REPORT

DETECTION OF AVIAN INFLUENZA (AI) VIRUS IN FIGHTIING COCK FARM IN LABUAN SUBDISTRICT

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LEGISLATION

Study Title : **Detection of Avian Influenza (AI) Virus in Fighting Cock Farms in Labuan Sub district.**

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ABSTRACT

Cock fighting is a tradition many Indonesian people like. This practice, which often brings together chickens from many different regions, is believed to play a role in spreading Avian Influenza. Close contact between fighting cocks and cock fighting hobbyists during the rearing process and during cock fighting competitions also poses a high risk for AI transmission to human.

Eleven fighting cock farms in Labuan subdistrict were tested for AI virus infection. Tracheal swab samples were collected from 5 chickens in each farm. Samples from each farm are pooled into one and tested with rt-PCR at the Virology Laboratory of the Faculty of Veterinary Medicine, Bogor Agricultural University. Information on farmer characteristics, husbandry management, and farmer knowledge on AI were collected through interviews with a structured questionnaire.

Testing of samples found that 55% of fighting cock farms surveyed in Labuan subdistrict was infected by H5 AI virus. Data on AI knowledge level shows that 72% of fighting cock farmers in this region has moderate knowledge of AI.

This study recommends the implementation of AI control and eradication measures in fighting cock farms and further improvement of farmer's AI knowledge.

CONTENTS

LIST OF TABLES

LIST OF FIGURE

LIST OF ANNEXES

INTRODUCTION

Background

Since Avian Influenza (AI) or bird flu first emerged in Indonesia in 2001, it has still caused disease in birds and human until now. The continuous emergence of AI cases in human has made Indonesia the country with the highest human death case due to AI. A report from Komnas FBPI until May 19, 2008, stated that Indonesia has had 108 fatalities from 133 cases with a Case Fatality Rate of 81.2% (Komnas FBPI 2008).

Poultry is believed to be the main host of Avian Influenza and could spread the disease to other birds and also to human. Chicken farming, which is the largest sector in the poultry industry in Indonesia, has come under the spotlight in regards to the spread of Avian Influenza. This is why AI management in poultry, especially chickens, has become the main priority in AI control in both animal and human.

Indonesia is a country that has fighting cock traditions. Many people still hold on to this tradition until now and recently it has been connected to gambling practices. A type of chicken widely used as fighting cocks in Indonesia is the Bangkok chicken. In line with its name, the Bangkok chicken originates from Thailand; it was then bred by people in Indonesia and has become very famous among cock fighting hobbyists in Indonesia. This chicken has been admitted to have good qualities in the cock fighting arena (Sartika T & Iskandar S 2008).

Cock fighting is an activity believed to be related to the spreading of AI cases. Close contact between fighting cocks from many different areas during a fight is suspected to contribute to AI virus transmission between chickens. There had been a cock fighting related human case reported in Thailand in 2004, the infection was found in a boy who had close contact with fighting cocks by handling the birds and help clean mucus and secretions from the bird's throat during fights by using his own mouth (Anonim 2008).

Cock fighting hobbyists often hold tournament in its region, either between villages, subdistrict, districts, and even provinces. Such events require chickens to be transported across villages, subdistricts, districts or even across provinces to participate in the events. This practice is believed to be a source of AI virus spread between regions.

Labuan subdistrict is part of the Banten province and is currently a breeding center for fighting cocks. Many people in this area breed fighting cocks, both as livestock and for hobby purposes. Fighting cock farms in this subdistrict have an average population of 20-30

chickens per farm. The chickens currently bred are a mix between different strains of chickens, all aiming to produce chickens with highly desired qualities.

The people in Labuan subdistrict commonly farm fighting cocks in a very simple traditional way. The chickens are kept in poultryhouses that are placed in the house of the owner, such as in the kitchen or the side or the back part of the house. Such arrangements have very high risk of transmitting zoonotic diseases such as AI to people living in the house.

This study was conducted to detect the presence of AI virus in fighting cocks and study the role of these chickens in spreading AI related to various husbandry management characteristics done by farmers in Labuan subdistrict.

Objective

Objectives of this study were:

1. To detect the presence of Avian Influenza (AI) virus in fighting cock farms
2. To identify management characteristics of fighting cock husbandry
3. To measure the knowledge level of fighting cock farmers on AI
4. To measure the biosecurity level in fighting cock farms

Output

Outputs of this study are:

1. Data on the infection level of Avian Influenza (AI) in fighting cock farms in Labuan subdistrict
2. Data on the management characteristics of fighting cock husbandry in farms in Labuan subdistrict
3. Data on the AI knowledge level of fighting cock farmers in Labuan subdistrict
4. Data on the biosecurity level in fighting cock farms in Labuan subdistrict

Benefit

Results of this study are expected to provide information as a basis for making policies for Avian Influenza mitigation in fighting cock farms, particularly in Labuan subdistrict.

