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Policy Research for Establishing Philippines Animal Disease Profiling Program: PADPP

2023. 6.

Institute of International Rural Development(IIRD)
Kangwon National University

The Bureau of Animal Industry (BAI),
Health and Welfare Division (AHWD) and
National Veterinary Quarantine Services Division (NVQSD)

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이 보고서를「2022 국제농업협력(ODA) 정책컨설팅(KAPEX)」과제의 최종 보고서로 제출합니다.

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1 Introduction

1.Research Background

Salmonella is one of the leading causes of foodborne illnesses in humans and is considered as a disease of public health importance. In the Philippines, Salmonella spp. is the leading microbiological cause of FBDO poisoning for the periods 1995-2004 (Azanza, 2006) and 2005-2018 (Azanza et al, 2019). Outbreaks of salmonellosis in humans have often been associated with the consumption of contaminated raw chicken meat, eggs, beef, pork, seafood, and vegetables (Pires et al.,2014). Among these, chicken meat and eggs are the most common sources of human infection with Salmonella Enteritidis (SE) and Salmonella Typhimurium(ST) accounting for a major part of the problem (OIE, 2018). In addition, Fowl typhoid and Pullorum Disease, caused by Salmonella Gallinarum(SG) and Salmonella Pullorum(SP), respectively, are listed as notifiable diseases by the World Organization for Animal Health (OIE), 2019.

According to the USDA 2021 Livestock and Poultry Annual report on the Philippines, chicken and egg are the 2nd and 4th sources of dietary protein for

Filipino consumers. It is forecasted in the said report that the per capita consumption of chicken and egg for 2022 will be at 15.6 kg and 5.5 kg, respectively. Recognizing the role of eggs as a reliable protein source to curb malnutrition, the Philippine Poultry Layer Industry Roadmap for 2022-2040 aims for domestic chicken eggs to continuously meet the four global food security indices: affordable, available, safe, and resource resilient. Part of the roadmap targets which focuses on customer and industry value includes food safety through quality and fair priced eggs. In order to ensure the safety and quality of eggs, there is a need to have a strong surveillance system for disease causing bacteria as Salmonella from farm to egg.

Currently, the Bureau of Animal Industry (BAI) through the Animal Health and Welfare Division (AHWD) and National Veterinary Quarantine Services Division (NVQSD) requires poultry breeder farms to be tested for SP as one of the requirements for Animal Disease Monitoring Compliance Certificate (ADMCC) and local animal movement, respectively. In line with the provisions of the Food Safety Act of 2013 (Republic Act Number 10611), there is a need for the national veterinary authority to review the existing guidelines for ADMCC and local movement of poultry and poultry products to include SE and ST as they cause food-borne diseases and a concern of public health importance.

2. Objectives

The purpose of this study is to compare Salmonella surveillance and diagnosis mechanisms in poultry in the Philippines and Korea, and to provide basic data for the development of an ODA program to introduce Korea's experience of Salmonella surveillance and diagnosis mechanisms to the Philippines.

Specifically, it aimed the following:

1. To identify gaps in terms of surveillance and diagnostic mechanisms, and existing policies concerning Salmonella Control in Philippine poultry farms.
2. To review the surveillance and diagnostic mechanisms and policies of South Korea in relation to Salmonella Control in poultry farms.
3. To recommend applicable, doable and implementable action plans for the improvement of Salmonella Surveillance and diagnostics in the Poultry farms in the Philippines.

3. Methodology

The research was conducted from December 2022 to March 2023 and existing policies relating to Salmonella were included in the review.

3.1. Data collection

A preliminary desk review of the Salmonella-related policies was conducted by the research team followed by a focus group discussion (FGD) on review and evaluation of the existing policies, surveillance and diagnostic mechanisms with identified private and government veterinarians, key stakeholders, subject matter experts and researchers. Key questions were formulated to guide the discussions during the FGD. Written documents and video/audio recordings were taken during the activities.

3.2. Invitational Workshop

The research team attended an invitational workshop focusing on Salmonella in South Korea as part of the Korean Agricultural Experiences Project for Food Security. Kangwon National University(KNU IIRD) in Korea, organized and invited the DA-BAI to the Korean invitational program "Creation of the Philippine Animal Disease Profiling Program(PADPP)" of capacity building for the Philippines. The invitation program was as below.

Date	Program	Location
Jan. 30 (Mon)	Departure from Manila to Incheon (5J186, Jan 30 02:25-07:10)	Seoul
Jan. 31(Tue.)	Opening Ceremony/ Orientation/ Workshop	
10:00-10:15	Move to KREI Seoul Office	KREI Seoul Office
10:20-10:40	Orientation & Introduction of KAPEX (Dr. Inbae Ji)	
10:40-11:30	Opening Ceremony	
11:30-14:00	Welcoming Luncheon	
14:30-15:10	Presentation: Country Report (Head of Joint research team, Philippines)	
15:20-16:30	[Workshop]Methodology of Action Plan & Discussion (Dr. Inbae Ji, Dr. Hyuk Park)	
17:00-19:00	Dinner	
Feb. 1(Wed.)	Field Visit/ Lecture	
08:10-9:30	Move to Optipham(Seoul to Osong)	Osong Gimcheon
9:40-11:40	[Field Visit & Lecture 1] Hyunil Kim, Chairman of Optipham	
12:00-13:30	Lunch	
13:40-14:50	Move to APQA(Seoul to Gimcheon)	
15:00-15:30	[Field Visit] Dr. Lee Hwang(Animal and Plant Quarantine Agency)	
15:30-17:30	[Lecture 2] Dr. Kang Min Soo(Animal and Plant Quarantine Agency)	
17:30-18:00	Move to the Hotel (ITX 1034: 18:20- 20:58)	
Feb. 2(Tur.)	Field Visit	
09:00-17:00	City tour	Seoul
Feb. 3(Fri.)	Workshop/Closing Ceremony (ICN-MNL Fri, Feb 3 19:20- 22:30)	
08:50-09:10	Move to the KREI Seoul Office	KREI Seoul Office
09:10-11:00	[Workshop 2] Presentation of Action Plan & Discussion (Dr Inbae Ji, Dr. Hyuk Park)	
11:10-12:00	Closing Ceremony & Awards Ceremony	
12:00-12:30	[Wrap-up] Questionnaire Survey	
12:30-14:00	Farewell Luncheon	
14:30	Move to Incheon International Airport (OZ703, ICN: 19:20)	

2 Situation of the Poultry Sector in Philippines

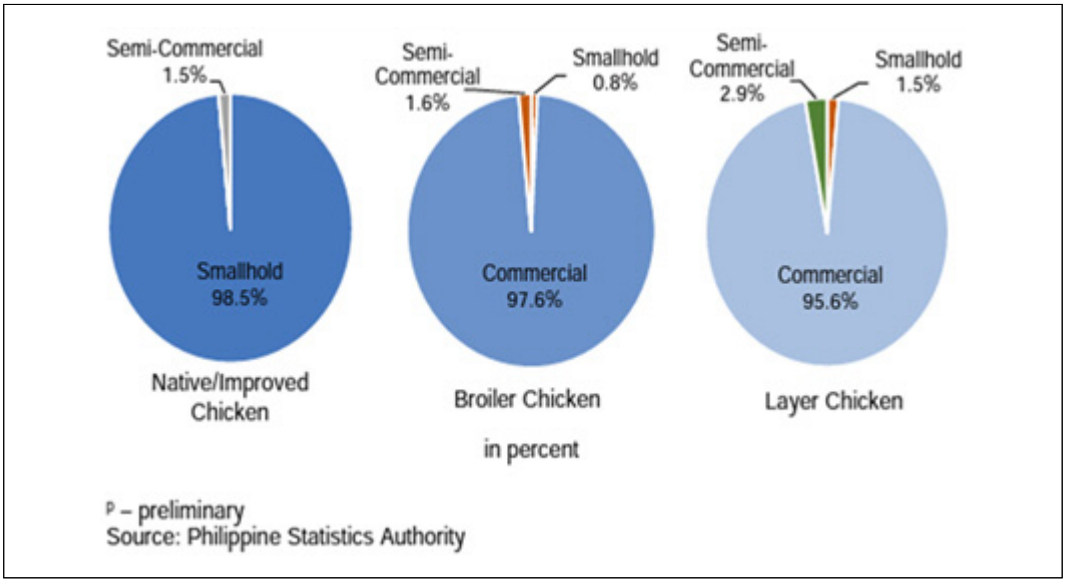
1. Philippines Poultry Industry

In a report published by the Philippine Statistics Authority (PSA), the poultry industry accounted for 47.5% (35.6% broiler meat and 11.9% chicken eggs) of the total livestock and poultry production in 2020. In a report published by the Philippine Statistics Authority, the poultry industry accounted for 47.5% (35.6% broiler meat and 11.9% chicken eggs) of the total livestock and poultry production in 2020. For 2022, the latest inventory report by the PSA revealed that the total inventory of chicken in the country totaled 200.21 million birds, 5% higher than the inventory of the same period from the previous year. Of this number, 41.5% accounts for native/improved breed, 35.7% accounts for broilers, and the rest of the 22.8% accounts for layers.

For all three types of poultry, management type is grouped into three: commercial, semi-commercial, and smallhold 〈Figure 2-1〉. The difference between these management types is the volume of animals. For broilers, a farm is considered

smallhold if the number of birds raised is 500 and below, semi-commercial if 501-10, 000, and commercial if above 10, 000 birds. For layer and native/improved, management type is classified as smallhold if 250 and below, semi-commercial if 251-5,000, and commercial if above 5,000.

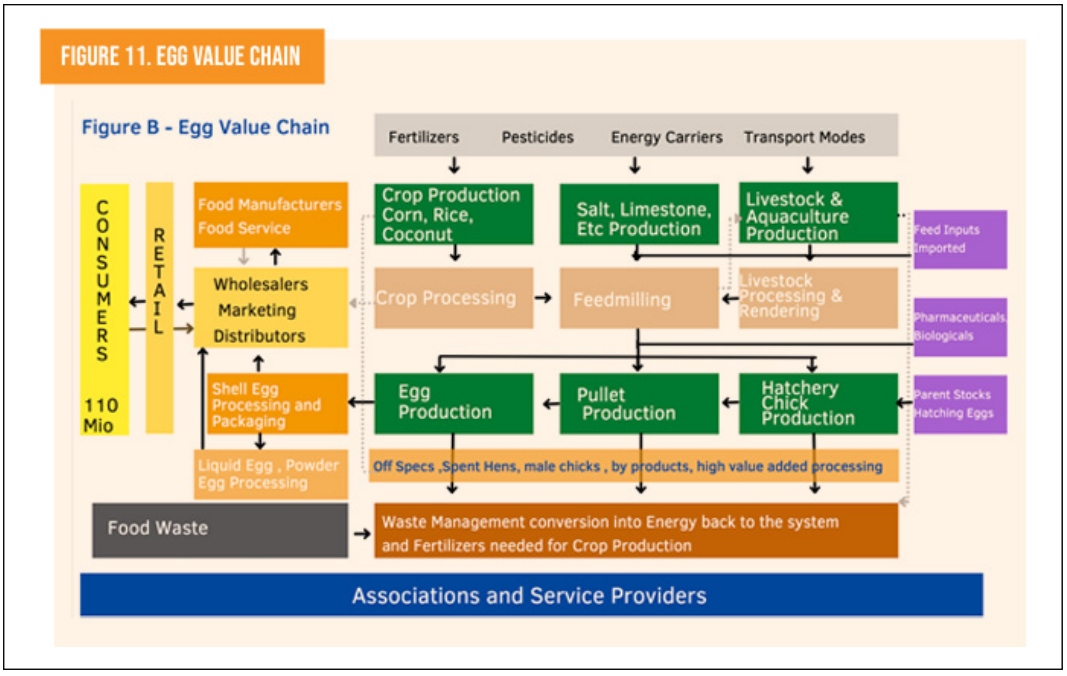
〈Figure 2-1〉 Distribution of chicken inventory by classification



Source: Philippines Statistics Authority (2022)

Egg production for the third quarter of 2022 was at 176.96 thousand metric tons, an increase of 6.1% compared to the same period of the previous year (PSA. 2022). This production is coming from a total inventory of 67.4 million laying flocks, comprising layer chicken (65.7%) and native/improved chicken (34.3%). The poultry layer industry is seeing a constant growth with the annual growth within a ten-year period (2011-2022) recorded to be at 8.8% (Department of Agriculture. 2022).

〈**Figure 2-2**〉 Egg value chain (Philippine Layer Industry Roadmap 2022-2040)



Source: Department of Agriculture (2022:25)

The figure above illustrates the value chain map for the layer industry in the Philippines. Pullets are raised until they reach the pre-laying stage, after which these are transferred/sold as ready-to-lay (RTL) to layer production farms. The eggs are then sold by the farms to a wholesaler/distributor. From the wholesaler, eggs can go to the food manufacturers and food service industry, or they can go to egg processing and packaging where they are further processed to liquid or powder egg. From wholesale, eggs can also go directly to the retailers where consumers buy their table egg requirements.

For breeder farms, there are 1,314 registered poultry farms in BAI (2020-2023). Out of this, 430 are poultry breeder farms which applied for ADMCC. Among these, 23 farms were subject to salmonella testing due to absence of vaccination. The breeder farms who reported as "vaccinated" were not required for testing.

2. Korea's Poultry Industry

2.1. Overview of Korea's livestock industry

In Korea, consumption of meat and edible eggs increases every year with the continued rise of national income, as shown in the figure below. In 2021, annual per capita consumption of meat and edible eggs was 56kg and 13kg, respectively. Consumption of livestock products was temporarily stagnant with the decrease in supply due to the outbreak of highly pathogenic avian influenza (HPAI) in 2016 and African swine fever (ASF) in 2019, but it was recovered soon.

Accordingly, as shown in table below, the production amount of livestock industry has increased every year as a major growth engine in the agricultural sector. The livestock industry is a major pathway to increase farmers' income and help them escape poverty.

