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DISEASE RISK CONTROLS IN FATTENING PIG FARM HOUSEHOLDS IN KINH MON TOWN, HAI DUONG PROVINCE

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Abstract

This study aims to assess the current measures for disease risk controls in pig production of the farm households in Kinh Mon town, Hai Duong province. The study results show that most of the large-scale and medium-scale pig farm households in the town have actively applied measures for diseases risk controls. Meanwhile, many small-scale pig farm households have not fully applied the measures, specifically in piglet source selection, pigpen establishment, hygienic cleaning, feed source and vaccination. The major solutions for enhancing the measures for the disease risk controls in pig production include the development of large-scale pig farm models, the enhancement of the propaganda and dissemination on measures for disease risk controls, strengthening the management of veterinary service providers, and improvement of the policies for pig production in the town.

Keywords: Control measures, disease risk, farm household, fattening pig production, Kinh Mon town

1. Introduction

Pig production is a strategic sectors of Vietnam's economy [1]. It contributes to approximately 60% of total livestock output and is considered a source for the livelihoods of around three million farm households, of which 77% are smallholders [2]. Pig production has been also considered a traditional activity in rural area of Vietnam for very long time [3].

Kinh Mon is a semi-mountainous town of Hai Duong province. With its large natural area (16,533.6 ha) and favourable climate and human resources, Kinh Mon town has the good conditions for agricultural production in general, fattening pig production in particular. After the outbreak of African swine fever (ASF) in 2019, the pig production in the town has increased quite rapidly, and reached at 32,220 heads in 2021, of which fattening pig made up 71.6%.

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Animal production in general, pig production in particular has significantly contributed to the employment generation, farm household income improvements and economic development in the town [4]. However, the fattening pig production in the district has still faced with many difficulties such as low input quality, input price soaring, output price volatility, high disease risk, low yield, etc., of which disease risk is considered as one of the key. Although the ASF pandemic has been controlled, however the probability of ASF occurrence in pig production still remains quite high in Kinh Mon town. In addition, many other diseases such as Diarrhea, Sasteurellosis, Palmonellosis, Erysipelas suis, Blue ear disease could still happen in pig production in the town. The occurrence of these diseases and outbreaks has caused the significant loss for pig production households. What measures for pig households have been implemented to control the disease and how to enhance the control measures in the town are the questions that need to be investigated. Under such a circumstance, this study is conducted to assess the current disease risk control measures and to propose the solutions for enhancing the measures for disease risk control in pig production of farm households in Kinh Mon town in the coming time.

2. Methods

2.1. Data collection

Secondary data on pig production such as the total herd, number of pig raising households, total pig production, the number of disease-infected pig head, the economic loss due to the disease in pig production in Kinh Mon town were gathered from Economic Department, Statistical Office and related units in the town.

The primary data on pig production and farm households' measures for preventing the diseases in pig production and their assessments were collected through the focus group discussion with the management staff of the Kinh Mon Town and the direct survey of 100 pig production households with different scale of pig production. The focus group discussions with 05 related staff in the town (including 02 staff in Economic Department who are responsible for animal production and 03 staff in the Veterinary Station) were conducted to get their opinions on the pig production and the applied measures for controlling the diseases in pig production. Based on the current state of the pig production and the discussion with the management staff in Kinh Mon town, the scale of pig production in the farm households could be divided into three groups of small scale (less than 30 pig heads per year), medium scale (30-200 pig heads per year) and large scale (equal or more than 200 heads per year). A total of 100 pig farm households with different scales (including the 40 small scale households, 30 medium scale households and 30 large scale households) in three representative communes of Minh Hoa, Hien Thanh and Long Xuyen were randomly selected for direct surveys using the standard questionnaires. The main contents of the questionnaires included the basic information of the respondents and farm households, the status of fattening pig production in the farm households, and the measures applied by the farm households for disease risk controls in their pig production, and their opinions on difficulties in disease risk controls. The farm survey were conducted during July and August 2022.

2.2. Data analysis

The descriptive statistics and comparative analysis methods were mainly used in this

research. Descriptive statistics method was used to describe the general pictures of fattening pig production, the diseases and their associated damages in fattening pig production. Meanwhile, comparative analysis method was applied to investigate the differences in disease prevention measures in pig production between groups and years.

