

Newcastle Disease in Chickens of Smallholder Farmers at Krang Yov Commune S'ang District, Kandal Province

Sokha Thim^{1,3}, Chhay Kheang Lim¹, Kroesna Kang¹, Sath Keo¹, Vutey Venn² and Kouch Theng¹

1. Faculty of Veterinary Medicine, Royal University of Agriculture, Phnom Penh 12400, Cambodia

2. General Directorate of Animal Health and Production, Phnom Penh 120603, Cambodia

3. Graduate School, Royal University of Agriculture, Phnom Penh 12400, Cambodia

Abstract: The study was conducted in Krang Yov commune, S'ang district, Kandal province and was conducted in three villages, including Kampong Po, Andong and Svay Damnak village. In the total, 88 families were selected for interview by using snowball technic of nonprobability sampling. According to the results of the interviews, it showed that the number of farmers who raised chickens and had participated in training was very low number, ranging from 10.71% to 34.38 %. For chicken raising system, the free ranging was the most popular by allowing the chicken to scavenge around the village, however, the total confinement was also applied. The local breed was more popular and the purpose of raising was for selling meat, however there were few households that raised the fighting cock for hobby. The number of chickens owned per household, was mostly less than 20 birds, while, the average number of birds per household ranged from 16.82 birds to 37.66 birds. However, the average number of birds per household was significant different between the households who have participated in chicken raising training and those who never participated ($p < 0.05$), accounting for 47.52 birds and 19.85 birds, respectively. For the chicken feed, most of the farmers in those three villages used the concentration feed to offer the chicken, especially for supplementation, but, the whole rice was also used to supplement feed. The vaccination for chicken was significant different among the villages ($p < 0.05$), in which the household in Kampong Po village had highest percentage of vaccinating their chicken, 40.63%, than those in Svay Damnak and Andong village. The Newcastle vaccination was the more popular in those areas. But, all of the households have experienced with the disease, especially ND (Newcastle Disease) accounting for 67.05%, followed by influenza and fowl pox. When chicken got sick, most of farmers had treated their chicken with different methods, especially buying the medicine from the store and treatment by themselves were mostly applicable. Regarding the specific case of Newcastle disease, most of farmers were familiar with this disease and it frequently occurred in dry season and the knowledge on biosecurity measurement was very high, during suspected cases. However, the real practice with bird infected with Newcastle disease was limited since they treated the affected bird, and few farmers left their affected chicken in the flock, which could cause further spreading of this disease in the flock and village.

Key words: Raising system, vaccination, biosecurity, ND.

1. Introduction

The Cambodia is a developing country with great potential in agriculture, especially in crop production and animal husbandry. The Cambodian had long history of raising chickens to contribute to food security and was playing an important role in improving the livelihoods of the rural farmers, which can provide a significant income due to easiness to raise with short production cycle [1]. There were 90%-95% of famers in rural areas who preferred to raise chickens at

backyard, since it needed low inputs and fasted income return [2]. However, the small-scale poultry production of farmers in Cambodia was encountering some main challenges, such as high morbidity and mortality rates and low productivity, due to the limited knowledge of chicken-raising, breed selection, feed and feeding, disease prevention and treatment of the owners [3]. The main diseases that frequently occurred were: such as CRD (Chronic Respiratory Disease), Coryza, Blood diarrhea (Coccidiosis), Cholera, Fowl Pox, Gumboro,

Corresponding author: Sokha Thim, Ph.D., research field: animal science. E-mail: tsokha@rua.edu.kh.

AI (Avian Influenza), and ND (Newcastle Disease), which caused economic loss for farmers and the country in poultry production. Among those common diseases, ND is a fatal disease that can seriously damage the household income due to high case-fatality, up to 80 percent [4], in addition it was an acute, highly contagious and fast spreading to other birds in all ages [5]. For this reason, prevention of the spreading disease was very important, and early detection of sick or suspected birds was the critical point for high consideration in order to prevent diseases effectively and reduce the threatening of the diseases and economic losses. Moreover, the vaccination and biosecurity [6] were the main options for control of ND in rural and peri-urban areas in Southeast Asia. Due to this reason, the study of “Newcastle disease in chickens of smallholder farmers at Krang Yov commune, S’ang

district, Kandal province” was designated to identify the chicken production status and main challenge for farmers with ND and other correlation to the disease.