〈Table 2-1〉 The production amount of livestock industry

Unit: Billion USD, 1 USD = 1,000 KRW

Item	2015	2016	2017	2018	2019	2020	2021
Agriculture	48.47	47.28	48.17	50.05	49.78	50.14	59.22
Livestock	19.13	19.23	20.12	19.73	19.87	20.35	24.57
% livestock	39.5	40.7	41.8	39.4	39.9	40.6	41.5
Beef cattle	4.28	5.06	4.66	5.09	5.36	5.99	7.23
Dairy cattle	0.03	0.05	0.03	0.06	0.07	0.08	0.06
Hog	6.34	6.76	7.34	7.12	6.39	7.18	8.48
Chicken	1.74	2.00	2.38	2.26	2.10	2.03	2.27
Egg	1.67	1.71	2.10	1.28	1.41	1.63	2.47
Dairy	2.08	2.18	2.13	2.13	2.22	2.20	2.16

Source: NIAS (2022)

As shown in the table above, the production amount of Korean poultry industry increases every year. The industry ranks in the top 4 and 5 in agricultural sector, with KRW 2.47 trillion in eggs and KRW 2.27 trillion won in broilers respectively.

〈Table 2-2〉 Yield Amount by AGri-Product (2021)

Unit: Billion USD, 1 USD = 1,000 KRW

Item	Rice	Pork	Beef	egg	chicken	dairy	strawberry	apple	garlic	onion
Yield	9.53	8.48	7.23	2.47	2.27	2.16	1.48	1.38	1.37	1.34

Source: NIAS (2022)

As the demand in the livestock industry increases according to the growth of income, the government should promote the growth of livestock industry. Such effort is also necessary to get the farmers out of poverty. Besides, if pathogenic microorganisms remain in livestock products, it requires strict management as they can proliferate rapidly, cause massive food poisoning outbreaks, thus generating social problems. In case of Korea in 2021, the main cause of food poisoning includes Norovirus, Salmonella, and Pathogenic Escherichia coli. As recent international disputes intensify, the stable supply of food and livestock products has become more important. Therefore, the government needs to foster livestock industry.

〈Table 2-3〉 Current Status of Food Poisoning by Causative Bacteria(2021)

Unit: Billion USD, 1 USD = 1,000 KRW

Cause	Pathogenic E. coli	Salmonella spp.	S. aureus	C.per-fringens	C. jejuni
Case	9.53	8.48	7.23	2.47	2.27
Proportion(%)	13.1	13.1	2.0	4.5	11.4
Cause	**E. vibrio**	**B. cereus**	**Norovirus**	**Unknown**	**Etc.**
Case	2	7	57	13	58
Proportion(%)	0.8	2.9	22.3	5.3	23.7

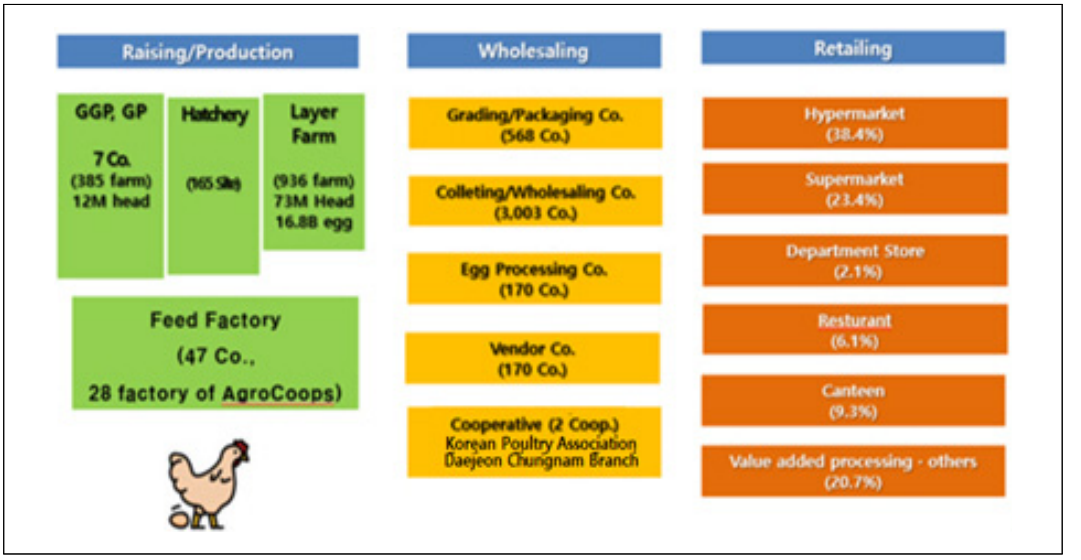
Source: MFDS (2022)

2.2. Overview of Korean poultry industry

In Korea, distribution structure of egg collection industry is made up of breeding chicken and commercial chicken as follows. As of 2021, there were 385 reproductive chicken farms and 165 hatcheries, with breeding chickens imported from abroad by

seven companies. 16,881 million eggs are produced annually at 936 layer farms. 12 million chickens are raised by 385 breeding farms, and 73 million chickens by 936 layer farms respectively. And the feed for layer chickens are supplied by 47 feed companies and 28 Nonghyup feed companies.

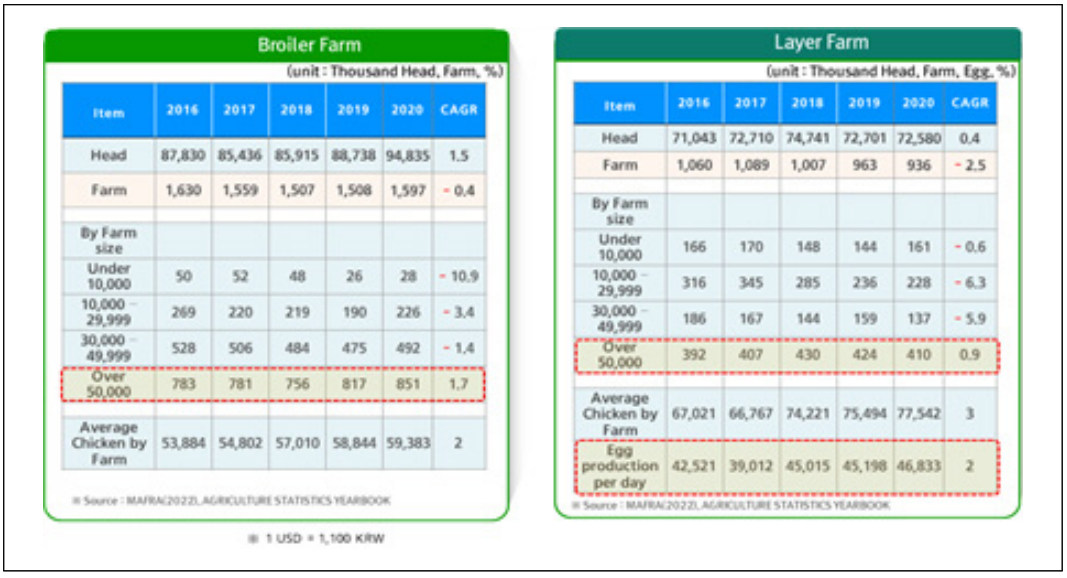
〈Figure 2-3〉 Value Chain of Korean Egg industry



Source: Park Hyuk (2023)

For edible eggs, there are 568 selective packaging companies, and 3,003 collection and sales companies. And the number of egg processing companies amounts to 170. Distribution structure of edible eggs is very complex as too many companies engage in collection and sales of edible eggs. In layer farms, they directly make retail distributions by obtaining the permits from selective packaging companies and collection and sales companies of edible eggs, thus increasing the complexity of the distribution structure.

〈Figure 2-4〉 The number of Poultry farms by farm scale



Broiler Farm

(unit : Thousand Head, Farm, %)

Item	2016	2017	2018	2019	2020	CAGR
Head	87,830	85,436	85,915	88,738	94,835	1.5
Farm	1,630	1,559	1,507	1,508	1,597	-0.4
By Farm size						
Under 10,000	50	52	48	26	28	-10.9
10,000 – 29,999	269	220	219	190	226	-3.4
30,000 – 49,999	528	506	484	475	492	-1.4
Over 50,000	783	781	756	817	851	1.7
Average Chicken by Farm	53,884	54,802	57,010	58,844	59,383	2

※ Source : MAFRA(2022), AGRICULTURE STATISTICS YEARBOOK

※ 1 USD = 1,100 KRW

Layer Farm

(unit : Thousand Head, Farm, Egg, %)

Item	2016	2017	2018	2019	2020	CAGR
Head	71,043	72,710	74,741	72,701	72,580	0.4
Farm	1,060	1,089	1,007	963	936	-2.5
By Farm size						
Under 10,000	166	170	148	144	161	-0.6
10,000 – 29,999	316	345	285	236	228	-6.3
30,000 – 49,999	186	167	144	159	137	-5.9
Over 50,000	392	407	430	424	410	0.9
Average Chicken by Farm	67,021	66,767	74,221	75,494	77,542	3
Egg production per day	42,521	39,012	45,015	45,198	46,833	2

※ Source : MAFRA(2022), AGRICULTURE STATISTICS YEARBOOK

Source: MAFRA (2022)

While the number of farms decreases every year, the number of chickens raised increases. For this reason, layer chickens and broilers are being scaled up and specialized. As shown in the figure above, the number of farms with small breeding scale decreases, while the number of layer farms with more than 50,000 chickens increases. Average number of chicken breeding per farm and average daily production are increasing every year.

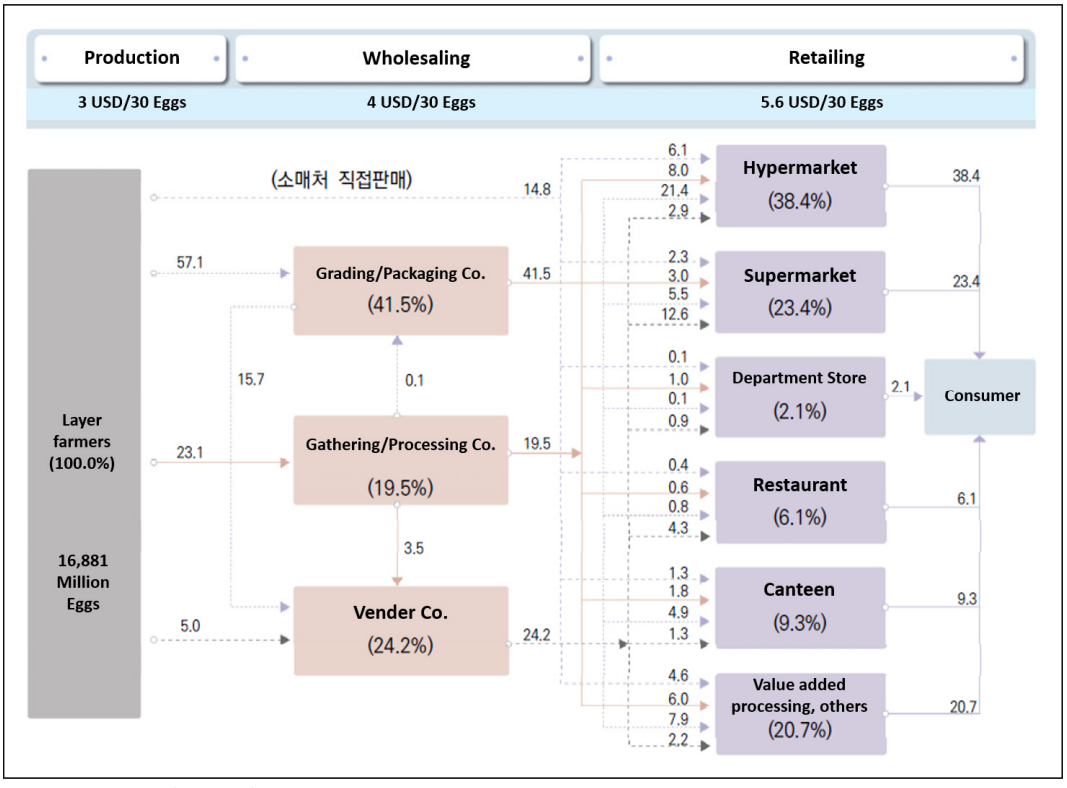
In Korea, the eggs consumed as fresh eggs after 2018, and all edible eggs after 2020 must be selectively packaged. The selection and packaging of edible eggs should be done by selective packaging companies for edible eggs that are approved by provincial governors. And as of 2021, the number of licensed selective packaging companies amounts to 568, with 41.5% of total production being distributed wholesale by selective packaging companies.

Edible eggs selective packaging is a business specializing in selecting, washing, drying, sterilizing, inspecting, and packaging edible eggs, and is subject to the permission from the provincial governors. This business must implement HACCP

obligations as of 2018. The number of HACCP-certified companies (2022) amounts to 567 (99.8%).

Edible egg collection and sales requires reporting to city authorities, and specializes in collecting and processing, or purchasing and selling of edible eggs. As of 2021, wholesale distributions through collection and sales businesses accounts for 19.5% of edible eggs. In 2021, the number of such companies amounts to 3,003, with the HACCP-certified companies (2022) reaching 1,147 (38.2%).

〈Figure 2-5〉 Distribution structure of Korean Egg industry



Source: KIAPQE (2021:50)

3 Structural Problems of the Poultry Sector in Philippines

1. Poultry Salmonellosis

1.1. Etiology and Transmission

Salmonellosis is a bacterial disease caused by strains of Salmonella. It was originally isolated in 1885 by Dr. A.E.Salmon, where it is named after. It occurs in animals and humans and in both cases it is an enteric disease of varying severity, usually involving diarrhea. With poultry, however, most Salmonella infections are asymptomatic.

Salmonella are rod-shaped, gram-negative one-celled organisms that cannot be seen, smelled or tasted. The optimal growth is between 35-37°C and at pH 7-7.5. It can survive for several months away from the host and can survive refrigeration, freezing (much reduced growth at temperatures (15°C and above 6°C) and dry conditions. It is sensitive to most disinfectants and can be killed at high temperatures. In general, 60°C for 2-6 minutes or 70°C for 1 minute will kill the bacteria.