METODE

Time and Location

This study was conducted in three villages in Labuan subdistrict: Teluk, Cigondang, and Kampung Baru village. The study was conducted from October to December 2008.

Population

The study population was fighting cock farms in Labuan subdistrict.

Sample

The samples size for this study was calculated with Win Episcope 2.0.

Number of farms surveyed.

The number of farms surveyed was calculated with the proportion estimation formula. With an estimated farm population of 25 farms, 95% confidence interval, and 10% estimated proportion, the number of farms surveyed was 11 farms. Table 1 below shows the names of fighting cock farmers surveyed in this study.

Table 1. Determination of Villages and Fighting Cock Farmers in Labuan Subdistrict

No	Village	Total Farm	Farmer Name
1	Cicondang	8	1. Sumar
			2. Sunarto
			3. Adi (RT)
			4. Deden
			5. Samsuri
			6. TB. firman firdaus
			7. H. Dede
			8. Saeful
2	Kp. Baru	2	9. Utun
			10. Suwirya
3	Teluk	1	11. Buang

Number of samples per farm

The number of chickens sampled per farm was calculated with the disease detection formula. With an assumed chicken population per farm 25 birds, estimated number of infected chickens 10 birds, and 95% confidence interval, the calculated number of chickens sampled per farm was 5 birds.

In total, the number of samples collected in this study = 11 farms x 5 chickens per farm = 55 samples.

Sample Collection

The samples collected in this study were tracheal swabs. Samples taken from one farm (5 chickens) were pooled into one sample for testing. AI detection tests were conducted at the Virology Laboratory at the Faculty of Veterinary Medicine, Bogor Agricultural University.

Sample Handling and Testing

Tracheal swab samples were transported through a cold chain (4^{o}C) to the Virology Laboratory at the Faculty of Veterinary Medicine, Bogor Agricultural University (FKH-IPB). Every 5 samples from a farm were pooled, resulting in 11 pooled samples in total. The pooled samples were then tested for H5 virus antigens with Reverse Transcription Polymerase Chain Reaction (rt-PCR).

Data Collection

Data for this study was collected with the following method:

Farm characteristic data

Farm characteristic data was collected by interviewing the farm owner, manager, or worker using a structured questionnaire (Appendix 1). Data collected included farmer characteristics, husbandry management, health management, farmer knowledge of Avian Influenza, and cock fighting management in the farm.

Farmer knowledge level data

The knowledge level of fighting cock farmers on Avian Influenza was measured by asking farmers to respond to statements regarding AI based on what they know. Statements

given were related to host types, disease symptoms, disease transmission, prevention methods, and AI mitigation methods. There were three types of responses farmers could give for each statement: right, wrong, or do not know. Statements given were a combination of positive and negative statements.

To determine the knowledge level, any statement responded correctly was given a score of 3, while incorrect responses were given a score of 0 and if the farmer did not know, the score given was 1. The knowledge level was categorized as 'good' if the total score was over 30. If the total score was between 15 and 30, the knowledge level was categorized as 'moderate'. A poor knowledge level was if the total score was less than 15.

Data Analysis

Data collected in this study was analyzed with SPSS 13.0. Farmer characteristics and farm management were analyzed descriptively. The association between husbandry management characteristics with farm infection status was tested with Chi Square. The strength of the association was calculated with Odds Ratio (OR).

RESULT AND DISCUSSION

Farmer Characteristic

Characteristics of fighting cock farmers in Labuan subdistrict is shown in **Table 2** below.

Table 2. Characteristics of Fighting Cock Farmers in Labuan Subdistrict

Characteristic	*Total*	Percent (%)
Age		
< 40 years	5	45.4
40 – 50 years	4	36.4
> 50 years	2	18.2
Gender		
Male	11	100
Female	0	0
Education		
Elementary school	7	63.6
Junior high school	3	27.3
Senior high school	1	9.1
Farm Business		
Side business	6	54.6
Hobby	5	45.4
Farming Experience		
< 1 year	1	9.1
1 – 2 years	5	45.4
3 – 5 years	1	9.1
Over 5 years	4	36.4
Ownership Status		
Owner	11	100
Worker	0	0
Other Occupations aside from Farming		
Employee	9	81.8
Entrepreneur	2	18.2

Gender

Fighting cock farms in Labuan subdistrict are all (100%) owned or cared by men. None of the farms (0%) were owned or cared by women.

Age

The age group of fighting cock farmers in Labuan subdistrict is divided into three categories: the productive age group (40-50 years), very productive age group (less than 40 years), and less productive age group (over 50 years). Most farmers were in the very productive age group (45.4%) followed by the productive age group (36.4%) and least was the less productive age group (18.2%).

Education Level

Fighting cock farmers have various education levels, starting from elementary school until senior high school. The highest percentage is farmers with elementary school education level (63.6%), followed with junior high school (27.3%) and senior high school (9.1%).