2. Material and Method

2.1 Study Area and Period

The study was conducted in Kraing Yov commune, S’ang district, Kandal province. Three villages were selected, such as Kampong Po, Svay Damnak and Andong village (Fig. 1). Among those villages, 88 households (Table 1) were selected based on criteria as following:

- Raising chicken
- Willing to join the interview

Each participated farmer was selected by using snowball sampling technique of nonrandomized sampling.

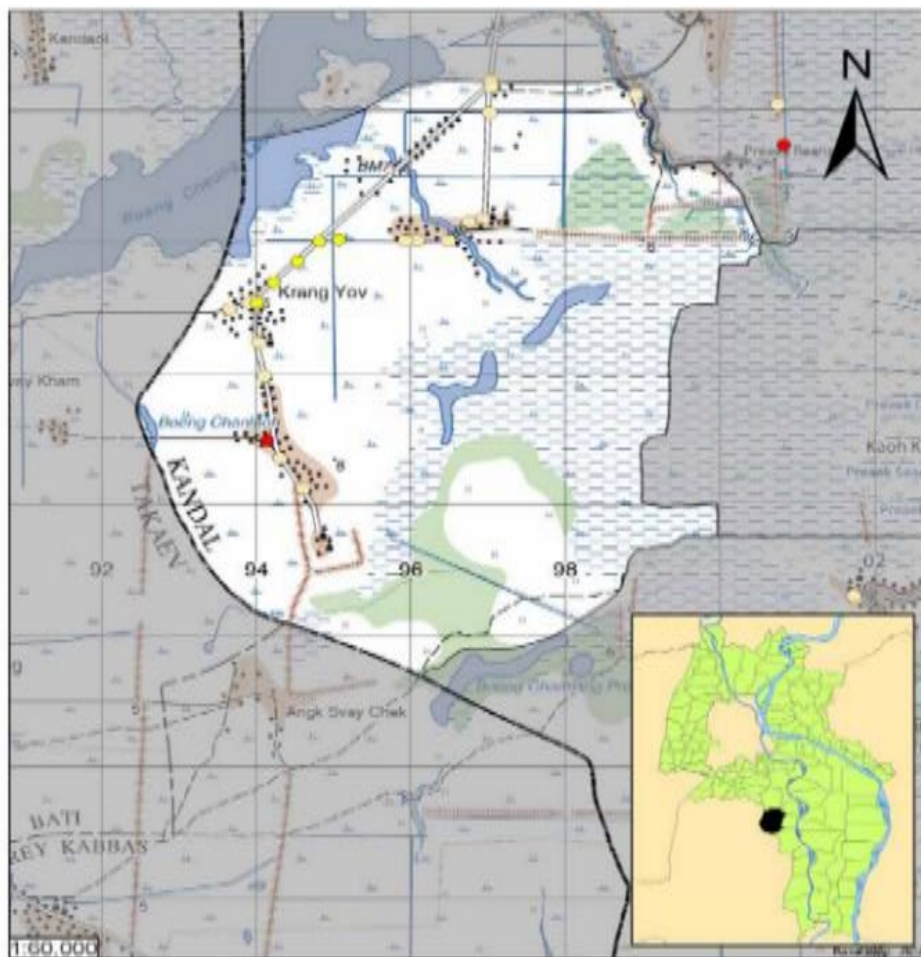


Fig. 1 The location of the Kang Yov commune (white area) in the Cambodia Map.

Table 1 Number of interviewed family in each village.

Selected villages	Number of family	Number of family interviewed
Kampong Po	282	32
Svay Damnak	247	28
Andong	246	28
Total	775	88

The total study period was from March to June 2022.

2.2 Data Collection

The semi-structural interview with face to face was applied using designated questionnaire. The data were collected as following: demography, chicken management and health management.

2.3 Data Management and Data Analysis

The collected data were recorded and analyzed by using Microsoft Excel for descriptive statistics, including frequency and distribution, in order to describe the dataset. Some tools for inferential Statistics were used, such as parameter test and non-parameter test.

3. Result

3.1 Information about Farmers

According to Fig. 1 it showed that the majority of age categories of interviewed farmers was from 31- to 40-year-old, consisting of 75.45%.