There are approximately 2,500 different serotypes of Salmonella. Salmonella can be transmitted both vertically from parent flocks to offspring and horizontally from contamination in the environment to the birds. The vertical transmission from breeding flocks to commercial flocks has been seen for two of the most significant paratyphoid serotypes, Salmonella Enteritidis (SE) and Salmonella Typhimurium (ST). Vertical transmission of paratyphoid salmonella to the progeny of infected breeder flocks can result from the production of eggs contaminated by salmonella in the content or on the surface. During oviposition eggshells are often contaminated with paratyphoid salmonellae by fecal contamination. The penetration of salmonellae into and through the shell and shell membranes can result in direct transmission of infection to the developing embryo or can lead to exposure of the chick to infectious salmonella organisms when the shell structure is disrupted during hatching. A reduction of these two serotypes has been accomplished in many countries due to introduction of strict biosecurity, effective surveillance and vaccination.

Horizontal transmission can occur by direct bird to bird contact, ingestion of contaminated feces or litter, contaminated water, personnel, farm and personal equipment, and a variety of other sources.

The relative importance of these routes of transmission varies in different countries and between poultry industry so it is important to have in place effective monitoring including sampling programs that can identify sources of infection.

1.2. Salmonella in Layers

a. Typhoid Salmonella

Typhoidal Salmonella is represented by only two serotypes, SG and SP, which are notifiable diseases by the World Organization for Animal Health. What makes them

special is that they do not infect mammals naturally, but they are found adapted in birds, mainly chickens and turkeys. Among the 2,500 serotypes, only these two can cause a high mortality rate in birds.

b. Fowl Typhoid

Fowl Typhoid is an acute or chronic septicemic disease of mature chickens cause by SG. Clinical disease is usually seen in older chickens although young chicks may be affected. During acute disease, the most characteristic clinical sign is mucoid yellow diarrhea. Respiratory distress and depression may also be seen. While sporadic mortality over a long period may be seen during sub-acute disease. Chronic disease may follow acute or sub-acute disease and is characterize by loss of condition and severe anemia.

The disease may be transmitted through excretion of SG on the feces of infected birds and may persist in feces for at least one month and longer in carcasses. Egg transmission may also occur.

c. Pullorum Disease

Pullorum disease, previously known as Bacillary White Diarrhea, in poultry is caused by SP. It is an acute systemic disease of young chickens and poultry. Pullorum disease is spread from infected parent birds via the egg to the chick. Infected chicks spread the disease laterally in the hatchery. Reports of clinical disease in avian species other than chickens, turkeys and pheasants are rare.

❍ Pullorum Disease is usually seen in chicks younger than 3 weeks old. First indication is an excessive number of dead-in-shell chicks and deaths shortly after hatching. Clinical signs are variable and non-specific, although, white diarrhea, with pasting of the vent is often a characteristic of the disease.

❍ Antibiotic treatment is not recommended as birds may become carriers. Control is usually by testing and the removal of infected birds.

1.3. Paratyphoid Salmonella

This group is represented by all others serotypes of Salmonella. Paratyphoid Salmonella do not cause mortality in poultry and do not interfere in performance. The main reason in establishing a control program for these serotypes is to reduce or avoid human infection by consuming contaminated meat and eggs. The most prevalent serotypes are SE and ST.

Chickens are usually asymptomatic carriers of paratyphoid Salmonella bacteria. The organisms colonies the intestinal tract and sometimes the reproductive tract of the carrier birds. This can lead to contamination of meat and eggs intended for human consumption.

Clinical signs are uncommon in poultry but can be seen in birds younger than two weeks of age. Nonspecific clinical signs that may be seen are listless, diarrhea, fluffed up feathers. Signs are similar for all serotypes.

Infected poultry that are older than 4 weeks are usually free from salmonella bacteria within 60 days. A small percentage of infected birds may excrete salmonella continuously or intermittently. Excretion can be reactivated by stress.

There are three different types of disease in humans that are considered to be associated with paratyphoid salmonella, which are caused by different strains: typhoid fever, gastroenteritis, and an invasive form. The two most widely known types are typhoid fever caused by ST and the gastroenteritis form most often caused by SE.

2. Philippine Livestock Regulations Laws and Related Policies

2.1. Act 3639 (BAI Mandate)

The BAI as an attached bureau of the Department of Agriculture is mandated to investigate, study and report the cause of dangerous communicable diseases and the means of prevention, and in general, promote the development of the livestock industries.

2.2. Executive Order 292 series 1987 (Administrative Code of 1987)

This defined the staff functions of the Bureau, such as to formulate programs for the prevention, control and eradication of animal diseases and for the development and expansion of the livestock and poultry industries to meet the growing requirement of the growing populace; recommend specific policies and procedures governing the flow of livestock product through the various stages of marketing as well as the proper preservation and inspection of such products; coordinate and monitor the activities and projects relating to livestock and allied industries prescribe standards for quality in the manufacture, importation, labeling, advertising, distribution and sale of livestock, poultry and allied industries and; recommend plans and programs, policies and regulations to the Secretary of Agriculture and provide technical assistance in the implementation of the same.

2.3. Republic Act No. 10611 of 2013 (Food Safety Act)

The BAI is assigned as the food safety regulatory agency responsible for the enforcement of food safety standards in the primary and post- harvest stages of food derived from animals including eggs and honey.

2.4. Republic Act No. 8485 (Animal Welfare Act of 1998)

It is the purpose of this Act to protect and promote the welfare of all animals in the Philippines by supervising and regulating the establishment and operations of all facilities utilized for breeding, maintaining, keeping, treating or training of all animals either as objects of trade or as household pets. By virtue of this Act, the BAI thru the Animal health and Welfare Division is the implementing agency.

❍ Administrative Order No. 12 series of 2002 (Code of Practice and Minimum Standards for the Welfare of Chicken)

- Pursuant to the provisions of the Republic Act 8485, otherwise known as the "Animal Welfare Act of 1998", this Code is intended to encourage all persons involved in the poultry industry to adopt the highest standards of husbandry.

2.5. Salmonella- relevant Policies

❍ DA-Administrative Order No. 5 series 2019 (Guidelines on the Local Transport/ Shipment of Animals, Animal Products and By-products)

These Guidelines shall apply to any person or entity whether government or

private engaged in the shipment of live animals, animal products and by-products that shall depart from seaport or airport and/or pass through established interregional veterinary quarantine checkpoints within the Philippines.

Purpose

These guidelines are promulgated to protect and promote life and death of animals and the human populace by ensuring utmost biosecurity against the introduction or the spread of diseases through unregulated movement of animals, animal products and by-products; and to facilitate trade.

Regulatory Authority

The Bureau of Animal Industry - National veterinary Quarantine Services Division through its veterinary quarantine officers, animal quarantine inspectors and deputized veterinary quarantine officers shall have the regulatory authority to implement this Administrative Order.

Relevance to Salmonella

Shipment of live animals, particularly poultry breeder (Hatching eggs, Ready to lay pullets and Day-old chicks) and table eggs within and between Luzon, Visayas and Mindanao must be accompanied by Veterinary Health Certificate (VHC) duly issued by a veterinarian and a Shipping Permit (SP). Only poultry farms or establishments duly accredited by BAI or LGU veterinary services and livestock handlers and transport carriers registered with BAI/ DA-RFO shall be allowed to transport animals, semen and genetic materials. Backyard/ Small hold farms shall be allowed to transport animals, provided they have complied with the mandatory requirements such as VHC, laboratory tests and vaccination. For slaughter purposes, shipment shall be allowed provided a VHC is presented. The VHC shall be signed by the veterinarian and concurred by LGU/ DA-RFO veterinarian attesting the Salmonella-

free status of the source farm and that the eggs were transported in new or appropriately sanitized containers. BAI-NVQSD Animal Health Transport Requirements include a negative salmonella test every 6 months for broiler breeder/ layer breeder poultry farms. The BAI- AHWD Farm accreditation (now ADMCC) requirements include a laboratory test for Salmonella Pullorum, filled-up poultry inspection report signed by BAI veterinarian, vaccination and medication program and a licensed farm veterinarian or consultant for GP/ PS Breeder layer/ broiler breeder farm.

❍ DA BAI-Administrative Circular No. 7 series 2016 (Guidelines in the BAI Certification of Poultry Hatchery Facilities)

This guideline will be applicable to any individual or group of individuals engaged in hatchery operations/ establishments that operates hatchery equipment for the production of chicks

Purpose

To set the minimum standard requirement in the certification of hatchery facilities to monitor and safeguard the health and welfare status of poultry at this relevant stage of production and ensure the quality of chicks produced.

Regulatory Authority

The Bureau of Animal Industry, the competent government agency of the Department of Agriculture that is responsible for formulating programs for the prevention, control and eradication of animal diseases and for the development and expansion of the livestock and poultry industries and recommend policies and procedures governing flow of livestock products as well as the proper preservation and inspection of such products.

Relevance to Salmonella

Hatchery facilities is one relevant establishment to improve the production and market qualities of chicks and reduce disease attributed to hatchery disseminated diseases such as Salmonella Pullorum (SP) and Salmonella Enteritidis (SE). The establishment should have a documented monthly monitoring program covering eggs, surfaces, equipment for SP and SE. The establishment should use serological and/or microbiological tests to determine whether an infection is present.

❍ DA BAI-Memorandum Circular No. 46 series 2022 (Amendment to Memorandum Circular No. 24, Series of 2022 'Laboratory Submission Protocol for Imported Animals During the Mandatory 30-Day Quarantine Period' Particularly Hatching Eggs)

Scope and Limitations

BAI issued Memorandum Circular (MC) No. 24 s2022 providing guidance to all Veterinary Quarantine officers (VQO) or the Animal Quarantine Inspectors (AQI) on the schedule, collection and submission of laboratory samples for animals during the quarantine period. Addendum guidelines were created to cater the needs of birds based on the World Organisation for Animal Health's (WOAH's) Terrestrial Animal Health Code, and the sampling size based on several sampling assumptions with limitations on availability of laboratory resources. WOAH defines poultry as birds reared and kept in captivity for the production of any commercial animal products or for breeding for this purpose (eggs, meat or feathers, etc.)

All imported birds, hatching eggs (HE), and day-old chicks (DOC) shall come from a country or zone free from high pathogenicity avian influenza (as defined by the WOAH), showed no clinical signs of disease on the day of shipment, kept in isolation prior to shipment, and transported in new or appropriately sanitized containers. The requirements indicated in the import terms and conditions of the specific commodity shall also be fulfilled.

Relevance to Salmonella

The importer shall submit a copy of the following documents to NVQSD Central Office and their corresponding Veterinary Quarantine Officer (VQO) or Animal Quarantine (AQI) at the port of entry and at quarantine site, seven (7) days prior to the arrival of the indicated commodity:

❍ HE from poultry

Importers must submit a copy of the schedule of setting the hatching eggs, the date of hatch, estimated hatch forecast and planned vaccination/ medication program (Salmonella). Relevant to the requirements indicated in the point of origin's import terms and conditions, the attestation declared and signed by the origin's veterinary officer or agency shall include that Hes are sourced from a pullorum-free flock (or sourced from birds over 4 months that tested negative with whole blood agglutination test). If the parent flock is vaccinated against salmonella, the type of vaccine used and the date of vaccination shall be included. There shall be no testing required upon arrival of the HEs at the port of entry, provided that the above-mentioned health attestations are satisfied. After arrival, the 21-day mandatory quarantine period prior to dispatch shall be observed for health status for the imported hatching eggs until after they become hatched chicks, subject to periodic inspection by the corresponding VQO.

❍ HE from birds other that poultry

Importers must submit a copy of the schedule of setting the hatching eggs, the date of hatch, estimated hatch forecast and planned vaccination/ medication program (Salmonella) and test results from country origin. A statistically appropriate sample of the parent flock birds was subjected, with negative results, to a diagnostic test Salmonella at the time of collection of the hatching eggs (attach all test results). HEs are sourced from a pullorum-free flock (or sourced from birds over 4 months that

tested negative with whole blood agglutination test. If the parent flock is vaccinated against salmonella, the type of vaccine used and date of vaccination shall be included. There shall be no testing required upon arrival of the HEs at the port of entry, provided that the above-mentioned health attestations are satisfied. After arrival, the 30-day mandatory quarantine period shall be used to observe health status for the eggs until they are hatched chicks, subject to periodic inspection by VQO or AQI.

❍ Day-old poultry (DOP)

Importers must submit a copy of the planned vaccination/ medication program (salmonella) of the day-old poultry. The DOP are sourced from pullorum-free flock (or sourced from birds over 4 months that tested negative with whole blood agglutination test). If parent flock is vaccinated against salmonella, the type of vaccine used and date of vaccination shall be included. There shall be no testing required upon arrival of the DOP at the port of entry, provided that the above-mentioned health attestations are satisfied. After arrival, the 30-day mandatory quarantine period shall be used to observe health status for the DOP, subject to periodic inspection by VQO or AQI.

❍ All live poultry (other than day-old poultry)

Importer shall submit a copy of the vaccination, medication, treatment history of the flock 30 days prior to export. If the flock is vaccinated against salmonella, the type of vaccine used and date of vaccination shall be included. Copy of planned vaccination/ medication program (salmonella) of the arriving poultry. After arrival, the 30-day mandatory quarantine period shall be used to observe health status for the DOP, subject to periodic inspection by VQO or AQI. Sample collection shall be made 7 to 14 days after arrival of the poultry in the declared quarantine site for bacterial isolation (salmonella). The required samples/ transport media is cloacal swab/ cary-Blair transport media (cotton swab should remain intact inside the

media). However, no salmonella testing required for birds sourced from government recognized Salmonella-free farms. During the quarantine period, any performance parameter observed that below acceptable health standard for live poultry shall be considered for case investigation and corresponding sample collection (as applicable)

3. Korea's Livestock Regulations Laws and Related Policies

3.1. Hygiene management in edible eggs

As edible eggs are significant mediums for Salmonella food poisoning, the hygiene management of edible eggs is very important. For this reason, sanitary management measures for edible eggs are announced and strengthened every year in Korea. Salmonella food poisoning occurs every year as shown in the chart below, and testing of Salmonella in edible eggs has been enhanced and implemented since 2011. Afterwards, the number of tests has been adjusted according to decrease in the number of farms.