Education levels could the way farmers manage their farms. Hence farmers with higher education levels are expected to have better farm management compared to farmers with lower education levels.

Farm Business

Most fighting cock farmers in Labuan subdistrict have farms as a side business (54.6%), while others only farm fighting cocks as a hobby (45.5%).

Farming Experience

The length of farming experience is believed to affect they way farmers raise and handle chickens. Hence farmers with more farming experience are expected to have better practices in handling and managing chickens, in terms of the management of sick chickens, dead chickens, farm biosecurity and waste.

The farming experience of farmers varies from less than 1 year to over 5 years. Most farmers (45.4%) have 1-2 years of farming experice, while 36.4% of farmers have more than

5 years of experience. Only 9.1% of farmers have experience less than 1 year and another 9.1% of farmers have 3-5 years of farming experience.

Ownership Status

Farm owners that handled their own farms tend to handle their birds better compared to other people. All fighting cock farms (100%) in Labuan subdistrict were handled by the farm owner.

Main Occupation

The main occupation of fighting cock farmers in Labuan subdistrict were employees and entrepreneur, 81.8% and 18.2% respectively.

Husbandry System

Data on the husbandry system of fighting cock farms in Labuan subdistrict is shown in **Table 3**.

Table 3. Husbandry System of Fighting Cocks in Labuan Subdistrict

Characteristic	*Total*	Percent (%)
House Type		
Postal house	10	90.9
Litter house	1	9.1
Farm Size		
< 8 m^2	6	54.5
8 – 10 m^2	3	27.3
>10 m^2	2	18.2
Chicken Population		
< 20 birds	2	18.2
20-25 birds	4	36.4
> 26 birds	5	45.4
Type of Chicken		
Bangkok	11	100
Saigon	0	0
Source of Chicks		

Characteristic	*Total*	Percent (%)
Breed on farm	9	81.8
Buy from other farmers	2	18.2
Have Other Poultry on Farm		
Yes	6	54.5
No	5	45.5
Type of Other Poultry		
Native chicken	2	33.3
Commercial chicken strain	2	33.3
Muscovy duck	0	0
Geese	0	0
Domestic duck	2	33.3
Age Variation		
Two age variation	5	45.4
Three age variation	3	27.3
More than three age variation n	3	27.3
Management of Chickens with Different Ages		
Mix	3	27.3
Separate within a same house	8	72.7
Placed in separated houses	0	0
Management of New Chickens		
Mix with other chickens on farm	11	100
Separate from other chickens on farm	0	0
Source of Feed		
Commercial feed	1	9.1
Homemade feed	1	9.1
Commercial feed and homemade feed	9	81.8
Feeding		
Twice a day	10	91.9
Three times a day	1	9.1
More than three times a day	0	0
The Age Chickens Start to Fight		
< 1 year	2	18.2
1-2 years	9	81.8
> 2 years	0	0
Distance of Fighting Events		
Between Villages	4	36.4
Between Subdistricts	7	63.6
Between Districts	0	0
Between Provinces	0	0

Housing

House Type

There are two types of poultryhouses used in fighting cock farms in Labuan subdistrict, the postal house and litter house. Most farms have postal type houses (90.9%) which are easier to clean, while the remaining 9.1% have litter type houses.

House Size

The size of houses in fighting cock farms in Labuan subdistrict varies starting from $2m^2$ to $20m^2$. Poultryhouse sizes could be divided into 3 categories, small farms less than 8 m^2 (54.5%), moderate size farms 8 – 10 m^2 (27.3%), and large farms over 10 m^2 (18.2%). Results of the study shows that most farms in Labuan subdistrict are small farms.

Chicken

Chicken Type

The type of chicken bred in fighting cock farms in Labuan subdistrict are Bangkok chickens. Based on interview with farmers, all 11 farms surveyed bred Bangkok chickens. The chickens bred were not of pure genetics but had been crossbred with other strains of local chickens.

Chicken Population

The chicken population in fighting cock farms in Labuan subdistrict could be divided into three, a small population of less than 20 birds, 20-26 birds, and large population over 26 birds. Most farms had a population of over 26 birds (45.4%), while 36.4% had populations of 20-26 birds. While only 18.2% of farms had populations less than 20 birds.

Source of Chicks

From 11 farms surveyed, 81.8% bred their own chickens, while 18.2% of farmers bought chicks from other farmers. There are many ways a farmer can breed their own chickens such as by borrowing cocks from other farmers. This is because fighting cocks are expensive.

Rearing Management

Age Variation

Fighting cock farming in Labuan subdistrict has different age variations, some have two age variations, three age variations and some farms even have more than three age variations. Most farms surveyed had two age variations (45.4%), while only 27.3% of farms had three age variations and another 27.3% of farms had more than three age variations.