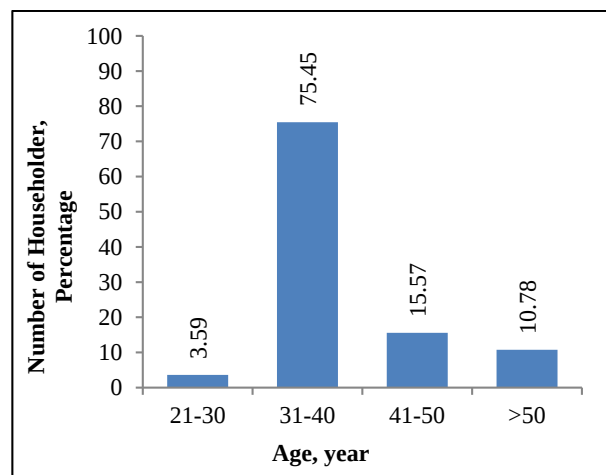
There were a low number of households who have participated in chicken raising training in those three villages, ranging from 10.71% to 34.38% and there were also no significant differences among those three villages, i.e. there were similar percentages (Table 2).

3.2 Chicken Raising System

The farmers in those 3 villages applied different raising systems, however, free ranging was the most popular for them, since the chicken were allowed to scavenge around the village, accounting for 42.86% to 75.00%. However, the total confinement was also applied in which farmers feed chicken with concentrated feed combined with available local feed resources in the village and also the kitchen waste (Fig. 2). The local breed was more popular and purpose of raising was for selling meat, however there were few households who raised the fighting cock for hobby.

3.3 Number of Chicken per Household

The numbers of chicken raised per household, mostly were less than or equal 10 birds and from 11-20 birds, ranging from 30.68% and 34.04%, respectively. However, there were 4.55% of households that possessed more than 70 birds (Fig. 3).

**Fig. 1** Age categories distribution of chicken owner.**Table 2** Number of household participating in training on chicken raising.

Villages	Total interview	Participated		Never participated		Chi-square value	p value
		Number	Percentage	Number	Percentage		
Kampong Po	32	11	34.38	21	65.63	4.631	0.099
Svay Damnak	28	7	25.00	21	75.00		
Andong	28	3	10.71	25	89.29		
Total	88	21	23.86	67	76.14		

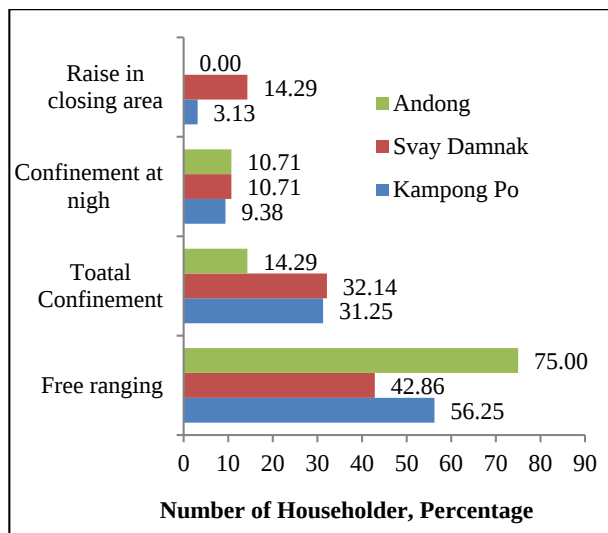


Fig. 2 Chicken raising system.

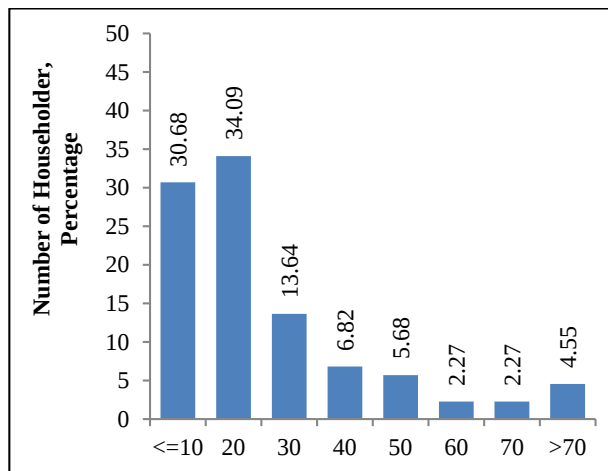


Fig. 3 Number of bird per household.