〈Table 3-1〉 Yearly Monitoring Results on Salmonellar Food Poisoning

Year	Salmonella Enteritidis Salmonella spp. Detection in egg			Salmonella Food Poisoning	
	#tested	# positve (head)	rate of detection (%)	# outbreak (case)	# patient
2009	1,617	-	-	17	477
2010	1,612	-	-	27	677
2011	5,001	-	-	24	1,065
2012	5,081	2	0.04	9	147
2013	4,845	-	-	13	690
2014	4,566	-	-	24	1,416

Year	Salmonella Enteritidis Salmonella spp. Detection in egg			Salmonella Food Poisoning	
	#tested	# positve (head)	rate of detection (%)	# outbreak (case)	# patient
2015	4,859	-	-	13	202
2016	4,374	-	-	21	354
2017	3,997	1	0.03	20	662
2018	3,942	1	0.03	19	3,516
2019	4,265	1	0.02	18	575
2020	4,156	-	-	21	529
2021	4,172	-	-	32	1,561

Source: MFDS (2021)

In Korea, the grade of eggs has been determined by Korea Institute for Animal Products Quality Evaluation since 2003, and the rate of grading is still less than 10%. Egg grades are divided into 4 levels of freshness quality and 5 levels of weight.

Safety Management Certification Standards for layer farms were announced in 2008, and HACCP introduction was recommended. As of 2023, almost all layer farms have introduced HACCP system and operated.

With comprehensive egg hygiene measure announced in 2010, it became mandatory to select, package, and refrigerate the eggs that are sold for household use. However, as such methods are not being applied in reality, additional hygiene measures are being introduced every year. In 2010, a new type of business called "Edible eggs Collection and Sales" was established, which is subjected to the notification to competent cities and counties for the business operation.

In 2013, the task of Livestock Products Safety was transferred from Ministry of Agriculture, Food and Rural Affairs (MAFRA) to Ministry of Food and Drug Safety. While the Ministry of Food and Drug Safety is responsible for safety management for entire stage of livestock products, safety management at the farm and butchery process is delegated to MAFRA for operation.

After tick remover was detected in edible eggs in 2017, "Livestock Products Hygiene Management Act" was revised. And with new establishment of edible egg selective packaging business, it is subject to the permission of provincial governor for operation.

In 2019, it became mandatory to mark laying dates on the shells of edible eggs. Traceability management system for edible eggs has been implemented since 2020. For the contamination by edible egg salmonella bacteria, national hygiene management is operated through traceability management system and safety monitoring inspections. And autonomous hygiene management of farms is in the process using HACCP system.

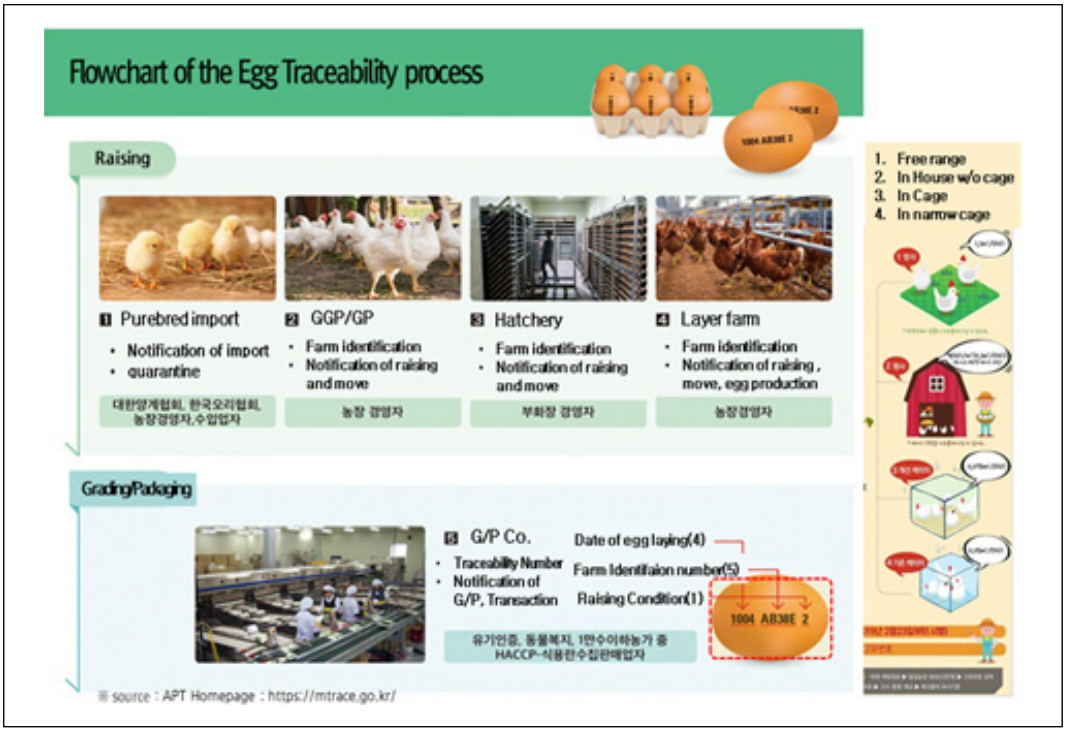
a. Traceability management system

Traceability management system for livestock and the products refers to providing history information on meat and eggs for consumers to purchase livestock products with confidence. In this system, it enables recording and managing of the information on each stage of transactions for livestock, meat, and eggs. And if the problem occurs, moving routes can be traced back to facilitate swift actions. Furthermore, it can boost consumer confidence by providing history information at the time of selling.

Traceability management system provides consumers with the information such as country of origin, breeder, type, and grade in order to differentiate them from the imported products and enhance distribution transparency. Besides, the competitiveness of livestock industry can be strengthened through the enhanced management and refinement of the pedigree and specification information of chickens, ducks, and eggs by integrating traceability management system. For the occurrence of hazardous accidents, such as food poisoning, the efficiency of quarantine can be improved through rapid tracking actions and measures. In case of diseases or problems arising from egg hygiene and safety, the measures including recovery, and disposal can be promptly taken through history tracking actions.

For cows, traceability management system is in place in 2007, and for pigs in 2015 and for eggs in 2020 in sequence. Traceability system for an individual cattle and farm traceability system for pigs and eggs has been implemented respectively.

〈Figure 3-1〉 Flowchart of the Egg Traceability process 1



Source: APT Homepage (https://mtrace.go.kr/)

As shown in the figure above, breeding business owners must notify the income earned through hatchery eggs at the production stage. Chicken breeding farms, hatcheries, and layer farms must be issued farm identification numbers, and then input the movement of egg groups and egg productions into the traceability management system.

Selective packaging companies must notify competent authority about the quantities of selective packaging and transactions at selective packaging stage.

Since 2019, selective packaging companies have been required to display 10-digit numbers on egg shells. First 4-digit number indicates laying date, and 5-digit number in the middle means a unique number of the farm. And the last digit indicates breeding environment of layer farm. 1 is reserved for free grazing farms, 2 for cage free plain farms, 3 for cage farms, and 4 for narrow cage farms.

〈Figure 3-2〉 Flowchart of the Egg Traceability process 2

Source: APT Homepage (https://mtrace.go.kr/)

In collection and sales stage, collection and sales companies shall notify competent authority in regards to collection and sales volume.

During consumption stage, consumers can check out the history of eggs by entering 10-digit number indicated in egg shell into the mobile app of traceability management system.

b. Safety inspection of edible eggs

Meat and edible eggs are subject to safety inspection of livestock products. The items of safety inspection can be broadly divided into microbiological inspection and residual substance inspection.

Safety inspection of edible eggs is administered by the Ministry of Food and Drug

Safety. Inspection plan for edible eggs at farm stage, is established by Ministry of Agriculture, Food and Rural Affairs (MAFRA) and Quarantine Agency, and consulted with the Ministry of Food and Drug Safety. Monitoring and inspection of edible eggs is conducted in accordance with the inspection plan established by the Animal Hygiene Testing Laboratory of province. Then inspection results are entered into Livestock Products Safety System. And the Quarantine Agency analyzes the inspection results, evaluates standard values and inspection methods, establishes the inspection plan for the following year, and then notify the MAFRA.
4,000 inspections are scheduled in 2023. Considering the number of layer farms is less than 1,000, it is estimated that the farms go through three to four inspections a year.

Microbiological inspection of edible eggs at layer farms is performed in accordance with "Regulations on Inspection of Microorganisms and Residual Substances in Edible Eggs (Joint Notification of Ministry of Food and Drug Safety and Ministry of Agriculture, Food and Rural Affairs (MAFRA), March 31, 2022)." Microbiological inspection is carried out for the purpose of ensuring food safety of edible eggs by preventing and reducing microbial contamination of edible eggs. Inspection subjects are edible eggs produced in Korea. The items to be inspected include foreign substances, alteration, spoilage, besides microbiological inspection on three types of Salmonella serotypes, such as Salmonella Enteritidis, Salmonella Typhimurium, and Salmonella Thompson. Inspection and testing agencies for livestock products in cities and provinces undertake the inspection tasks. For sample collection, public officials visit farms in person, select 20 eggs per farm randomly and conduct the inspection by mixing both egg white and yolk. Inspection method is based on Salmonella testing method for Food Standards and Specifications (Notification).

If the inspection result confirms that salmonella bacteria turns out to be positive, local government should begin investigation and carry out additional inspections

into the cause of contamination (4 times every 2 weeks) in accordance with Article 13 of "Regulations on Microbiological and Residual Substances of Edible Eggs," and provide improvement measures to prevent contamination on farms. Supply of edible eggs should come after going through processing and heating steps. Inspection results and improvement measures are notified to Quarantine agency.

c. Hazard Analysis and Critical Control Points for Food and Livestock Products (HACCP)

In HACCP system, producers analyze harmful factors that can adversely affect the hygiene of livestock food over entire cycle of breeding, butchery, processing, packaging, and distribution. It is an independent, preventive, and intensive hazards management (prevention) system that provides scientific and systematic methods by setting Critical Control Point (CCP) at stage of prevention and removal of such harmful elements, or when securing safety.

In Korea, HACCP was implemented by establishing new "Hazards Management Standard (Hazard Analysis and Critical Control Points) for Food and Livestock Products" through revisions of the Food Sanitation Act in 1995 and the Livestock Hygiene Management Act in 1997.

In case of livestock products, relevant projects were implemented in following sequence: butchery and livestock processing plants (including meat packaging processing) in 1997, feed factories in 2001, collection companies in 2004, livestock products transport business, livestock products storage, livestock products sales, assorted feed in 2005, pig farms in 2006, cattle farms in 2007, chicken farms in 2008, duck farms in 2009, edible eggs collection and sales in 2011, and edible eggs selective packaging business in 2018.

Unlike foreign countries, Korea's HACCP system was led by the government. Farmers, who promote HACCP system, must apply and operate prerequisites and

HACCP management to the farms in accordance with "Livestock Products Hygiene Management Act" and "Hazard Analysis and Critical Control Points for Food and Livestock Products (Ministry of Food and Drug Safety Notice No. 2022-40, some parts revised on May 18, 2022)." As of December 31, 2022, the number of HACCP-certified layer farms was 1,107, and the number of HACCP-certified livestock farms amounted to 7,032 including layer farms. 43.1% of 16,479 full-time farm owners, who were recommended to apply HACCP by the government, obtained HACCP certifications.

For layer farms to apply HACCP, Salmonella inspections must be conducted at least once semi-annually in accordance with Hygiene Management Standards of the prerequisite program in attached Table 4 "Hazard Analysis and Critical Control Points for Food and Livestock Products" and appropriate measures must be taken autonomously according to the results of tests.

d. Livestock Products Safety Management System (LPSMS)

Aimed at creating information system for Livestock Products Safety Management, LPSMS is an information system jointly used by livestock products hygiene organizations, such as Ministry of Agriculture, Food and Rural Affairs, Animal and Plant Quarantine Agency, and Livestock Products Hygiene Inspection Agencies of each city and province. Animal and Plant Quarantine Agency created the system and it has been under operation afterwards.

Livestock Products Safety Management consists of inspection agency management, inspection plan management, inspection personnel management, butchery (meat) inspection, edible egg inspection, raw milk inspection, microbiological inspection, residual substance inspection, consignment inspection management, laboratory information management, statistics and performance management.

In the Laboratory Information Management System of the Livestock Products Safety Management, starting from the sample request stage, inspection results of samples are reported along with statistical processing. Once the Laboratory Information Management system is established, inspection records and results are safely stored and analyzed to provide warnings by enabling analysis of dangerous time and regions.

Private inspection agencies (Optifarm, Disease Judgment Diagnosis Center at Jeonbuk National University) established and operate a laboratory information management system. Inspection results of the private agencies are reported to the Quarantine Agency.

e. Management of Avian Salmonellosis

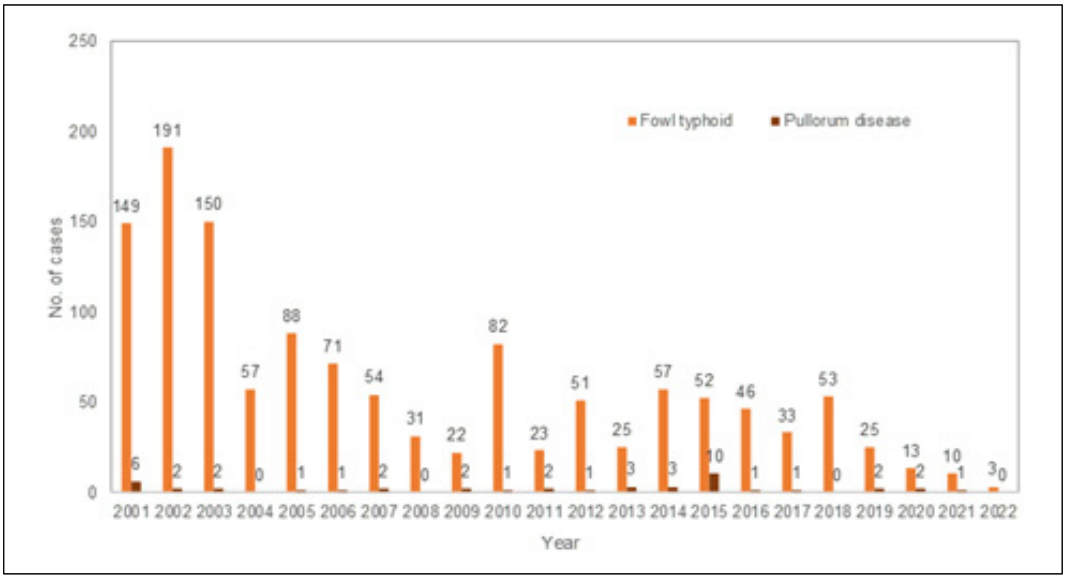
In order to control Fowl Thyphoid and Pullorum disease, which causes great economic damages in poultry industry, it is necessary to introduce new chickens in the Salmonella negative group and perform preventive blocking and quarantines. In Korea, monitoring inspections (16 weeks, 36 weeks, 56 weeks) are conducted on breeding farms (Grand Parent Stock and Parent Stock, Hatchery) in accordance with "Guidelines for Breeding Farms and Hatcheries Quarantine Management (Ministry of Agriculture, Food and Rural Affairs (MAFRA) Notification No. 2022-119 December 8, 2022)."