3. Results and discussions

3.1. Overview of pig production and the diseases in Kinh Mon town, Hai Duong province

Kinh Mon was the first town in Hai Duong where AFS disease appeared. Before the AFS in 2019, pig production in Kinh Mon town had developed quite well with total herd of around 65 thousand heads in year 2018 and ranked the second (of total 12 districts and towns) in Hai

Duong province. However, the ASF outbreak in 2019 nearly destroyed the pig industry in Kinh Mon town. The total herd in 2019 sharply declined down to just 11.3 thousand heads (just equal to only 17.4% of the herd in 2018). Almost all pig farm households in Kinh Mon town bear the huge economic loss due to the ASF in 2019. During 2020-2021 when the ASF outbreak was controlled, the pig production in Kinh Mon were gradually restored [5]. However, due to the huge economic loss by the 2019 outbreak and the farmers of disease risk in pig production, the total pig herd in Kinh Mon town reached only 32 thousand head in 2021 or only a half of total herd in 2018 when the ASF had not occurred, yet. The herd of fattening pigs usually accounted for more than 70% of the total pig herd in Kinh Mon town. The total production of pig live weight in 2021 recorded at 1.3 thousand ton, around 3 folds higher in 2019 (table 1).

Table 1. Pig production in Kinh Mon town, Hai Duong province

Items	Unit	Year 2019	Year 2020	Year 2021	In comparison (%)		
					2020/ 2019	2021/ 2020	2019- 2021
1. Total pig herd	head	11,305	21,446	32,220	189.7	150.2	168.8
- Swine	head	847	2,291	3,147	270.5	137.4	192.8
- Boars	head	11	44	23	400.0	52.3	144.6
- Fattening pig	head	8,415	15,802	23,073	187.8	146	165.6
- Piglet	head	2,032	3,309	5,977	162.8	180.6	171.5
2. Total live weight production	ton	456.2	870.7	1,310.00	190.9	150.5	169.5

Source: Statistical Office, Kinh Mon town, 2021 [6]

3.2. Diseases in fattening pig production in Kinh Mon town, Hai Duong province

Although the number of pig raising households in Kinh Mon town had been declined for recent years, more than 1,200 households still remained to raise pigs as

the one of their livelihood activities. Most of the households raised their pigs inside the residential area at the small scale and medium scale. Only few large scale farm households raised the imported pigs. Moreover, the transportation of piglet and pork without

safe condition from this commune to another commune inside the town and from other towns to Kinh Mon town occurred daily. Therefore, the pig production in Kinh Mon town was highly exposed to disease risks.

According to the report by the Veterinary of Kinh Mon town, diseases were one of the highest risks in pig production and most seriously affected the pig production in the town.

Table 2. Number of disease-infected fattening pigs in Kinh Mon town during 2019-2021

Items	Unit	2019	2020	2021	In comparison (%)		
					2020/ 2019	2021/ 2020	2019- 2021
1. Number of fattening pigs	head	8,415	15,802	23,073	187.8	146.0	165.6
2. Number of infected pigs by disease	head	2,433	3,150	2,838	129.5	90.1	108.0
- Diarrhea	head	312	453	613	145.2	135.3	140.2
- Pasteurellosis	head	241	421	562	174.7	133.5	152.7
- Salmonellosis	head	214	516	323	241.1	62.6	122.9
- Erysipelas suis	head	112	154	117	137.5	76.0	102.2
- Parasitic disease	head	211	209	198	99.1	94.7	96.9
- ASF	head	1021	976	513	95.6	52.6	70.9
- Other diseases	head	322	421	512	130.7	121.6	126.1
3. Rate of disease-infected pigs	%	28.9	19.9	12.3	-	-	-

Source: Economic Department, Kinh Mon town, 2021[4]

The data in table 2 shows that the rate of disease-infected pigs in Kinh Mon was quite high during 2019-2021. In 2019, nearly 30% of pig heads in the town was infected with various diseases, especially ASF and many pig farm households were required to demolish their pig herd when ASF appeared in their villages and the total loss for the pig farm households was estimated to be more than 100 billion VND. In 2020-2021, even the ASF outbreak was controlled, many pigs in the town were still infected with ASF. In addition, other diseases (mainly Diarrhea, Pasteurellosis, Salmonellosis) still happened and affected the pig production in the farm households. Although the rate of disease-infected pigs had been declined during 2019-

2021, it was still quite high (12.3% of the total herd) and caused the significant loss for pig farm households.