The average number of birds per household was not different significant ($p < 0.05$), ranging from 16.82 birds to 37.66 bird per household (Table 3).

However, the average number of birds per household was significant different between the households who have participated in chicken raising training and those who never participated, accounting for 47.52 birds and 19.85 birds per household, respectively (Table 4).

3.4 Feed for Chicken

Most of the farmers in those three villages have used the concentration feed to offer the chicken, especially for supplementation. However, the whole rice was also used to supplement feed in Svay Damnak village, up to 42.86% (Table 5).

3.5 Vaccination for Chicken

Through Table 6 it was found that the number of households who have vaccinated their chicken was significant different among the villages ($p < 0.05$), in which the households in Kampong Po village had higher percentage of vaccinating chicken, 40.63%, than those in Svay Damnak and Andong village (Table 6).

Table 3 The average birds per household by village.

Village	Average	SE mean	F value	p value
Kampong Po	37.66	6.366		
Svay Damnak	23.29	6.805	2.659	0.076
Andong	16.82	6.805		

Table 4 The average birds per household by training status.

Participation in training	Average	SE mean	t value	p value
Yes	47.52	7.260		
No	19.85	4.266	3.168	0.002

Table 5 Variety of chicken feed by household.

Feed type	Kampong Po (n = 32)	Svay Damnak (n = 28)	Andong (n = 28)
Concentrated feed	50.00	67.86	50.00
Home made	37.50	10.71	10.71
Rice brand	-	25.00	7.14
Kitchen waste	21.88	21.43	35.71
Whole rice	15.63	42.86	21.43
White rice	3.13	21.43	21.43
Corn	6.25	14.29	3.57
Water spinach	-	3.57	-
Banana stalk	-	3.57	-

Table 6 Vaccination status of household.

Village	Total interview	Vaccinated		No vaccinated		Chi value	p value
		Number	Percentage	Number	Percentage		
Kampong Po	32	13	40.63	19	59.38	6.771	0.034
Svay Damnak	28	3	10.71	25	89.29		
Andong	28	8	28.57	20	71.43		
Total	88	24	27.27	64	72.73		

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In those 3 villages, the Newcastle vaccine was more popular and used by the most of the household, ranging from 62.50% to 69.23%, while fowl pox was the second rank of main vaccine in those areas (Table 7).

Table 8 showed that the numbers of household who had vaccinated and non-vaccinated their chicken associated with participation in training, i.e. that more than half of households who had participated in training on chicken raising have vaccinated their chicken.

3.6 Diseases and Treatment of Chicken

All of the households who raised the chicken have experienced the disease, no one is an exception. The critical disease for chicken was Newcastle accounting for 67.05% of farmers who had met during their production cycle, followed by seasonal influenza and fowl pox, accounting for 18.18% and 9.09% respectively (Fig. 4).

However, most of them had treated their chicken, ranging from 82.14% to 89.29%. While, the treatment methods applied in those 3 villages had varied, but the treatment by buying the medicine from pharmacy store and treatment by themselves were mostly applied and the percentage of the combination of these two methods ranged from 84.00% to 96.30% (Table 9).

3.7 About Newcastle

For ND, most of farmers were familiar with this disease and 90.91% knew this disease (Fig. 5).

Table 7 Types of vaccination used.

Types of vaccine	Kampong Po (n = 13)	Svay Damnak (n = 3)	Andong (n = 8)
ND	69.23	66.67	62.50
Fowl Cholera	15.38	-	-
AI	7.69	-	12.50
Fowl pox	30.77	66.67	50.00
Other	38.46	-	37.50

Table 8 Correlation between training and vaccination.

Participating in training	Total	Vaccination		Chi-square value	p value
		Yes	No		
Yes	21	57.14	42.86	12.41	< 0.001
No	55	17.91	82.09		

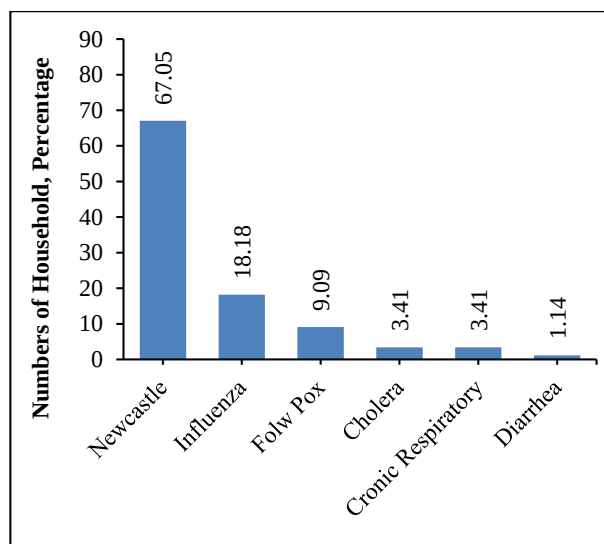


Fig. 4 Type of diseases that were met.