In monitoring tests, it determines a positive group of Salmonella by primary flat plate aggregation reaction, secondary ELISA test, and third bacterial isolation & identification test in sequence. In other words, for the second test, if the positive rate is 10% or more for each chicken group for total number of chickens of first test subjects, it is determined as a positive group of Salmonella, and as a result of the third test, the chicken that bacterial isloation and identification is made on one or more chickens, is determined to be a positive group of Salmonella. If the result of

third test is negative for chicken coops with a positive rate of less than 10% in the first and second tests, it is determined as a negative chicken group. After the test is conducted, if the chicken turns out to be positive, it is eliminated. For commercial chickens, vaccination and antibiotic treatments are used. But vaccines are not used for breeding chicken groups. In Korea, various competitive exclusion agents, Bacteriophage, organic acid treatments, and probiotic vaccination (since 2001) are being implemented for a positive group of salmollea.

Fowl typhoid and pullorum were detected as shown in the figure below.

〈Figure 3-3〉 Current Outbreak of Avian Salmonellosis



Source: KAHIS Official Website (http://www.kahis.go.kr, Dec. 2022)

In Korea, for safety monitoring test of eggs causing food poisoning, government official visits a layer farm, collects 20 eggs, and conducts a triple test by mixing up egg white and egg yellow (S. Enteritidis, S. Thyphimurium, S. Thompson). Subjects of Salmonella serovar are selected by referring to past food poisoning cases.

In the case of Salmonella-positive farms, if negative results are confirmed by conducting four consecutive tests every two weeks, it can be sold as fresh eggs. If the

result is positive, eggs go through heat treatments or are shipped for processing. In Korea, for the positive group of Salmollea, various competitive exclusion agents, Bacteriophage, and organic acid treatments are used. SE vaccine has been developed, but it is not allowed for sale.

As shown in the Table below, as a result of test, Salmonella enteritidis (SE) was detected at layer farms. Monitoring test criteria for edible eggs include "Regulations on Inspection of Microorganism and Residual Substance of Edible Eggs (Joint Notification by Ministry of Food and Drug Safety and Ministry of Agriculture, Food and Rural Affairs (MAFRA), March 31, 2022)."

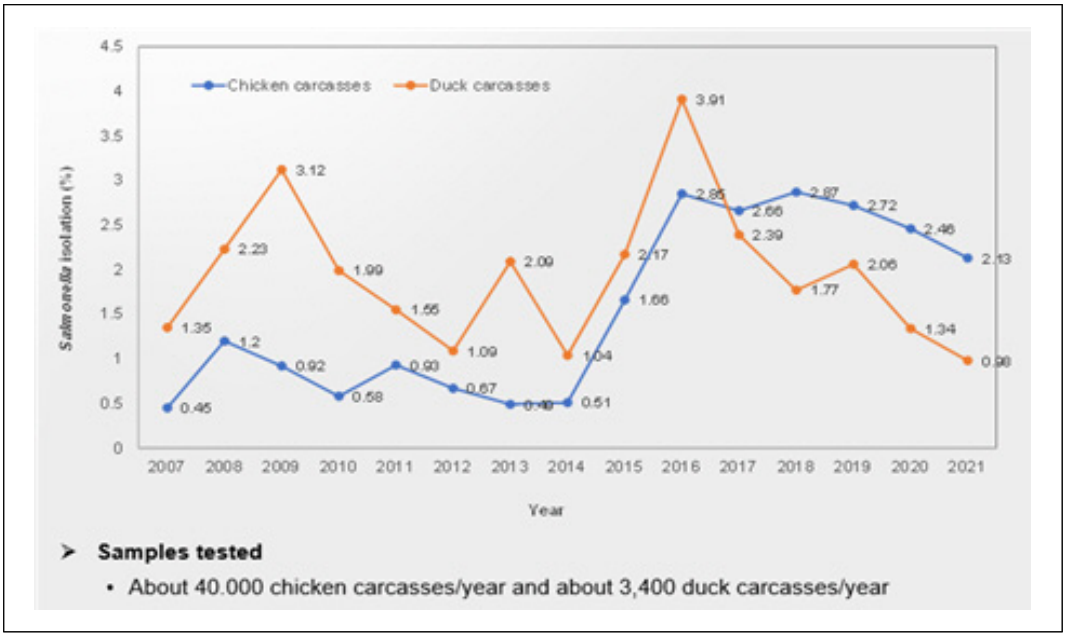
〈Table 3-2〉 Yearly Salmonella Detection Result on Edible Egg

Year*	No. of farms tested	No. of farms positive(%)
2017	3,997	1(0.025)
2018	3,942	1(0.025)
2019	4,265	1(0.023)
2020	4,156	0(0)
2021	4,172	0(0)

* Tested for Enteritidis until Aug. 2019, and after that tested for Enteritidis, Typhimurium, and Thompson.

As shown in the figure below, Salmonella enteritidis (SE) test were conducted nationwide for broiler and meat duck butcheries and SE were detected. Monitoring inspection standard of poultry meat includes "Regulations on Microbial Inspection of Meat (Joint Notification by Ministry of Food and Drug Safety and Ministry of Agriculture, Food and Rural Affairs(MAFRA), May 29, 2020)." In Korea, it is a mandatory for butcheries to introduce the HACCP system, and set a Critical Control Point (CCP) to conduct SE testing for meat and environment. SE inspections are conducted autonomously.

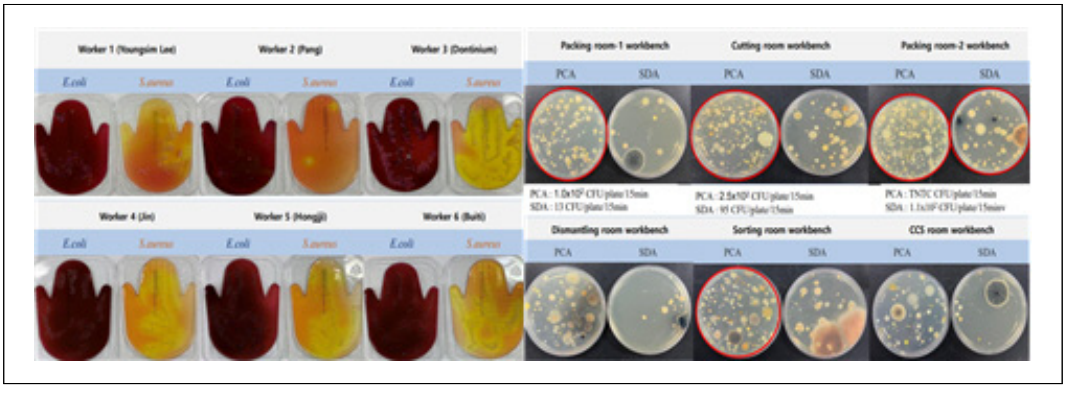
〈Figure 3-4〉 Poultry Dressing By year



Source: Optipharm(2023)

Ten butcheries belonging to Easy Bio affiliates are autonomously conducting microbiological tests for Salmonella on worker's palm and working environment, as shown in the figure below.

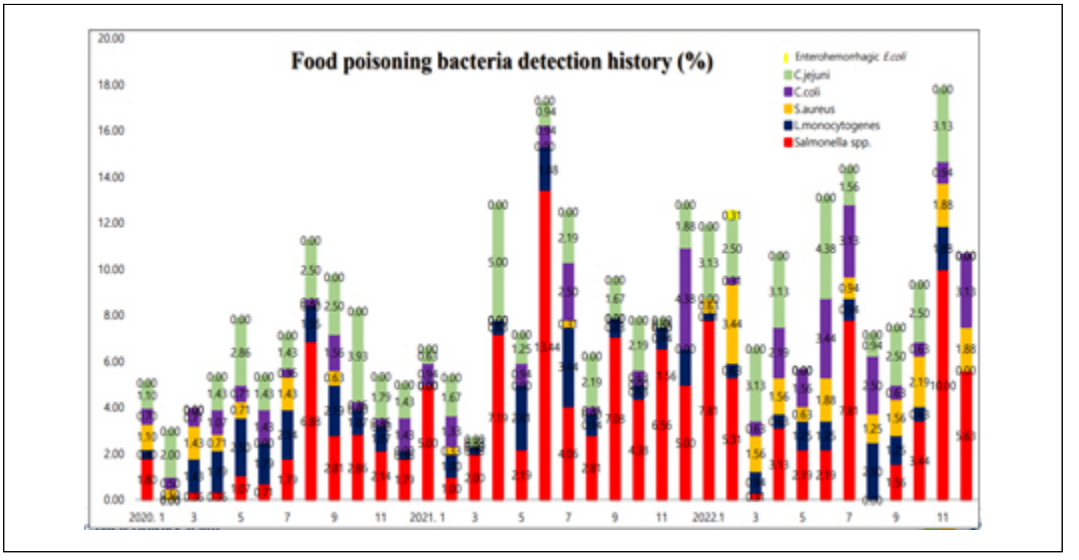
〈Figure 3-5〉 Hygiene Inspection on Dressing Plant



Source: Optipharm (2023)

The results of detection of food poisoning bacteria for samples, which was requested to OptiPharm, are shown in the figure below. The detection of food poisoning bacteria is seasonal and a lot of detections of Salmonella has been confirmed.

〈Figure 3-6〉 Food Poisoning Bacteria Detection Results in Slaughterhouses by Year



Source: Optipharm (2023)

In case of Korea, it is recommended to introduce HACCP system for layer farms with more than 30,000 chickens. Based on HACCP plan, HACCP-certified farms are expected to set semi-annual SE test as Critical Control Point (CCP), and voluntarily stop shipping fresh eggs if found positive after conducting SE tests autonomously for eggs, groups, and the environment, ship them for processing purpose.

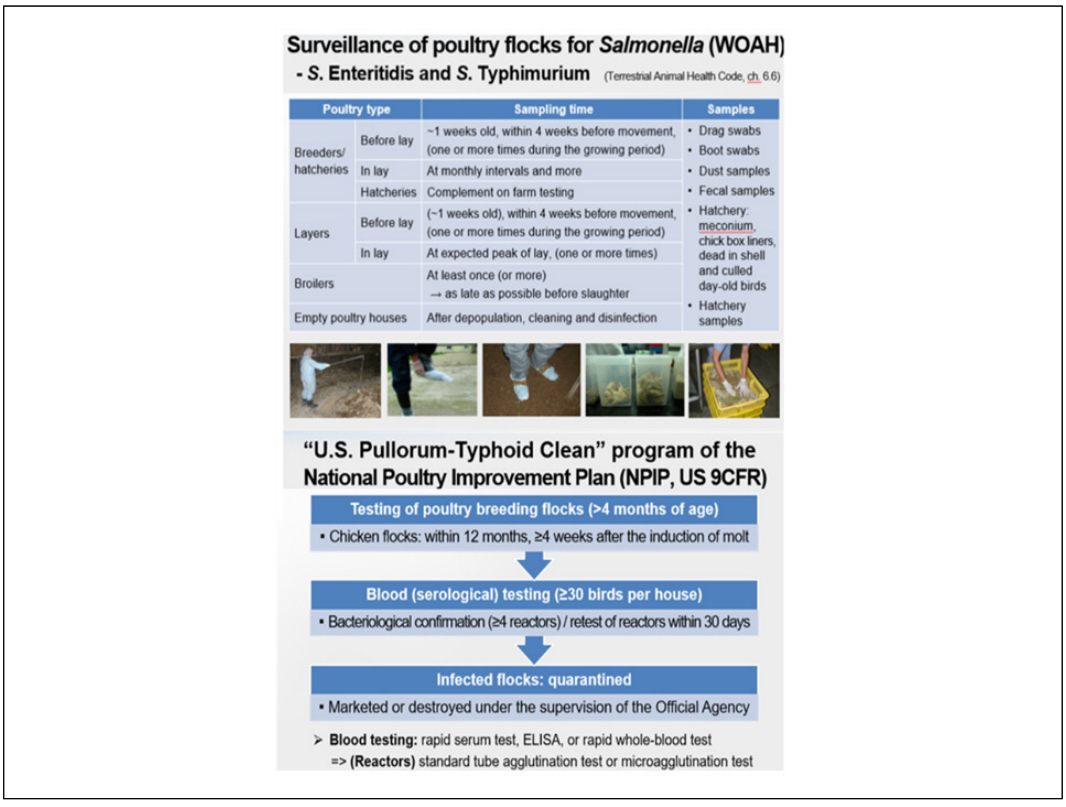
Regarding monitoring inspection and forecasting of salmonella bacteria, the recommendations from World Organization for Animal Health (WOAH), the United States, and the European Union are shown in the figure below.

〈Table 3-3〉 Surveilance for S.Pullorum and S.Gallinarum in poultry & hatcheries in EU(regulation(EU) 2019/2035)

Farm	Time of sampling	Number of samples	samples	
			Serological (serum/tube agglutination tests, ELISA)	Bacteriological (alternative or confirmative)
Breeding poultry	At the point of lay	60	Blood samples	Post-mortem tissues, cecal/fecal droppings, or cloacal swabs
Productive poultry	During production at least once a year			
Hatchery	At least once every 6 weeks	1(pool)	-	Down and meconium per hatcher
		or 20	-	Second grade (and dead-in-shell) chickens per flock
Infected flocks => Depopulation & subsequent negative results for membership (e.g., Poultry Health Scheme in UK)				

➢ Species : chickens, turkeys, ducks, quails, pheasant, guinea fowl, and partridges

〈Figure 3-7〉 Monitoring inspection and forecasting of salmonella bacteria (WOAH/US)



4 Analysis of the Poultry Sector in Philippine

1. Gap on Philippine Policies, Surveillance and Diagnostic Mechanisms for Salmonellosis

An Inception Workshop was conducted to review and evaluate the policies and surveillance mechanisms relevant to Salmonella on January 25-26, 2023. The invited participants are technical and policy experts from state university colleges (Central Luzon State University and Cavite State University), specialty colleges (Philippine College of Veterinary Public Health, Philippine College of Veterinary Epidemiologists and Philippine College of Poultry Practitioners), Department of Agriculture (National Meat Inspection and Service, Livestock Biotechnology, Policy Review Service, Regional Field Offices and Consultant) and poultry stakeholders (Philippine College of Poultry Practitioners).