Feeding

Feeding frequency adopted by farmers vary, some give feed twice a day and some three times a day. A majority of fighting cock farmers give feed twice a day (90.9%), while only 9.1% give feed three times a day.

Management of New Chickens

New chickens obtained through purchase or through other means should be properly handled to prevent it from transmitting disease to healthy birds on the farm. All fighting cock farms (100%) in Labuan subdistrict directly mix new chickens with other chickens on the farm without any prior treatment.

Other Poultry

Other Poultry on Farm

Only 45.5% of fighting cock farms in Labuan subdistrict raise other poultry besides fighting cocks on farm, while 54.5% do not have other types of poultry on farm.

Type of Poultry

From all fighting cock farms that raise other poultry besides fighting cocks, 40% of them have native chickens, 40% have domestic ducks, and 20% raise commercial chickens.

Cock Fighting

Starting Age

In general, cocks start to fight at a certain age. Relatively younger birds are generally stronger in fights. Most fighting cock farmers (81.8%) in Labuan subdistrict start to fight cocks at the age of 1-2 years, while 18.2% of farmers start to fight cocks less than 1 year old.

Location of Fighting Events

Fighting cock events could be held at the same place or move from one location to another. Most fighting cocks (63.6%) in Labuan subdistrict participate in events competing between subdistricts and the rest (36.4%) participate in village level competitions. None of the fighting cocks in this region participate in events that compete between districts or provinces.

Health System

Data on health management of fighting cocks in Labuan subdistrict is shown in **Table 4**.

Table 4. Health System in Fighting Cock Farms in Labuan Subdistrict

Characteristic	*Total*	Percent (%)
AI Vaccination		
Never	8	72.7
Once a year	0	0
Twice a year	0	0
Three times a year	3	27.3
AI Education		
Yes	1	9.1
Never	10	90.9

Characteristic	Total	Percent (%)
Management of Sick Birds		
Sell	1	9.1
Slaughter	4	36.4
Separate and treat	6	54.5
Management of Dead Birds		
Bury	5	45.4
Burn	3	27.3
Throw into the sea	3	27.3

AI Vaccination

Vaccine Application

As much as 72.7% of farmers never give Avian Influenza vaccines to their poultry, only 27.3% of farmers give Avian Influenza vaccination.

Vaccination Frequency

Around 66.7% of farmers that vaccinate give vaccination 3 times a year, while the remaining 33.3% give vaccination only twice a year.

The vaccination program adopted by fighting cock farmers is part of a program planned by the local livestock service office, which is conducted once every 4 months, therefore within one year there is 3 times AI vaccination.

AI Education

Education on AI, either from the government, university, or non-government organizations, is expected to improve public knowledge on AI. Only 9.1% of fighting cock farmers in Labuan subdistrict had received education on AI. The remaining 90.9% had never received education on AI.

Management of Sick and Dead Chickens

Chickens that fall ill or die during rearing should be managed properly. If not, sick or dead chickens could be a source of disease for other healthy birds in the flock.

As much as 9.1% of farmers manage sick chickens by selling the chickens and 36.4% of farmers slaughter them, while 54.5% of farmers separated sick chickens on the farm.

Regarding dead chickens, 45.4% of farmers manage dead chickens by burying them, while 27.3% of farmers burn the chickens and 27.3% throw dead chicken carcasses to the sea.

Sanitation System

Data on the poultryhouse sanitation system in fighting cock farms in Labuan subdistrict is shown in **Table 5**.

Table 5. Sanitation Management of Poultryhouses

Characteristic	*Total*	Percent (%)
Regularly clean houses		
Yes	2	18.2
No	9	81.8
Sweep houses		
Yes	7	63.6
No	4	36.4
Wash houses		
Yes	6	54.5
No	5	45.5
Clean with disinfectant		
Yes	0	0
No	11	100

House Cleaning Frequency

Regular cleaning and sanitation of poultryhouses is needed to prevent introduction of disease agents into the house environment. Dirty poultryhouses that are rarely cleaned could be a source of disease for birds that live in it.

The proportion of fighting cock farms that regularly clean their poultryhouses is 18.2%, while most of other farms (81.8%) do not regularly clean their poultryhouse.

House Cleaning Method

The cleaning and disinfection method applied by farms could affect the cleanliness of the poultryhouses. Houses that are properly cleaned and disinfected will not become a source of disease. As much as 63.6% of fighting cock farms clean poultryhouses by sweeping, while 54.5% of farms wash the houses. Cleaning methods applied by farmers do not use disinfectants.

Farmer Knowledge Level

The knowledge level of fighting cock farmers in Labuan subdistrict is shown in **Table 6** below.

Table 6. Knowledge Level of Fighting Cock Farmers in Labuan Subdistrict

No	Knowledge Level	Total Score	Number of Farmer	Percent (%)
1	Good	> 30	3	27.3
2	Moderate	15-30	8	72.7
3	Poor	< 15	0	0
Total			**11**	**100**

Data in **Table 6** shows that 72.2% of fighting cock farmers surveyed in Labuan subdistrict had 'moderate' levels of knowledge on AI, while 27.3% of farmers had 'good' knowledge levels and none of the farmers surveyed had 'poor' knowledge levels.