Table 9 Treatment of chicken.

	Kampong Po	Svay Damnak	Andong
No treatment	15.63	10.71	17.86
Treat	84.38	89.29	82.14
Treatment Method			
VAHW in village	-	8.00	8.70
VAHW out village	3.70	8.00	-
Pharmacy store	29.63	28.00	39.13
Themselves	66.67	56.00	52.17

Note: VAHW-Village Animal Health Worker.

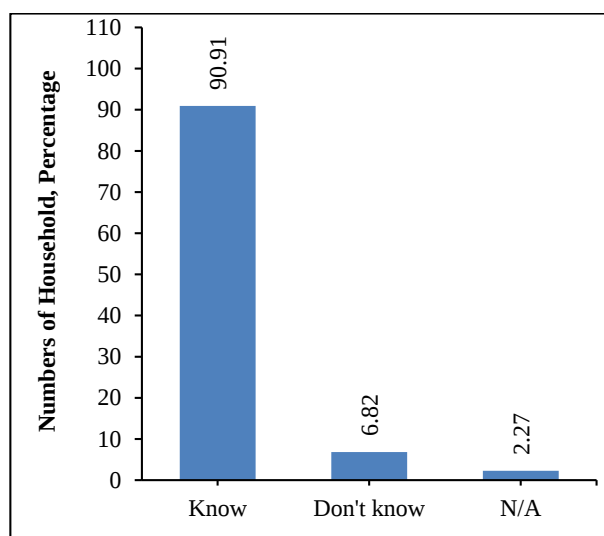


Fig. 5 Awareness of ND.

For the high peak of Newcastle outbreak, most of the farmers blamed the dry season, accounting for 72.73%, when it was very hot, especially in April and May (Fig. 6).

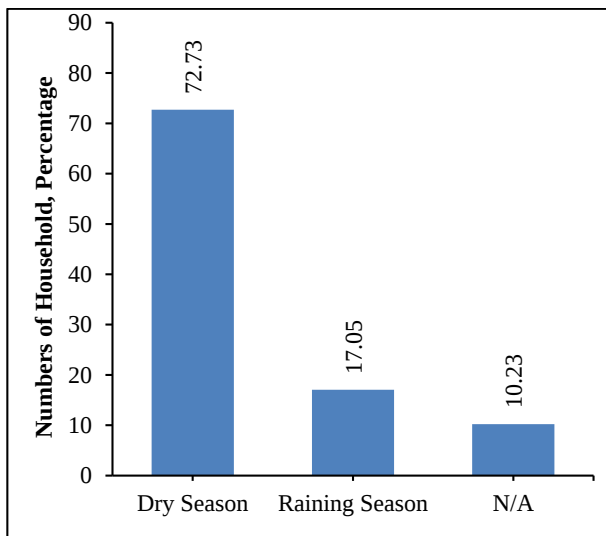


Fig. 6 The seasonal outbreak of ND.

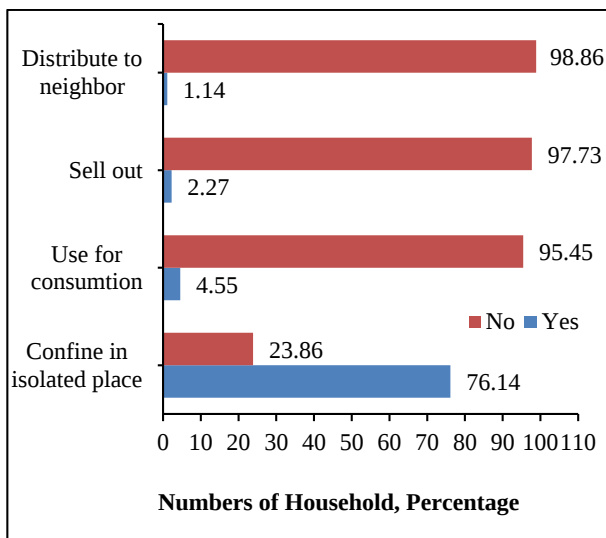


Fig. 7 Measurement when dealing with the suspected bird.