Although the pig farm households already applied various control measures for preventing and treating the diseases, however, the pig farm households that had dead pigs due to the diseases accounted for significant portion. According to the survey, 27.5% of small scale pig farm households had the dead pigs due to the diseases in 2021. These figures in medium scale and large scale households were 20% and 7.5%, respectively. Total economic loss due to the culled pig in those farms was significant, especially in large-scale farm households (around 177 million per household).

Table 3. Economic loss for dead pigs due to the diseases in surveyed households in year 2021

Items	Unit	Small-scale households	Medium-scale households	Large-scale households
1. Total survey households	Hh	40	30	30
- Number of households with dead pigs	Hh	11	8	3
- Rate of households with dead pigs	%	27.5	20.0	7.5
2. Total estimated economic loss	Mil VND	80.4	214.0	531.0
- Estimated economic loss per households	Mil VND	7.3	26.5	177.0

Household survey, 2022

3.3. Assessment of disease risk controls by pig farm households in Kinh Mon town, Hai Duong province

3.3.1. Selection of piglet providers

Good supply sources of piglet play an important role for preventing the disease risk in fattening pig production. In Kinh Mon town, the pig raising households could get the piglet from 4 main sources, including self-provision, purchase from individual piglet providing households, from piglet providing station, and from middlemen. The households which were self-provision of piglet accounted for 41% of the total survey

households. While the rate of piglet self-provision in small-scale households was just 20%, this figure in large-scale households was 63.3%. The large-scale pig households thus tend to provide their piglet by themselves for better disease risk control. Significant rate of small scale households purchase the piglet from small piglet providers (37.5%) and from middlemen (27.5%). The quality of piglets from those sources was not well guaranteed and could results in disease risks, however, the price was usually cheaper and transaction took place quite rapidly. This is one of the reasons why the diseases usually occur firstly in small scale households.

Table 4. Main piglet providing sources for pig farm households in year 2022

(Unit: %)

Indicators	Small-scale households	Medium-scale households	Large-scale households	Total
- Self-provision	20.0	46.7	63.3	41.0
- Purchase from small individual piglet providing households	37.5	10.0	6.7	20.0
- Purchase from piglet providing station	15.0	30.0	30.0	24.0
- Purchase from middlemen/local market	27.5	13.3	0.0	15.0

Household survey, 2022

3.3.2. Pigpen establishment and hygienic cleaning

Pigpen design and hygienic cleaning of pigpen and other pig raising tools also play the essential role in diseases control

for pig production [7]. A good pigpen is the one that could meet the standard requirement of area, reasonable location, and coolness in the summer, warmth in the winter. The establishment of standard pigpen

could help to apply the feeding and caring measures easily and to isolate disease pigs for treatment conveniently. The survey results show that 67.5% of large scale pig households established the standard pigpen.

However, the cost for standard pigpen was quite high. This was the main constraint for other pig farm households to establish the standard pigpen, especially for medium and small scale pig households in the town.

Table 5. Pigpen establishment by pig farm household groups in year 2022

(Unit: %)

Indicators	Small-scale households	Medium-scale households	Large-scale households	Total
1. Rate of households having standard pigpen	67.5	53.3	13.3	47.0
2. Rate of households having no standard pigpen	32.5	46.7	86.7	53.0
- Rate of households who would like to establish the standard pigpen in coming time	32.5	26.7	16.7	26.0
- Rate of households who would not like change the pigpen	0.0	20.0	70.0	27.0
3. Rate of households often applying hygienic cleaning	80.0	96.7	100.0	91.0
- With antiseptic solutions	52.5	86.7	96.7	76.0
- With lime powders	57.5	90.0	96.7	79.0
4. Households with pigpen far from residential area	5.0	23.3	56.7	26.0

Household survey, 2022

Hygienic cleaning of pigpen and rearing tools is also one of the essential requirements for preventing the diseases for animal raising as well as for fattening pig production. The survey results show that all pig farm households recognized the importance of the hygienic cleaning in disease prevention. Most of all pig households (91%) cleaned the pigpen and raising tools very often. Almost all large-scale pig farm households (96.7%) also used antiseptic solution and lime powder for hygienic cleaning. However, these figures at small scale households were just less than 60%. Significant rate of small pig farm households only simply cleaned the pigpen and washed the tools with fresh water, but not cleaned pigpen or soaked the tools with antiseptic solution. In general,

only 26% of the pig farm households which had the pignpens far from residential area. The rate of large scale farm households that had pignpens far from residential areas was 56.7% and this figure for medium scale farm households was 23.3%. Nearly all small farm households (95%) raised the pigs in the residential areas. This is also the reason why the diseases often occurred firstly in the small scale farm households.