Moderate to good knowledge levels found in fighting cock farmers in Labuan subdistrict could be the result of continuous efforts done by the government, private sector, and non-government organizations for the last few years to improve public knowledge and awareness on AI. Many of the efforts conducted were public educations both directly and through public service ads in various media such as the radio, newspaper and television. People with relatively good knowledge are expected to have good awareness and care to participate actively in preventing AI spread from among birds and from bird to human.

Aspects of Farmer Knowledge

Most fighting cock farmers in Labuan subdistrict are known to have 'moderate' knowledge levels. Unfortunately that is not enough to specifically describe farmer's

knowledge of each statement category. Farmer knowledge level based on the type of AI statement is shown in **Table 7**.

Table 7. Knowledge Level of Fighting Cock Farmers in Labuan Subdistrict Based on Type of Statement

No	Response	Host		Transmission		Prevention		Mitigation		Total	
		N	%	N	%	n	%	n	%	N	%
1	Right	9	27.3	12	27.3	20	30.3	11	25.0	**52**	**27.8**
2	Wrong	9	27.3	4	9.1	19	28.8	5	11.4	**37**	**19.8**
3	Do not know	15	45.4	28	63.6	27	40.9	28	63.6	**98**	**52.4**
	Total	**33**	**100**	**44**	**100**	**66**	**100**	**44**	**100**	**187**	**100**

Data in Table 7 shows that from 187 responses given by fighting cock farmers surveyed, 27.8% had good knowledge of the statements given (gave right responses), while 19.8% had incorrect knowledge of the statements given (gave wrong responses) and 52.4% had no knowledge of the statements given (did not know).

Specifically on host animals and AI clinical signs, most fighting cock farmers had no knowledge on the subject (did not know) with a proportion of 45.4%, while 27.3% of farmers had good knowledge (gave right responses) and 27.3% of farmers had incorrect knowledge (gave wrong responses).

The knowledge level of farmers on AI disease transmission shows that 27.3% of farmers had good knowledge on how AI is transmitted (gave right responses), while 63.6% of farmers did not know and 9.1% had incorrect knowledge (gave wrong responses).

The knowledge level of farmers on AI disease prevention shows that 40.9% of farmers did not know how to prevent the disease, while 30.3% had good knowledge and 28.8% had incorrect knowledge on how to prevent the disease.

The knowledge level of farmers on AI disease mitigation shows that only 25% of farmers had good knowledge, 11.4% had incorrect knowledge, and 63.6% had no knowledge on how to mitigate AI.

Comparison of specific knowledge levels of fighting cock farmers in Labuan subdistrict based on statement type is shown in **Figure 1**.

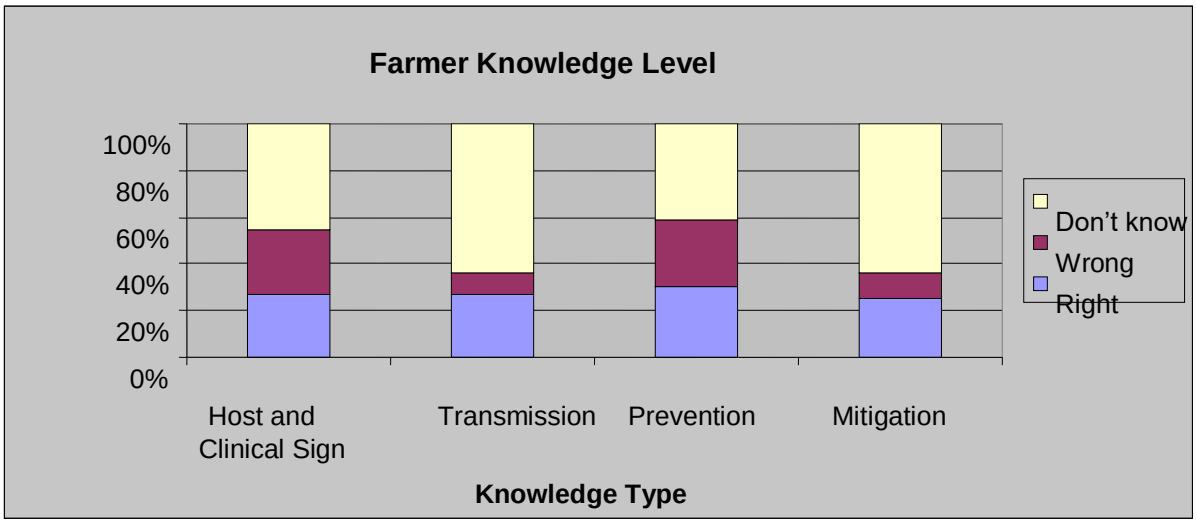

Figure 1. Comparison of Specific Knowledge Levels of Farmers in Labuan Subdistrict

Viral Prevalence

Viral prevalence indicates the proportion of H5 Avian Influenza infected farms basd on testing of tracheal swab samples with PCR. The viral prevalence of fighting cock farms surveyed in Labuan subdistrict is shown in **Table 8**.