As a result of this activity, gaps were identified based on the 3 key areas which are policy, laboratory and surveillance 〈Table 4-1〉.

〈Table 4-1〉 Identified gaps based on the three key areas on Salmonella program.

KEY AREAS	IDENTIFIED GAPS
Policy	No Salmonella program in place
	Disconnection between National and Local policies
	Policies tend to be swayed by influence & pressure groups
	Lack of specific legislation for Salmonella
	Non-uniform guidelines (in terms of salmonella programs)
	Compliance of smallhold farms to stay in programs
	Absence of policy identification of objectives
Laboratory	No sampling plan in place
	Limited trained collectors
	Lack of strategic locations of laboratories in remote island provinces
	Usual method is lengthy (conventional)
	Lack of trained laboratory personnel (for salmonella testing)
	Limited capability (resources, manpower)
	No robust data management and analysis (Laboratory Information Management System)
	Weak linkages with research institutions
Surveillance	No surveillance guidelines (design, # of samples)
	Lack of data management & analysis
	Limited pool of experts (epidemiology unit)
	Underreporting from the private stakeholders
	Non-inclusion of small hold farms

1.1. Policy

The Salmonella-related policies in the Philippines were identified and discussed in detail in the previous section. Despite the existence of such policies, there is a need for a National Salmonella Surveillance and Monitoring Program with clearly defined objectives to harmonize these policies.

Currently, semi-commercial and commercial broiler breeder and breeder layer farms (Hatching eggs, Day-old chicks, Pullets and Ready to Lay chickens) that apply for the Animal Disease Monitoring and Compliance Certificate, as a requirement for the issuance of a shipping permit, are required to submit a Salmonella Pullorum

laboratory result. For smallholders without a need for a shipping permit, there is no incentive to subject their flock to testing which means that smallhold flocks are seldom tested. With about approximately 41.5% of the total poultry inventory belonging to the smallhold sector, their non-inclusion to the testing requirement remains to be a pressing concern that must be considered in the amendment of existing policies or programs.

The existing policies are also limited on these commodities: breeders, hatchery, imported live poultry. Although individual farms may include Salmonella testing and control in their own farms, the absence of a policy that covers layer farms especially on eggs means absence of an accreditation process to check on compliance and validity of such mechanisms employed by the farms. In the hatcheries, environmental testing to detect Salmonella spp. is being conducted with varying frequency of testing.

There were inconsistencies and gaps observed between the expectations and the actual implementation of the policies. The number of samples, sample collectors and processors, diagnostic method, and retesting protocol were not explicitly stated in the policies. Moreover, there is no evaluation mechanism (feedback) from the stakeholders to address issues and problems concerning the implementation of the policies.

1.2. Surveillance

Without the existence of a National Salmonella Surveillance and Monitoring Program, there is a lack of surveillance data to provide information on the prevalence of Salmonella in the poultry population in the country. Surveillance plan and an appropriate sampling design is lacking which means that there is no available data to determine the presence of any Salmonella risk areas in the country.

Although the current practice can be considered a form of passive surveillance for Salmonella Pullorum and Gallinarum, the data are unfortunately not being processed and analyzed. In addition, the current testing is limited only to semi-commercial and commercial breeder farms that are transporting their commodity (i.e hatching egg, day old chick/day old pullet, ready to lay pullet) across the country. The same cannot be said of Typhimurium and Enteritidis where there is zero surveillance in laying hens and in eggs.

Underreporting is also identified as an issue for surveillance either due to reluctance of private stakeholders or the limited veterinary manpower in local government units; there needs to be a push for early disease reporting not just for Salmonella but for other diseases of animal and public health importance as well.

The previously mentioned gaps were attributed to the limited technical capacities in the national, regional and local veterinary offices. There is no dedicated epidemiological unit to analyze data and provide sound advice in the Salmonella monitoring and control policies.

1.3. Laboratory

The technical capability of the laboratory in terms of diagnostic technique was identified to be a limiting factor. The Rapid Plate Agglutination Test (RPAT) being done at the national reference laboratory is only a screening test for the detection of Salmonella Gallinarum and Pullorum. Bacterial isolation is also being done but identification is limited only at the genus level. This means that the laboratory is unable to perform confirmatory test to identify the specific Salmonella serovar as indicated in the policy. This limitation is attributed to inadequate technical manpower, equipment and procedures, and laboratory infrastructure.

Moreover, there is a need for robust data management through establishment of a Laboratory Information Management System (LIMS). This management system is

essential for the efficient traceability, record keeping and data management of samples being tested in the laboratory.

Most of the gaps identified during the workshop cut across the areas of policy, laboratory, and surveillance and this must be taken into consideration in formulating recommendations to address the identified gaps.

2. South Korea Policies, Surveillance and Diagnostic Mechanisms for Salmonellosis

2.1. Sanitation Management of Edible Eggs

a. Korean Laws and Regulations

1. Livestock Products Processing Act (1962)
2. Korea Food Code
3. Veterinary Services Laboratories (2015)
4. Livestock Industry Act (2007): Registration of Livestock (2013)
5. Veterinarians Act (1974)
6. Act on Public Quarantine Veterinarians (2006)
7. Animal Protection Act (2011)
8. Livestock Product Sanitation Control Act
   - Article 11: Livestock Inspection
   - Article 12: Livestock Product Inspection
   - Article 19: Access/ Inspection/ Collection
   - Article 44: Delegation and Consignment of Authority
9. Regulations of Inspection of Microorganisms and Residual Substances in Edible Eggs

b. Monitoring test

The purpose is to secure livestock product safety systematically from production to distribution by establishing and implementing safety inspection plans (microorganisms and residual substances) for meat and eggs. This is in accordance to Livestock Product Sanitation Control Act (Article 11: Livestock Inspection, Article 12: Livestock Product Inspection, Article 19: Access/ Inspection/ Collection, Article 44: Delegation and Consignment of Authority) and the Regulations on Inspection of Microorganisms and Residual Substances in Edible Eggs.

b.1. Raising Stage Livestock Product (Meat and Eggs) Safety Monitoring test

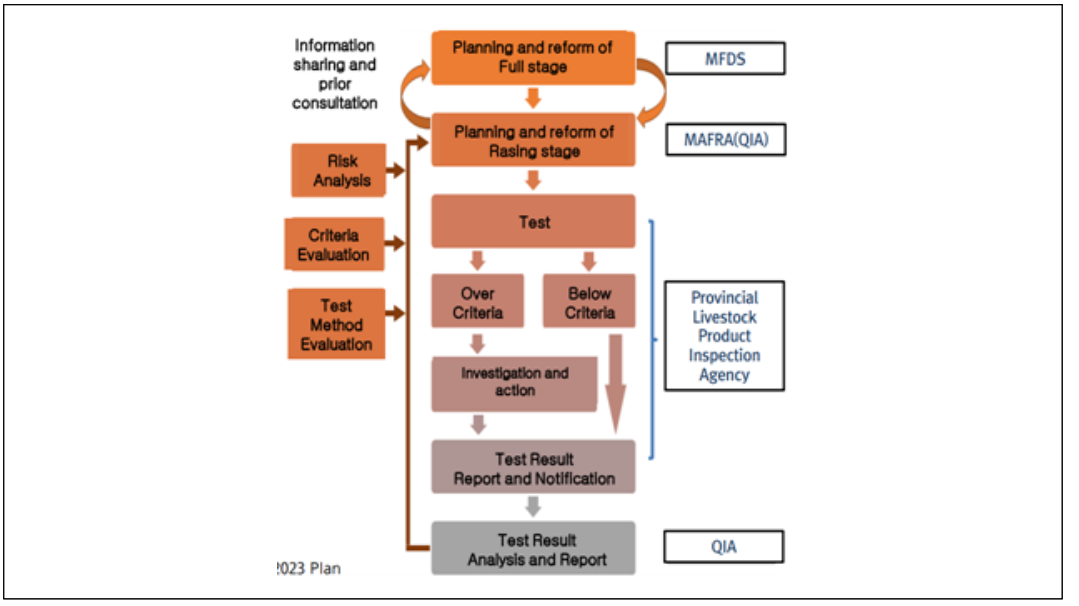
Plan of Microbiological test on edible eggs

The purpose of microbiological test on edible eggs is to secure food safety of edible eggs by preventing and reducing contamination of microorganisms.

Inspection Plan

The domestically produced eggs will be inspected for presence of foreign matter, deterioration/ decomposition and microorganisms (Salmonella Enteritidis, Salmonella Typhimurium and Salmonella Thompson). The Municipal/ Provincial livestock product testing/ inspection agency will visit a layer farm to randomly collect 20 samples per layer farm and mix whole eggs for testing. This is in compliance to Article 8 of Regulations on Inspection of Microorganisms and Residues in Edible Eggs.

〈**Figure 4-1**〉 Livestock Production (Meat and Egg) Safety Monitoring Process



Source: MFDS (2023)

Inspection Result Measures

Upon detection of Salmonella Enteritidis, Salmonella Typhimurium and Salmonella Thompson, the local government investigates the source of contamination and additionally inspects it four (4) times at two (2) weeks interval in accordance to Article 13 of Regulations on Inspection of Microorganisms and Residues in Edible Eggs.

Microbial Monitoring test results (as part of Sanitation management of edible eggs) are published in Food and Drug Year book of Ministry of Food and Drug Standard.

In the case of Salmonella-positive farms, if negative results are confirmed by conducting four consecutive tests every two weeks, it can be sold as fresh eggs. If the result is positive, eggs go through heat treatments or are shipped for processing. In Korea, for the positive group of Salmonella, various competitive exclusion agents, Bacteriophage, and organic acid treatments are used. SE vaccine has been developed, but it is not allowed for sale.

〈Table 4-2〉 Microbial Monitoring test results

Year*	No. of farms tested	No. of farms positive(%)
2017	3,997	1(0.025)
2018	3,942	1(0.025)
2019	4,265	1(0.023)
2020	4,156	0(0)
2021	4,172	0(0)

Source: Ministry of Food and Drug (2021)

b.2. Hazard Analysis Critical Control Point (HCCP)

HACCP system, which analyzes hazards that can have a detrimental effect on the sanitation of livestock products in the entire process of breeding, slaughtering, processing, packaging, and distribution of livestock, and is a step in preventing or removing these hazards or securing safety, is being voluntarily integrated in the layer farms, however it is mandatory/ obligatory in the grading and packaging of eggs.

The introduction of the HACCP system benefits both the farmers and the consumers in that it secures competitiveness for imported livestock products and it improves consumer's confidence through prevention of hazards, respectively.

The HACCP Certification Status is published in the Korea Agency of HACCP Accreditation and Services (KAHAS) website.

In HACCP system, producers analyze harmful factors that can adversely affect the hygiene of livestock food over entire cycle of breeding, butchery, processing, packaging, and distribution. It is an independent, preventive, and intensive hazards management (prevention) system that provides scientific and systematic methods by setting Critical Control Point (CCP) at stage of prevention and removal of such harmful elements, or when securing safety.

In Korea, HACCP was implemented by establishing new "Hazards Management Standard (Hazard Analysis and Critical Control Points) for Food and Livestock Products" through revisions of the Food Sanitation Act in 1995 and the Livestock Hygiene Management Act in 1997.

In case of livestock products, relevant projects were implemented in following sequence: butchery and livestock processing plants (including meat packaging processing) in 1997, feed factories in 2001, collection companies in 2004, livestock products transport business, livestock products storage, livestock products sales, assorted feed in 2005, pig farms in 2006, cattle farms in 2007, chicken farms in 2008, duck farms in 2009, edible eggs collection and sales in 2011, and edible eggs selective packaging business in 2018.

Unlike foreign countries, Korea's HACCP system was led by the government. Farmers, who promote HACCP system, must apply and operate prerequisites and HACCP management to the farms in accordance with "Livestock Products Hygiene Management Act" and "Hazard Analysis and Critical Control Points for Food and Livestock Products (Ministry of Food and Drug Safety Notice No. 2022-40, some parts revised on May 18, 2022)." As of December 31, 2022, the number of HACCP-certified layer farms was 1,107, and the number of HACCP-certified livestock farms amounted to 7,032 including layer farms. 43.1% of 16,479 full-time farm owners, who were recommended to apply HACCP by the government, obtained HACCP certifications.

For layer farms to apply HACCP, Salmonella inspections must be conducted at least once semi-annually in accordance with Hygiene Management Standards of the prerequisite program in attached "Hazard Analysis and Critical Control Points for Food and Livestock Products" and appropriate measures must be taken autonomously according to the results of tests.

b.3 Livestock Product Safety Management System (LPSMS)

LPMS, which informatizes livestock product safety management from the production stage to the consumption stage, and the information generated through this is jointly shared by livestock products hygiene- related organizations such as the MAFRA, QIA, MFDS, and each city and province sanitation inspection agency, is implemented.

System Configuration includes inspection agency management, inspection plan management, egg inspection, microbial testing, consigned inspection management, laboratory information management and statistics and performance management.

Aimed at creating information system for Livestock Products Safety Management, LPSMS is an information system jointly used by livestock products hygiene organizations, such as Ministry of Agriculture, Food and Rural Affairs, Animal and Plant Quarantine Agency, and Livestock Products Hygiene Inspection Agencies of each city and province. Animal and Plant Quarantine Agency created the system and it has been under operation afterwards.

Livestock Products Safety Management consists of inspection agency management, inspection plan management, inspection personnel management, butchery (meat) inspection, edible egg inspection, raw milk inspection, microbiological inspection, residual substance inspection, consignment inspection management, laboratory information management, statistics and performance management.

