	9	15.00
	Secondary education	10	16.67
	Tertiary education	31	51.67
	Formal education	6	10.00
4	Experience in layer farms (year)		
	<5	12	20.00
	5-10	35	58.33
	>10	13	21.67
5	Holding type		
	Partnership	3	5.00
	Independent	57	95.00
	Farm size (Number of birds)		
	<10.000	52	86.67
	>10.000	8	13.33
7	Household size (persons):		
	≤ 3	18	30.0
	4-6	41	68.33
	>6	1	1.67

2009). The other evident was rodents entered to sed. Backhans and Fellstrom (2012) argued that rodents on farms pose a danger of introducing new infections into the livestock inside, so rodent control should be considered an important measure to provide good bio-security.

Table 2 showed that overall, total farm biosecurity status score (FBSS) was 123.71. This score showed that layer smallholders achieved total score from 65 individual biosecurity indicator was 123.71, while the maximum score was 195 (It came from 65 x 3). In other words, layer smallholders were still lack behind a good biosecurity. This finding was smaller than total FBSS of layer smallholders in Bali and West Java (Patrick and Jubb, 2009), that was 125.8 and 140.0, respectively. This comparison may motivated layer smallholders in South Sulawesi to do a better biosecurity measures through

Tabel 2. Farm Biosecurity Status Score Based on Nine Risk Stages

Risks	Biosecurity scores
Farm inputs	17.88
Traffic onto the farm	17.12
Distance to source of risk	21.78
Vulnerability of farm	20.23
Biosecurity at farm gate	15.03
Biosecurity farm gate to shed	7.10
Biosecurity at shed	8.75
Traffic onto shed	4.00
Susceptibility of layer flock	11.82
Farm Biosecurity Satus Score (FBSS)	123.71

Tabel 3 . Level of Adoption of Total Biosecurity Measures

Level of Adoption	Number of Respondents	(%)	Mean of Adoption Index
Low adopter	25	41.67	
Partial adopter	16	26.67	
High adopter	19	31.66	
Total	60	100.00	63.44

voluntary adoption by farmers. Bleich *et al*. (2009) argued that developing and achieving adoption of biosecurity measures required a multidisciplinary and participatory approach working with producers, intermediaries, LBM traders and communities. Fraser *et al*. (2010) added that financial inducements or penalties to farmers could be necessary to facilitate adoption of biosecurity measures.

Adoption Level of Total Biosecurity

Table 3 showed that for all risks stage, majority of layer farmers (41.67%) achieved a low level of biosecurity adoption. The low level of biosecurity adoption might caused by socio-economic and technical factors. Olele and Emah (2007) found that the low level of adoption of improved fish technologies was attributed to cost of technologies, their complexities and lack of extension contact.

Comparing this results with the research has done by Susilowati *et al*. (2010), majority of layer smallholders in West Java (49%) adopted high level of biosecurity measures. This indicated that layer smallholders in West Java have better biosecurity measures in their farms. East *et al*. (2006) and East (2007) stated that high levels of biosecurity and hygiene practices had been adopted by most chicken farms in commercial layer in Australia.

In general, the mean of adoption index which showed the total level of biosecurity measures by layer smallholders was 63.44 and categorized as a partial adopter. This mean that 63.44 of part of biosecurity measured which consisted of 65 indicators have been adopted by layer smallholders in Sidrap regency, while 36.56 part of biosecurity measures have not been adopted. This implied that if layer smallholders did not want to suffer from loss, they should motivated themselves to implement several biosecurity measures which have not been implemented. This adoption index was higher than Rahman's findings (2007) in the level adoption of pig management, which was 55.87.

CONCLUSION

In general, biosecurity adoption level based on farm biosecurity status score among layer smallholders in South Sulawesi can be classified into a partial adopter. The low level of biosecurity at farm gate and traffic onto the shed can be enhanced by layer smallholders through voluntary adoption.

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