Table 8. AI Viral Prevalence in Fighting Cock Farms in Labuan Subdistrict

No	Village	Number of Farms	Number of Positive Farms	Viral Prevalence (%)
1	Cicondang	8	6	75
2	Kp. Baru	2	0	0
3	Teluk	1	0	0
Total		**11**	**6**	**55**

Data in Table 8 shows that 55% (6 farms) of 11 fighting cock farms surveyd in Labuan subdistrict were infected by AI viruses based on PCR testing. Meanwhile the remaining 45% (5 farms) were not infected by AI virus. Based on farm location, all infected farms were known to be in Cicondang village. From 8 fighting cock farms surveyed in this village, 75% of the farms (6 farms) were positive for AI virus. No AI virus was found in other fighting cock farms surveyed in Kampung Baru village and Teluk village.

Association between Knowledge Level and Infection

The knowledge level of fighting cock farmers could influence disease incidence, including AI, in farms managed. Farmers with better knowledge on farm management are expected to implement measures that could protect the farm from disease introduction. Association between the knowledge level of fighting cock farmers in Labuan subdistrict and AI virus infection in farms is shown in **Table 9**.

Table 9. Association between Knowledge Level and AI Virus Infection in Fighting Cock Farms in Labuan Subdistrict

No	Knowledge Level	Total	Positive	Negative	p- Value	OR	95% CI
1	Good	3	2	1	0.576	Ref	Ref
2	Moderate	8	4	4		2.00	0.125-31.975
	Total	**11**	**6**	**5**			

Data in **Table 9** shows an indication that fighting cock farms with 'moderate' farmer knowledge level has twice the risk to be infected by AI compared to farms with 'good' farmer knowledge level. Unfortunately this association is not statistically significant because the p-value is >0.05 and the 95% CI value is over 1. This result is most likely because the number of farms sampled in this study was too small, hence a significant relation could not be determined.

CONCLUSION AND RECOMMENDATION

Conclusion

1. Fighting cock farmers in Labuan subdistrict are generally men less than 40 years old with elementary school backgrounds. Farmers commonly work as employees with chicken farming as a side job. The farms are handled by the owners themselves and farmers usually have 1-2 years of farming experience.
2. The husbandry system of fighting cocks in Labuan subdistrict is conducted in postal poultry houses <8 m^2, with average population >25 birds. The type of chicken is Bangkok chickens which are bred on farm. Farms also have other poultry species on farm, raise chickens with 2 age variations, and new chickens are directly mixed with other birds on the farm.
3. The health system of fighting cock farms show that most farms never vaccinate against AI, never receive education on AI, separate and treat sick chickens, and bury dead chickens.
4. The sanitation system in fighting cock farms show that most farms do not regularly clean the poultryhouses and cleaning if done was conducted by sweeping and washing the houses without using disinfectant.
5. Most fighting cock farmers in Labuan subdistirct have 'moderate' levels of knowledge.
6. Fighting cock farmers in Labuan subdistrict in general have insufficient knowledge on host animals, disease transmission, prevention methods, and disease mitigation efforts.
7. The proportion of H5 AI infected fighting cock farms in Labuan subdistrict is 55% on PCR.
8. The knowledge level of fighting cock farmers on AI has no association with AI infection in fighting cock farms.

Recommendation

1. The husbandry system, health system, and sanitation system of fighting cock farms in Labuan subdistrict needs to be improved.
2. Efforts to improve farmer knowledge on AI either through extension classes, spreading leaflets, and radio or television broadcast are needed.

3. Avian Influenza control and eradication measures in fighting cock farms need to be conducted.
4. Adequate surveillance is necessary to monitor the success of AI control in fighting cock farms.

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ANNEX

Annex 1. Fighting Cock Farmer Questionnaire

Survey Date : .....
Enumerator : .....

FIGHTING COCK FARMER QUESTIONNAIRE

I. FARMER CHARACTERISTIC

1.1 Farmer name :.....(M / F)
1.2 Age :..... Year
1.3 Farmer address
- Village : .....
- Subdistrict : .....
- District/Municipality : .....