3.3.3. Selection of feed sources for pig production

Feeds could place the major effects on the growth of fattening pig. If the pig feed sources are not guaranteed (for example, feeds are infected with mold), that could cause the digestive diseases for pigs. The main feed sources for pig production usually

come from (1) pig feed companies (pig farm household could directly purchase feeds from feed companies in Hai Duong, Quang Ninh, Hung Yen province; (2) pig feed shops or pig farm households could purchase the feeds from feed shops in Kinh Mon town; (3) self-supply (pig farm households could provide the feeds by themselves through

mixing their maize, rice bran, vegetables or food wastes). The pig farm households could use only compound feeds from feed companies for pig production, or use mix of compound feeds and traditional feeds (such as maize, rice, vegetables or food wastes), or only traditional feeds.

Table 6. Selection of feeds for fattening pig production in year 2022

(Unit: %)

Indicators	Small-scale households	Medium-scale households	Large - scale households	Total
- Compound feeds only	7.5	43.3	63.3	35.0
- Mix of compound and traditional feeds	72.5	56.7	36.7	57.0
- Only traditional feeds	20.0	0.0	0.0	8.0

Household survey, 2022

The survey results show that majority of large scale farm households (63.3%) used only compound feeds for pig production and the rest used mix of compound and traditional feeds. Not any large scale farm household does use only traditional feeds for pig production. However, for small scale farm households, only small rate (7.5%) of them used only compound feeds while majority (72.5%) used mix of compound and traditional feeds for their pig production. Moreover, significant rate of small farm households (20%) used only traditional feeds for their pig production. Usually, the compound feeds from large feed companies were guaranteed for their quality and could help mitigate the disease risks. The quality of traditional feeds processed by farm households was however not guaranteed as the inputs for feeds (such as maize, rice, potato, vegetables, food wastes) could get infected with the mold and other disease sources.

3.3.4. Vaccination for fattening pigs

Vaccination for the fattening pigs based on the recommendation of veterinary staff

is the most proactive and efficient measure for disease controls as it can enhance the immune ability of pigs. It is recommended that the vaccination for Diarrhea, Pasteurellosis, Salmonellosis, Erysipelas suis, ASF, Blue ear disease, Streptococcal disease, and Asian foot-and-mouth should be applied for pig production. The survey results show that almost all the farm households (96%) vaccinated to prevent the various diseases for their pigs. This is possibly because the recent occurrence of ASF with the huge damage has made farm households to pay much more attentions on vaccination for their pigs. In total, 61% of the farm households used vaccination service by veterinary staff, 31% vaccinated their pigs by themselves, and 8% vaccinated their pigs with the help of other farmers. The majority of large farm households (83.3%) used vaccination service by veterinary staff while this figure for small scale farm household was just 50%.

Table 7. Vaccination for pig production in Kinh Mon town in year 2022*(Unit: %)*

Indicators	Small-scale households	Medium-scale households	Large-scale households	Total
1. Rate of households applying vaccination	90.0	100.0	100.0	96.0
2. Injectors	100.0	100.0	100.0	100.0
- By farm households themselves	30.0	46.7	16.7	31.0
- By the helps of other farm households	20.0	0.0	0.0	8.0
- By veterinary staff	50.0	53.3	83.3	61.0
3. Time to vaccination	100.0	100.0	100.0	100.0
- Only when diseases occur nearby	20.0	0.0	0.0	8.0
- Only one time when buying pigs	70.0	16.7	6.7	35.0
- Regular as recommended	10.0	83.3	93.3	57.0

Household survey, 2022

The majority of large and medium scale farm households vaccinated their pigs regularly, 2-3 times per pig litter as recommended for enhance the immunity, thus mitigating the disease risks as much as possible. Meanwhile, majority of small scale pig farm households (70%) vaccinated their pig only one time right after they bought their pigs. Several small scale farm households (20%) only vaccinated when they heard about the occurrence of nearby disease outbreak.