3.8 Biosecurity

The result of interview showed that most of farmers are aware of disease control measurement, especially during the suspected case. Most of them said that they did not distribute the suspected bird to neighbors nor sell out and 76.14% will confine birds in isolated area (Fig. 7).

However, for the real practice with bird infected with Newcastle, about 68.18% said that they will treat the bird, since they may not know this disease caused by virus which has no any effective treatment. The burying method will also be applied in case of the occurring of

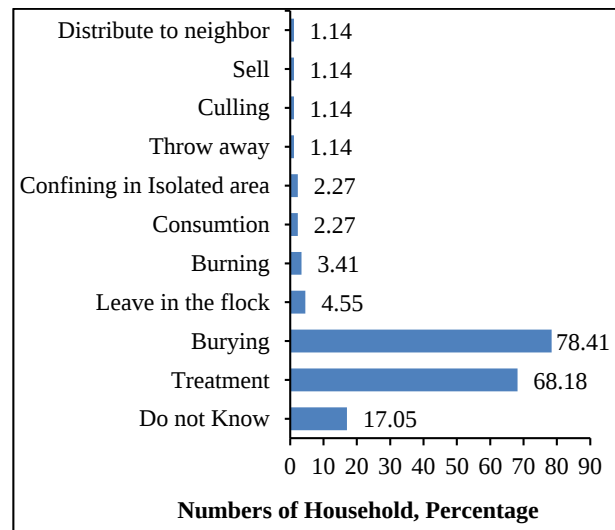


Fig. 8 The measurement for infected chicken.

infection accounting for 78.41%. However, there were also very few farmers who left their affected chicken in the flock, which could cause further spreading of this disease in the flock and village (Fig. 8).

4. Discussion

The classification of poultry production systems in Cambodia can be traditional/backyard, semi-intensive small or medium scale and intensive large-scale industrial. The traditional/backyard system has small flock sizes that are usually less than fifty birds per household [7]. It was similar to our finding that about 90.91% of households had less than fifty birds and 9.09% had higher than fifty birds, but in average 27 birds per household and this number varied with opportunity for joining the training. Thus, the training course on poultry farming was utmost important since the training changed the level of knowledge and skills of the farmers regarding the improvement of backyard poultry, diseases and feed management of poultry [8]. Feed resources were similar to the finding of Heft-Neal et al. [9], who reported that the scavenging was the most important source of chicken feed, but other supplementation sources were also offered to the chicken, including whole rice, rice brain, white rice, corn, banana stalk and commercial feeds.

The vaccination status varied among the villages, since Kampong Por had higher percentage of farmers who vaccinated their chicken, this result may come from the training provided during KOPAI (*Korea Project on International Agriculture*) from 2015 to 2018.

All of the backyard poultry producers faced the problem of poultry diseases, and the main infectious disease of poultry in this finding was mainly ND which occurred frequently, especially in dry season. There was a similar report [10] that found that in developing countries, the backyard poultry sector mostly suffers from two infectious diseases, such as AI and ND due to the inadequate backyard flock biosecurity highlighting the issue of poultry control in backyard systems [11, 12], and the basic biosecurity measures may not suffice to limit the spread of infectious diseases in backyard poultry flocks in Cambodia [13]. The bio-security refers to the implementation of policies and practices that prevent the introduction and spread of disease [14]. The effective disease control program for poultry production premises relied on hygiene and sanitation, thus prioritizing biosecurity guidelines and strategies, public awareness, and training on the concept and the implementation of biosecurity to all relevant stakeholder must be done and should be an obligatory prerequisite for operation and establishment of the farms [15].

5. Conclusion

In conclusion, the practice of free scavenging for the chicken production system of farmers in Krang Yov commune, S'ang District Kandal province, is still popular. Thus, all of them faced with diseases during their production cycle, especially ND. The vaccination and biosecurity were also applied, but are limited and need further improvement and action. Moreover, the training course was also limited and only few households participated. Thus, the support training on chicken production and biosecurity should be prioritized.

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