In the Laboratory Information Management System of the Livestock Products Safety Management, starting from the sample request stage, inspection results of samples are reported along with statistical processing. Once the Laboratory Information Management system is established, inspection records and results are safely stored and analyzed to provide warnings by enabling analysis of dangerous time and regions.

Private inspection agencies (Optifarm, Disease Judgment Diagnosis Center at Jeonbuk National University) established and operate a laboratory information management system. Inspection results of the private agencies are reported to the Quarantine Agency.

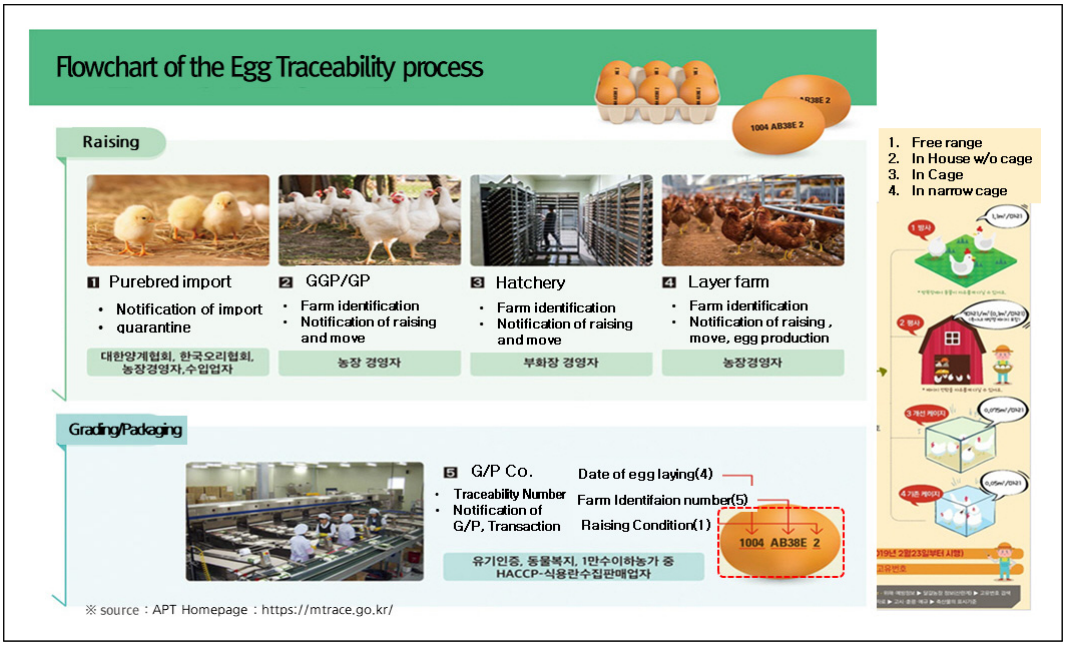
b.4. Traceability Management System

Traceability management system for livestock and the products refers to providing history information on meat and eggs for consumers to purchase livestock products with confidence. In this system, it enables recording and managing of the information on each stage of transactions for livestock, meat, and eggs. And if the problem occurs, moving routes can be traced back to facilitate swift actions. Furthermore, it can boost consumer confidence by providing history information at the time of selling.

Traceability management system provides consumers with the information such as country of origin, breeder, type, and grade in order to differentiate them from the imported products and enhance distribution transparency. Besides, the competitiveness of livestock industry can be strengthened through the enhanced management and refinement of the pedigree and specification information of chickens, ducks, and eggs by integrating traceability management system. For the occurrence of hazardous accidents, such as food poisoning, the efficiency of quarantine can be improved through rapid tracking actions and measures. In case of diseases or problems arising from egg hygiene and safety, the measures including recovery, and disposal can be promptly taken through history tracking actions.

For cows, traceability management system is in place in 2007, and for pigs in 2015 and for eggs in 2020 in sequence. Traceability system for an individual cattle and farm traceability system for pigs and eggs has been implemented respectively.

〈Figure 4-2〉 Flowchart of the Egg Traceability process



Source: APT Homepage (https://mtrace.go.kr/)

As shown in the figure above, breeding business owners must notify the income earned through hatchery eggs at the production stage. Chicken breeding farms, hatcheries, and layer farms must be issued farm identification numbers, and then input the movement of egg groups and egg productions into the traceability management system.

Selective packaging companies must notify competent authority about the quantities of selective packaging and transactions at selective packaging stage. Since 2019, selective packaging companies have been required to display 10-digit numbers on eggshells. First 4-digit number indicates laying date, and 5-digit number in the middle means a unique number of the farm. And the last digit indicates breeding environment of layer farm. 1 is reserved for free grazing farms, 2 for cage free plain farms, 3 for cage farms, and 4 for narrow cage farms.

In collection and sales stage, collection and sales companies shall notify competent authority in regard to collection and sales volume. During consumption

stage, consumers can check out the history of eggs by entering 10-digit number indicated in egg shell into the mobile app of traceability management system.

〈Figure 4-3〉 Flowchart of the Egg Traceability process

Source: APT Homepage (https://mtrace.go.kr/)

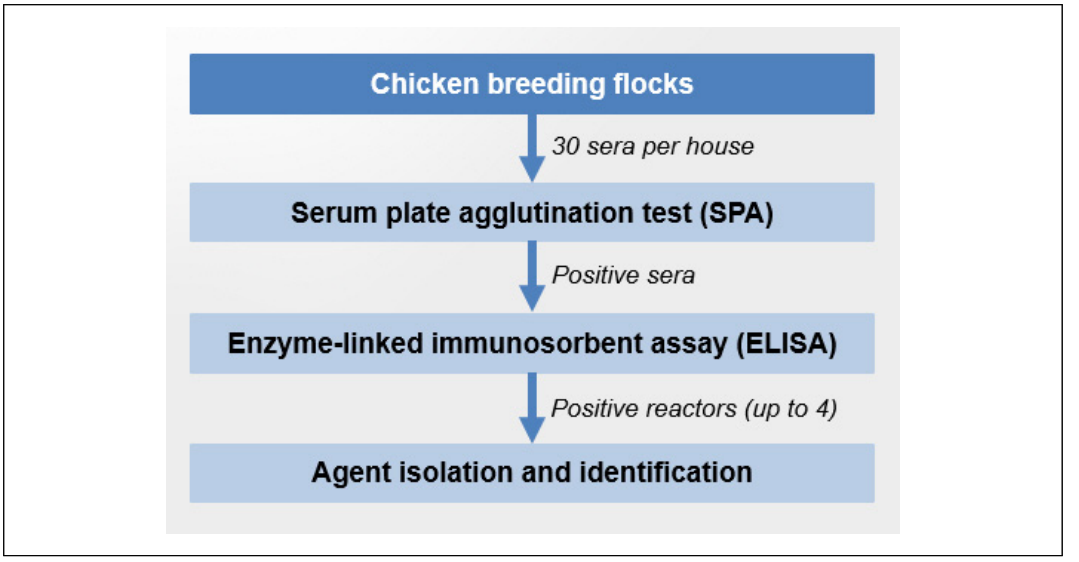
2.2. Prevention of Contagious Animal Diseases

Pullorum and fowl typhoid caused by Salmonella Pullorum and Salmonella Gallinarum, respectively, are categorized as contagious animal diseases under the "Act on the prevention of contagious animal diseases" of South Korea. It is for this reason that testing for the presence of Pullorum/ Gallinarum in the breeding flock, both the GPS and PS, is part of the statutory national control program in accordance with "Guidelines for Breeding Farms and Hatcheries Quarantine Management (Ministry of Agriculture, Food and Rural Affairs (MAFRA) Notification No. 2022-119 December 8, 2022)." Sampling is done at 16, 36, and 56 weeks of age with minimum

30 samples collected per house. The testing sequence is as follows: serum plate agglutination, ELISA, Bacterial Isolation and Identification. The samples collected are initially screened through serum plate agglutination (SPA) test. If the result of the screening is 10% of the sample group, the samples will be subjected to an ELISA test. If the ELISA test showed a positive result, bacterial isolation and identification is done through collecting organ samples from one or two chickens from the sample group. If isolation is negative and the first and second tests are less than 10% positivity rate, then the flock is considered negative. If, however, bacterial isolation is positive for the serotype tested, the flock will be eliminated (breeding flock). Commercial chickens that turn out positive will be treated with antibiotics and vaccination. Other management techniques such as competitive exclusion agents (ie probiotics), bacteriophages, organic acids, probiotic vaccine (since 2001) are also being implemented in South Korea.

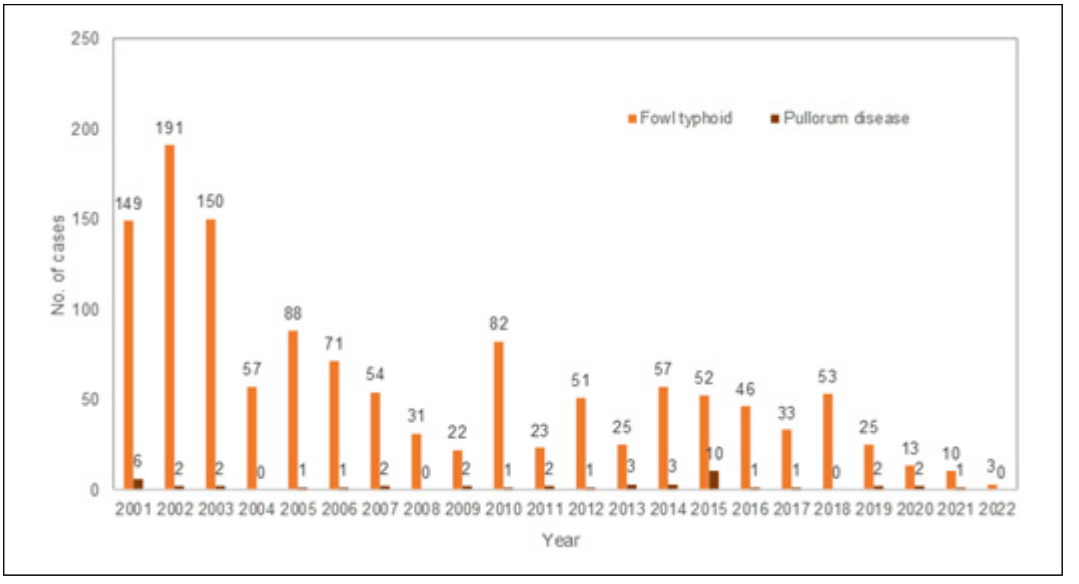
Sampling is done at 16, 36, and 56 weeks of age with minimum 30 samples collected per house. The samples collected are initially screened through serum plate agglutination (SPA) test. If there is a positive reaction/serum, an enzyme linked immunosorbent assay (ELISA) is performed. If there are at least 4 reactors detected during the ELISA, further sampling is done to isolate and detect the organism through biochemical reactions and PCR. Once there is a positive definitive diagnosis, the affected breeding flock will be culled and disposed. This program by the MAFRA through the APQA has resulted to zero detection of Pullorum and Gallinarum in breeder flocks since 2017.

〈Figure 4-4〉 Procedure for determining the status of flocks for pullorum disease and fowl typhoid in Korea



Source: Min-Su Kang. (2023). "Salmonellosis in Poultry and its Control Strategies"

〈Figure 4-5〉 Fowl typhoid and pullorum detection. (http://www.kahis.go.kr Dec 2022)



Source: KAHIS Official Website (http://www.kahis.go.kr, Dec. 2022)

3. Comparison of the Salmonella Monitoring and Surveillance between the Philippines and South Korea

South Korea is successful in controlling its Salmonellosis, Pullorum, and Fowl Typhoid cases in poultry farms through implementation of a series of laws and regulations that center on animal health and food safety.

〈Table 4-3〉 Comparison of Salmonella Monitoring and Surveillance between Philippines and South Korea

Parameter	Philippines		South Korea	
	Breeder	Layer	Breeder	Layer
Policy	Guidelines on the Local Transport/ Shipment of Animals, Animal Products and By-products (Administrative Order No 5 series 2019)	-	Act on the Prevention of Contagious Animal Disease	Livestock Product Sanitation Control Act
Involved Agencies	BAI, DA-RFO, LGU	-	APQA	MFDS, LGU
Surveillance and Monitoring	No surveillance program but requirement for Animal Disease Monitoring Compliance Certificate every 6 months	-	National Control Program (Statutory)	HACCP (voluntary) National Control Program (Statutory) yearly
Sampling	30 serum samples per farm	-	30 serum samples per house collected at 16, 26, and 56 weeks of age	20 egg samples per layer farm
Diagnostic Method	Rapid Plate Agglutination Test (RPAT)	-	Serum Plate Agglutination (SPA) Enzyme Linked Immunosorbent Assay (ELISA) Bacterial Isolation and Identification PCR	Bacterial Isolation and Identification

3.1. Policy

In Korea, monitoring of Salmonella in layer farms (and domestically produced eggs) and poultry breeder farms are stipulated in the provisions of Livestock Product Sanitation Control Act and Act on the Prevention of Contagious Animal Disease, respectively. The purpose of the Livestock Product Sanitation Control Act is to contribute to sound development and improvement of public sanitation by defining matters regarding farming, slaughter, handling of livestock product processing, distribution and inspection for sanitary control of livestock product and quality improvement while the Act on the Prevention of Contagious Animal Disease is to contribute to the development of the livestock industry and to improvement in public health by preventing the outbreak or spread of contagious animal diseases.

In the Philippines, monitoring of Salmonella in poultry breeder farms (hatching eggs, day-old chicks, pullets and ready to lay) is stipulated in the Annex of the Guidelines on the Local Transport/ Shipment of Animals, Animal Products and By-products (Administrative Order No 5 series 2019). The purpose of the guidelines is to protect and promote life and health of animals and the human populace by ensuring utmost biosecurity against the introduction or the spread of diseases through unregulated movement of animals, animal products and by-products; and to facilitate trade. For layer farms, there is no national program for Salmonella monitoring. This means that farms may or may not monitor their flocks and their eggs for Salmonella, but there is no certifying body government or private.

3.2. Involved Agencies

In Korea, the involved agencies in the monitoring of Salmonella is the Animal and Plant Quarantine Agency and the Local Government Unit while in the Philippines,

the involved agencies are the Department of Agriculture- Bureau of Animal Industry (DA-BAI), DA-Regional Field Offices and Local Government Unit.