1.4 Formal education :
- ☐ Elementary Sch. : ..... years
- ☐ Junior High Sch. : ..... years
- ☐ Senior High Sch. :..... years
- ☐ University : ….....years

1.5 Business status of fighting cock farm:
- ☐ Main business
- ☐ Side business
- ☐ Other, specify .....

1.6 Ownership status of fighting cock farm:
- ☐ Owned by respondent
- ☐ Worker
- ☐ Partnership
- ☐ Other, specify…….....

1.7 Fighting cock farming experience?
- ☐ < 1 year
- ☐ 1-2 years
- ☐ 3-5 years
- ☐ Over 5 years

1.8 Other occupation aside from farming fighting cock:
- ☐ Enterpreneur
- ☐ Government officer/military/police
- ☐ Employee/worker
- ☐ Farmer
- ☐ Other, specify .....

II. HUSBANDRY ASPECT

2.1 Land area used for fighting cock farming :
- ~ Poultry house : ..... m^2
- ~ Special location : .....:..... m^2
- ~ Other, specify : .....

2.2 Number of fighting cocks on farm:
- ☐ Hen : ..... birds
- ☐ Rooster : ..... birds

☐ Chick : ..... birds

2.3 Type of fighting cocks bred:

☐ Bangkok
☐ Saigon
☐ Burma
☐ Other, specify: .....

2.4 Source of chicks:

☐ Breed on farm
☐ Buy from other farmers near farm
☐ Buy from other areas, specify.....
☐ Buy from market, specify.....
☐ Other, specify: .....

2.5 Other poultry aside from fighting cocks kept on farm:

Poultry Type	Total (bird)
Native chicken	
Commercial chicken	
Muscovy duck	
Geese	
Domestic duck	
.....	

2. 6 Age variation on farm?

☐ One age (**go to question no 2.9**)
☐ Multiage
☐ Other, specify: .....

2.7 If multiage, how many age variations are there?

☐ Two
☐ Three
☐ More than three
☐ Other, specify: .....

2.8 How are chickens with different ages managed?

☐ Mixed
☐ Completely separated
☐ Other, specify: .....

2.9 What do you do to new chickens?

☐ Mix new chickens with old chickens on farm
☐ Completely separate new chickens from old chickens (no contact) for more or less 2 weeks
☐ Other, specify:.....

2.10 If separated, how?

☐ In a special house isolated from other birds
☐ In a special house near other birds
☐ In the same house with only a separating partition
☐ Other, specify: .....

2.11 Where does the chicken feed come from? (**Could answer more than one**) :

☐ Commercial feed, specify brand and type: .....
☐ Homemade feed

2.12 If use homemade feed, what are the ingredients (**Could answer more than one**):

- ☐ Powdered rice hulls
- ☐ Fish
- ☐ Restaurant waste
- ☐ Agricultural waste
- ☐ Other, specify.....

2.13 How many times are the chickens fed a day?

- ☐ Twice
- ☐ Three times
- ☐ More than three times

2.14 Are fighting cocks given raw eggs?

- ☐ Yes
- ☐ No
- ☐ Other, specify.....

2.15 How many times are fighting cocks given raw eggs?

- ☐ Once a day
- ☐ Three times a day
- ☐ Other, specify.....

2.16 What special treatment is given to fighting cocks? (**Could answer more than one**)

- ☐ Sunbathe
- ☐ Bathe (water)
- ☐ Other, specify.....

2.17 How many people work on the farm?

- ☐ Family workforce : ..... orang
- ☐ Hired workforce : .....orang

2.18 **If use hired workfore,** where do they come from:

- ☐ The local village
- ☐ The local subdistrict
- ☐ Other, specify: .....

2.19 Where do farm workers stay?

- ☐ Near the poultryhouse
- ☐ At your home
- ☐ At nearby residential houses
- ☐ Other, specify: .....

2.20 What is the average worker salary per month?

- ☐ < Rp. 300. 000,-
- ☐ Rp. 300.000,- - < Rp. 500.000,-
- ☐ Rp.500.000, - Rp. 750.000
- ☐ > Rp. 750.000,-

III. HEALTH ASPECT

3.1 Has there ever been a mortality case due to Avian Influenza?

- ☐ Yes, specify time: Month.....Year.....
- ☐ No **(Go to question 3.4)**

3.2. If **"yes",** how many chickens died at that time : ..... birds

3.3 How did you know the mortality was caused by Avain Influenza?

- ☐ Livestock Service Officer
- ☐ Veterinarian from the Animal Health Post

- ☐ Other farmers
- ☐ Other, specify: .....

3.4 Does Avian Influenza still cause cases in your village until now?

- ☐ Yes, specify when the last case occurred: Month.....Year.....
- ☐ No

3.5 How many times are your chickens vaccinated against AI?

- ☐ Once
- ☐ Twice
- ☐ Three times
- ☐ More than three times

3.6 Specify the type of vaccine used and the last time your chickens were vaccinated:

- ☐ Vaccine type : .....
- ☐ Last vaccination : Date.....month..... year.....

3.7 Who conducted the vaccination?

- ☐ Livestock Service Officer
- ☐ Veterinarian from the Animal Health Post
- ☐ Vaccinated yourself
- ☐ Other, specify:.....