3.3.5. Response of pig farm households to disease occurrence

In recent years, the occurrence of the diseases in pig production has been quite often, including the ASF outbreak. Significant rate of pig farm households (around 30-37.5%) would immediately buy the medicines for disease treatment once

their pigs got diseases. Majority of the large scale farm households (63.3%) and nearly half of medium scale households (46.7%) requested the helps from veterinary staff as they believed veterinary staff with good expertise could give them the efficient suggestions. This figure for the small scale farm households was only 17.5%. Around one third of small households tried to get consultations from experienced pig farm households on how to treat the diseases. The small farm households only requested the veterinary staff for helps and consultations when their pigs got the unfamiliar diseases or when they already treated the disease for long but their pigs could not been recovered as expected. Some pig farm households even sold their pigs once their pigs got sick as they may not care the harm they could cause when selling the sick pigs to the markets.

Table 8. Response of pig farm households to disease occurrence in year 2021*(Unit: %)*

Indicators	Small-scale households	Medium-scale households	Large-scale households	Total
1. Immediate response				
- To buy the medicines for self-treatment	37.5	36.7	30.0	35.0
- To request for helps from veterinary staff	17.5	46.7	63.3	40.0
- To request for helps from experienced households	35.0	13.3	3.3	19.0
- To sell sick pigs	10.0	16.7	6.7	11.0
2. Treatment and other applied measures				
- To inject pigs with antibiotics	42.5	46.7	43.3	44.0
- To enhance use of antiseptic solutions	57.5	93.3	100.0	81.0
- Not to allow the strangers to visit the pigpen	27.5	76.7	93.3	62.0

Household survey, 2022

The survey results reveal that 44% of pig farm households injected their pigs with antibiotics when their pigs got the diseases and the rate were quite similar among the household groups. In addition, almost all the large scale farm households enhanced the use of antiseptic solutions and did not allow the strangers to visit pigpen any more to mitigate the transmission of diseases in the farm. The rate of small farm households applied more antiseptic solutions and inhibited the strangers from the pigpen was significantly smaller (table 8).

3.4. Factors affecting the disease risk controls in pig production in Kinh Mon town, Hai Duong province

According to the household survey, besides the scale of farm households, the economic condition of the pig farm households also significant affected their disease control applications. The worse-

off households usually bought piglets from free markets, established the pigpen without standard requirements, and used more traditional foods and applied vaccination for just one time when buying pigs. The worse-off households therefore faced more disease risks in their pig production than the better-off households. The farmers' participation of the training course on pig production also helped them a lot for better understanding of pig disease risks, role of vaccine for pig production, thus enhancing their capability to control disease risks. The participation of training course also created the opportunity for pig farmers to exchange their experiences in pig production and disease controls. The farmers participating the training courses established the standard pigpens and applied vaccination at higher rate in compared to the farmers not participating the training courses, thus reducing the occurrence of the diseases in their pig production (table 9).

Table 9. Effects of the training participation on pig disease occurrence in year 2021*(Unit: %)*

Indicators	Participated farm households (n=80)	Non-participated farm households (n=20)
- Pigs got diseases quite often	13.8	35.0
- Pigs got diseases sometimes	70.0	65.0
- Pigs did not get diseases	16.3	0.0

Household survey, 2022

In addition, according to the results of focus group discussion with the management staff, the propaganda on disease controls in pig production, the agricultural extension to transfer the advanced technologies, the dissemination of good pilot model on disease controls in pig production also placed the positive effects on disease control measures of the pig farm households. Moreover, the support policies for pig production and for the culling of disease-infected pigs also significantly affected the responses of pig farmers in their disease control measures. At present the People's Committee of Hai Duong province and People's Committee of Kinh Mon town have implemented several policies to support the development of livestock in general and of pig production in particular (such as for concentrate zone for animal production according to decision No. 2567/QĐ-UBND issued on 21/9/2016, supports for damages by ASF disease according to the plan 3791/KH-UBND issued 15 Oct 2020 by Hai Duong province), however the level of supports is quite low.

3.5. Solutions for enhancing the disease controls in pig production in Kinh Mon town, Hai Duong province

- Developing the large scale farm models: Majority of pig farm households in the town had small scale that could not meet the requirement of standard pigpen. They

also did not apply regular vaccination as the recommendation and thus their pigs were easy to get disease spreads. Thus, restructuring the pig sector and establishing the concentrate zone for pig production that could help actively apply the disease control measures are of very necessity.