3.8 Have you ever received Avian Influenza education?

- ☐ Yes
- ☐ No **(go to question No 3.11)**

3.9 If yes, from where did you receive the education?

- ☐ Local Livestock Service Officer
- ☐ Animal Health Post
- ☐ Other, specify.....

3.10 How many times have you received AI education?

- ☐ 1 time
- ☐ 2 times
- ☐ 3 times
- ☐ > 3 times

3.11 Do you usually report to the local livestock service officer if your farm experienced an outbreak?

- ☐ Yes
- ☐ No, specify the reason:

  .....
  .....
  .....
  .....
  ..... **(Go to question No.3.13)**

3.12 If **"yes",** how did you think the local livestock service officer responded to your report?

- ☐ Very quick
- ☐ Quick
- ☐ Slow
- ☐ Very slow
- ☐ No response

(Go to No 3.14)

3.13 If **"no response"**, how do you usually manage the sick birds?

- ☐ Sell the birds
- ☐ Slaughter the birds
- ☐ Immediately separate the sick birds from healthy birds for medication
- ☐ Other, specify:.....

3.14 What disease is usually found to infect your chickens?

- ☐ Diarrhea
- ☐ Cough/Sneeze
- ☐ Anorexia
- ☐ Paralysis
- ☐ Other, specify: .....

3.15 Do you report to the local livestock service officer/Animal Health Post if there was sudden death in your farm?

- ☐ Yes (**Go to question No 3.17)**
- ☐ No

3.16 If **"no",** how do you manage the dead chickens?

- ☐ Bury the carcasses
- ☐ Burn the carcasses
- ☐ Throw the carcasses into the nearest river
- ☐ Other, specify:.....

3.17 What disease symptom is usually found in sudden death cases?

- ☐ Diarrhea
- ☐ Cough/Sneeze
- ☐ Anorexia
- ☐ Paralysis
- ☐ Other, specify: .....

3.18 Do you regularly clean the poultryhouse and its surrounding?

- ☐ Yes
- ☐ No **(Go to No 3.21)**

3.19 If yes, how often?

- ☐ Once a day
- ☐ Once every 2 days
- ☐ Once every 3 days
- ☐ Other, specify: .....

3.20 How do you clean the houses?

- ☐ Sweep only
- ☐ Sweep and spray with disinfectant
- ☐ Other, specify: .....

3.21 Health program :

Program	Type	Time/Age Given	Frequency
Vaccination (other than AI)			
Anthelmintic			
Antibiotic			

Vitamin			

3.22 Who gave the medications to the chickens?

- ☐ Veterinarian from Animal Health Post
- ☐ Livestock Service Officer
- ☐ Yourself
- ☐ Other, specify: .....

Annex 2. Farmer Knowledge on Avian Influenza

FARMER KNOWLEDGE ON AVIAN INFLUENZA

To measure your knowledge level on Avian Influenza in fighting cocks, you are required to read the following statements carefully. After reading each statement, please give an honest response to the statements. Respond by giving a **check (V)** in one of the answer columns of "**right**", "**wrong**", or "**don't know**".

No	Statement	Right	Wrong	Don't Know
4.1.	Ducks and other waterfowl (geese, Muscovy duck) are commonly more resistant to AI infections compared to fighting cocks			
4.2.	Fighting cocks infected wit AI viruses (even though look healthy) could transmit the disease to other animals			
4.3.	Chickens suffering from depression, anorexia, ruffled feather, weakness, and drowsiness could be a sign of AI infection			
4.4.	Non-vaccinated fighting cocks are at higher risk of AI infection compared to vaccinated birds			
4.5.	Vaccinated cocks could not longer compete because they have become week and vulnerable against AI			
4.6.	The feces of AI infected fighting cocks is not dangerous for other animals because AI could not be transmitted through feces			
4.7.	Regular cleaning of poultryhouses, equipment, and its surrounding is the right way to reducing risks of AI transmission to your chickens			
4.8.	Visitor coming in and out of the farm area could not become a source of AI disease			
4.9.	Before anybody enters the farm/poultryhouse, they must wash their hands, legs, and footwear with water and soap			
4.10.	Vaccination in healthy chickens could provide immunity against AI			
4.11.	Sick chickens with signs consistent to AI can be slaughtered for consumption/sold			
4.12.	Newly purchased chickens could be directly mixed in the same house with old chickens on farm			
4.13.	Chickens that had suddenly died and is suspected for AI should be put in a plastic bag for inspection by animal health officers or buried			
4.14.	Massive sudden death does not have to be immediately reported to the local animal health officer			

4.15.	You must wash your hands with soap every time you will or after you handle chickens			
4.16.	Anybody in close contact or direct contact with AI infected fighting cocks could be infected by the disease			
4.17.	The nearest Animal Health Post or livestock service office is the place where you report cases of AI infection			