- Enhancing the dissemination and training course on disease controls for pig farm households: it is important to organize the campaigns to disseminate the information on disease controls and persuade pig farm households to apply the hygienic cleans through the local broadcasting and mass media, leaflets and action month for the disinfection. Besides, it is necessary to actively train on disease prevention measures for pig farm households. These measures will help raise awareness of pig farmers about the sources of the disease, how it spreads, its consequences and prevention measures. And at the same time, pig farm households will be more active and proactive in applying these measures for effective disease controls.

- Strengthening the management of veterinary service providers: In addition to enhancing the role of state veterinary medicine, such as assigning officials to go to the pig farm households to monitor diseases, to guide vaccination in a timely manner, strengthening the management of private veterinary service providers in the town should also be considered for priority. Currently, there are many stalls

selling veterinary drugs and vaccines and giving disease prevention advice for livestock households. Therefore, functional agencies such as Animal Husbandry - Veterinary Station, Market Management Team need to check the veterinary drug stalls for quality guarantees. In addition, it is necessary to organize the training courses to improve the professional qualifications of veterinary drug stall owners to improve the quality of their disease control advice.

- Improving the policies to support the development of pig production in the town: it is necessary to review and improve support policies, especially in support level for disease controls in pig farm households.

4. Conclusions

Kinh Mon town has the good conditions for agricultural production in general, fattening pig production in particular. Pig production has significantly contributed to the employment generation, farm household income improvements and economic development in the town. However, the fattening pig production in the district has still faced with many difficulties, of which disease risk controls is considered as the most. During 2019-2021 period, around 12.3-28.8% of the fattening pigs in the town were infected with diseases. The occurrence of various diseases has caused the significant loss for pig production households in recent years. Research results show that large-scale and medium-scale pig farm households actively applied disease control measures including the selection of piglets, preparation of pigpen, selection of feed sources, adding antibiotics to the feed and the full vaccination for the pigs. When pigs got sick, most of farm households reported to veterinary staff for diagnosis and got their advice on treatment methods. The factors

that affected the households' disease risk controls in their pig production includes pig farm scales, household economic condition, the participation of the farm households in training courses on pig production, the pilot model dissemination and the supported policies for pig production in the town. The main solution to strengthen disease controls in pig production includes developing a concentrated and large-scale pig farm model; enhancing the dissemination and training course on disease controls for pig farm households, strengthen the management of veterinary service providers and improving the policies to support the development of pig production in the town.

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QUẢN LÝ RỦI RO DỊCH BỆNH TRONG CHĂN NUÔI LỢN THỊT CỦA CÁC HỘ NÔNG DÂN TRÊN ĐỊA BÀN THỊ XÃ KINH MÔN, TỈNH HẢI DƯƠNG

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Tóm tắt

Nghiên cứu này tập trung đánh giá thực trạng công tác quản lý rủi ro dịch bệnh trong chăn nuôi lợn thịt của các hộ nông dân thị xã Kinh Môn tỉnh Hải Dương. Kết quả nghiên cứu cho thấy, đa số các hộ chăn nuôi có quy mô lớn và quy mô trung bình đã chủ động thực hiện các biện pháp quản lý rủi ro dịch bệnh. Trong khi đó việc thực hiện các biện pháp quản lý rủi ro dịch bệnh của hộ chăn nuôi có quy mô nhỏ còn khá nhiều hạn chế, đặc biệt là trong khâu lựa chọn lợn con, thiết kế và vệ sinh chuồng trại, lựa chọn nguồn thức ăn, tiêm vaccin cho lợn và điều trị khi lợn bị bệnh. Các giải pháp chủ yếu được đề xuất để tăng cường phòng chống dịch bệnh trong chăn nuôi lợn thịt bao gồm phát triển mô hình chăn nuôi tập trung, quy mô lớn; tăng cường công tác tuyên truyền phòng chống dịch bệnh cho các hộ chăn nuôi, tăng cường quản lý các đơn vị cung cấp dịch vụ thú y và hoàn thiện một số chính sách hỗ trợ phát triển chăn nuôi lợn trên địa bàn thị xã.

Từ khóa: *Quản lý, rủi ro dịch bệnh, hộ nông dân, chăn nuôi lợn thịt, thị xã Kinh Môn*