3.3. Surveillance and Monitoring

Having a national control program for Salmonella, South Korea through its Animal and Plant Quarantine Agency employs a detailed sampling plan involving the poultry breeders and layer farms. Their National Control Program is effective in bringing down cases of fowl typhoid and pullorum disease to zero detection since 2017 while the prevalence of salmonella in eggs collected from layer farms have been consistently at zero since 2020.

In addition, voluntary HACCP registration of poultry layer farms provides another layer of monitoring for Salmonellosis in table eggs. For poultry layer, specifically eggs, surveillance and monitoring for Salmonella Typhimurium, Enteritidis, and Thompson is done. With this system, Korean consumers are assured the safety and quality of the fresh eggs in the market. For the Philippine's case, the same level of consumer confidence for the availability of safe and quality eggs is lacking due to the absence of this type of monitoring system in the layer farms.

Concerning animal health, the Philippines does not have available information on the prevalence of both Pullorum disease and Salmonellosis mainly due to the lack of a surveillance plan for these diseases. Animal facilities, poultry farms included, are required to register with the Bureau of Animal Industry as mandated by the Animal Welfare Law (RA 8485) but it does not include monitoring for specific diseases. Testing for Pullorum is being done by breeder farms that are applying for the Animal Disease Monitoring Compliance Certificate which in turn is a requirement for local transport.

The World Organization for Animal Health (WOAH) Terrestrial Manual for

Pullorum Disease and Fowl Typhoid, serological tests such as SPA, RPAT, and ELISA are effective screening tools to determine the level of immune response in the flock but not enough to determine the presence of the disease. Identification through bacterial isolation and biochemical tests, and molecular techniques such as polymerase chain reaction (PCR) are necessary to arrive at a definitive diagnosis. South Korea has included both serological testing and agent identification in their surveillance and monitoring plan, even having two levels of serological screening (SPA and ELISA). Given the current testing scheme for Pullorum in the Philippines, it is not enough to obtain substantial information on the prevalence of the disease. This warrants a need to design a more appropriate surveillance and testing scheme based on WOAH standards.

5 Conclusion & Recommendations

1. Conclusion

One of the main gaps identified in all three groups is the lack of an existing Salmonella Control program in place. Currently, semi-commercial and commercial broiler breeder and breeder layer farms that apply for the Animal Disease Monitoring and Compliance Certificate, as a requirement for the issuance of a shipping permit, are required to submit a laboratory result for Salmonella Pullorum. For smallholders without a need for a shipping permit, there is no incentive to subject their flock to testing which means that smallhold flocks are seldom tested. This also means that there is no comprehensive data available on the prevalence of Salmonellosis in the poultry flock in the country. Similarly, prevalence of Salmonella on eggs is also lacking due to absence of a monitoring and surveillance system.

In terms of surveillance, the absence of surveillance guidelines was identified to be the main gap. A recurrent problem was also the underreporting from the private sector and the challenge to include the smallhold farms in the surveillance plan. There is a need to consult subject matter experts to formulate guidelines as well as proper management and analysis of data.

The capability of the reference laboratory to perform the necessary tests was also identified to be limited: technology, manpower, infrastructure, and equipment. These issues if unaddressed can pose a threat to the Philippine layer industry and to food safety.

There is a need for the Philippines to develop and establish the National Salmonella Surveillance and Monitoring Program to safeguard animal health and ensure the quality and safety of edible eggs. Moreover, the current egg value chain, specifically from production to postharvest may benefit from an established surveillance and monitoring system by ensuring the sustainability of the production and safety of the eggs for Filipino consumers. The South Korean experience on livestock product sanitation management, particularly on egg hygiene, can be a good model in formulating a system that is implementable in the Philippines.

To achieve this, addressing the gaps identified in existing policies in conjunction with strengthening surveillance and current laboratory diagnostic capabilities of the national reference labs must be done.

〈Table 5-1〉 Recommendations for the Philippine Salmonella program and related policies

	POLICY	2023		2024				2025			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	**Implementing Rules and Regulations on Food Safety (Salmonella component)**										
	Creation of Multisectoral TWG										
	Preparation (Drafting) of IRR										
	TWG Workshop										
	Finalization of the IRR										
	Public Consultation										
	Policy (IRR) Implementation										
	Evaluation/ Feedback from Stakeholders										
	Policy Review/ Evaluation										
	Policy Revision										
2	**High Level discussion between DA and DILG for mandatory compliance to national rules**										
	Initial Discussion										

	POLICY	2023		2024				2025			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Drafting of Resolution										
	Revisions										
	Approval and adoption of Final Resolution										
	SURVEILLANCE	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	**National Salmonella Surveillance and Control Program**										
	Preparation(Drafting)										
	Expert Consultation										
	High Level Discussion										
	Revisions										
	Implementation										
2	**Joint agreement for Private-Public-Academe partnership**										
	Meetings										
	Workshop										
3	**Strengthening Epidemiological Capacity of BAI veterinarians**										
	Training programs										
	LABORATORY	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	**Capacitation of National and Regional laboratories**										
	Training on Salmonella Diagnosis										
	Proficiency Testing on Salmonella Diagnosis										
	Upgrading of Laboratory Equipment										
	ISO/IEC 17025:2017 Laboratory Accreditation										
2	**Setting up a LIMS and a dedicated unit for national animal disease data management and analysis**										
	Preparation of LIMS related equipment										
	Capacitation of Technical Staff										
	Implementation										
3	**Adoption of advanced laboratory diagnostic technique**										
	Training of Technical Staff (National Laboratory)										
	Optimization of new protocols										
	Upgrading of Laboratory Equipment										
	Implementation										

2. Recommendations

(Salmonella) management of edible eggs and make a policy proposal to improve Philippines' hygiene management policies of edible eggs.

In terms of microorganism (salmonella) management for Korea's edible eggs, three key methods are put into action, such as government-initiated traceability management system for edible eggs, safety monitoring inspection for edible eggs, and the HACCP system promoted autonomously by private sector (farmers).

Firstly, in order to put into action of traceability management system of edible eggs and safety monitoring inspection, all egg producing farms must implement a registration and licensing system and be assigned unique numbers for the management. Since 2011, Korean government has assigned farm-specific numbers (livestock industry registration No.) to all farms and farm identification numbers are being issued according to traceability management system for livestock and livestock products.

For hygiene management of edible eggs, Korean government mandates that selective packaging companies conduct selective inspection and packaging for all edible eggs, and mark the date of laying, farm-specific number, and farm environment on egg shells. To this end, Korean government provided subsidies for the introduction of inspection and packaging machines. In korea, the marking of laying date on egg shell was introduced since 2019, and the marking of farm-specific numbers was indicated and promoted previously. In case of laying date marking, phase-in implementation seems to be reasonable as there is discrepancy in opinions about refrigerated distribution and storage period.

As described above, when implementing the marking of farm-specific numbers [the number written on the livestock breeding license and registration form issued by the competent authority (city and county) of the farm in accordance with Article 22 of "Livestock Industry Act" of Korea] and unique identification numbers on egg

shells, the traceability management system can be put into use. At the beginning stage, there was a transition period in Korea that those numbers were indicated on packaging materials, not on egg shells.

As there were many selective packaging companies and collection & sales vendors in Korea, it was difficult to use traceability management system for edible eggs. However, the traceability management system could be implemented easily in Philippines because there are only a few large collection and sales companies. It would be realistic for collection and sales companies to track histories according to farm identification numbers indicated on egg shells or packaging materials.

Even though we separately operate traceability management system and Livestock Products Safety Management System, which collects test results for food safety monitoring inspection, the integration of two systems seems to be reasonable for operating in Philippines. In Korea, the Livestock Products Safety Management System operates separately from a system integrating livestock products rating and traceability management.

In Korea, HACCP was introduced to autonomously promote it at production stage, and for farms to introduce HACCP for themselves so that they could mandatorily conduct a SE test. For that purpose, farms introducing HACCP system are preferentially granted the subsidies. And for the farms starting layer chicken business for the first time, the government issues a license for the livestock business and provides subsidies on condition of using HACCP system.

〈Table 5-2〉 General recommendations/focus for the improvement of Philippine Poultry monitoring system to ensure quality and safe eggs

		2024				2025				2026			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	**Establishment of Traceability System on Eggs**												
	Assessment of Current Status												
	Expert Consultations												

		2024				2025				2026			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Designing of Traceability Guidelines												
	Database and label preparation												
	Manpower Training												
	Implementation and Evaluation												
2	**Strengthening of Laboratory Diagnostic Capacity**												
	Assessment of Current Status												
	Expert Consultations												
	Designing Training Plan												
	Upgrading Laboratory Infrastructure and Equipment												
	Training Technical Staff												
	Optimization and Proficiency Testing of Protocols												
	ISO/IEC 17025:2017 laboratory accreditation												

3. Proposal for official development assistance(ODA) project

The KAPEX joint research reviewed the South Korea's Salmonella management of edible eggs that lead to a policy proposal for the improvement of Philippines' hygiene management of table eggs.

Korea's sanitation management of edible eggs has three key methods that are put into action: government-initiated traceability management system for edible eggs, safety monitoring inspection for edible eggs, and the Hazard Analysis and Critical Control Points (HACCP) system promoted autonomously by private sector (farmers). Recognizing the importance and impact of these methods in increasing the quality and safety of table eggs, consumers are offered higher value products. Ultimately, sustaining a production of high-quality eggs may also lead to globally competitive poultry products for export.

In the Philippines, these methods are not yet established. The Korea as the model

country can be the reference of the Philippines in the establishment of sanitation management system of edible eggs. Moreover, ensuring available safe and quality eggs to meet consumers demand will cause an increase in the number of value chain actors in the production of egg-derived processed food. This can result to an increase of consumer confidence in consumption of eggs and egg-derivative foods. Consequently, this may have a positive impact in the poultry industry. Thus, the proposed ODA Project will focus on "Establishment of a Sustainable Safety Monitoring System for Edible Eggs in the Philippines."

GENERAL OBJECTIVE

The project aims to establish a sustainable safety monitoring system for edible eggs in the Philippines.

SPECIFIC OBJECTIVES

1. To optimize the existing national registration system of poultry farms
2. To strengthen the poultry disease surveillance system and control program.
3. To establish a traceability management system in edible eggs.
4. To implement a safety monitoring inspection including drug residue testing in edible eggs.
5. To adopt a government-led Hazard Analysis Critical Control Point (HACCP) in the poultry farms.
6. To establish a government-led Hazard Analysis Critical Control Point (HACCP) in the grading and packaging business of edible eggs.
7. To capacitate the National Veterinary Reference laboratory and government lab-

oratories to support the poultry disease diagnosis and chemical analysis in the project.

8. To formulate enabling policies and guidelines for the implementation of Sustainable Safety Monitoring System for Edible Eggs.

PROJECT COMPONENTS

a. Poultry Farm Registration System

i. Assessment of current system
ii. Registration Needs Analysis
iii. Optimization of Registration System
iv. Human Resource Capacity
v. Implementation and Evaluation

b. Poultry Disease Surveillance System

vi. Assessment of current poultry disease surveillance
vii. Development Surveillance system and control program
viii. Human Resources Capacity
ix. Implementation and Evaluation

c. Safety Monitoring Inspection and Traceability System in Eggs

x. Assessment of Current Status
xi. Expert Consultations with local and partner country (South Korea)
xii. Designing of Safety Monitoring Inspection and Traceability System Guidelines
xiii. Database and label preparation

xiv. Equipment for Traceability System

xv. Human Resources Capacity

xvi. Policy formulation

xvii. Implementation and Evaluation

d. Hazard Analysis and Critical Control Points (HACCP) System

xviii. Assessment of Current Status

xix. Expert Consultations with local and partner country (South Korea)

xx. Development of HACCP System

xxi. Human Resources Capacity

xxii. Policy formulation

xxiii. Implementation and Evaluation

e. Laboratory Capacity

xxiv. Assessment of current status

xxv. Expert Consultations with local and partner country (South Korea)

xxvi. Designing Training Plan

xxvii. Upgrading Laboratory Infrastructure and Equipment

xxviii. Training Technical Staff

xxix. Optimization and Proficiency Testing of Protocols

xxx. ISO/IEC 17025:2017 Laboratory accreditation

Appendix

1. Regulations on Inspection of Microorganism and Residual Substance in Edible Eggs [Ministry of Food and Drug Safety Notification No. 2022-25, March 31, 2022, revision of other laws]

Chapter 1. General Provisions

Article 1 (Purpose)

The purpose of this regulation is to stipulate details for efficient inspection of microorganisms and residue ("residual substance") and the management of foreign substance, such as feces, blood, etc. and spoiled and rotten eggs, which is stated in "2. inspection items of edible eggs" in attached Table 4 (Inspection standard of livestock products) of Article 12, Section 7 "Livestock Hygiene Management Act (Livestock Products Sanitary Control Act)" and Article 12 of the Enforcement Regulation of the same Act.

Article 2 (Definitions of Terms)

Definitions of terms used in this Regulation are as follows.

1. "Edible eggs" refer to livestock eggs for the purpose of eating, meaning the eggs of chickens, ducks, and quails.
2. "Foreign substance" refers to the substance that may cause harm to human

health, such as feces, blood, egg contents, and feathers that are attached to surface of edible eggs.

3. "Residual substance" refers to raw substance and metabolites, such as animal drugs, pesticides, etc., which residual acceptance standards are set among food types in accordance with "Food Standards and Specifications (Notification by Ministry of Food and Drug Safety)."
4. "Monitoring inspection" refers to the test conducted for checking the contamination of microorganisms and residues, or the status of such substances in edible eggs.
5. "Regulatory inspection of residues" refers to the residue test conducted after taking measures to suspend shipments of edible eggs produced by the residue non-compliant farms or the farms likely to be residue non-compliant.
6. "Detection test" refers to the inspection conducted on microorganisms or residues that may cause safety problems at home and abroad, and shall be used as basic data for establishing inspection plan to microorganisms and residue for edible eggs in the future.
7. "Residue non-compliant farms" refer the farms (producing relevant edible eggs) that exceeded the residue acceptance standards as results of residue test.

Article 3 (Inspection Agency)

Inspection of edible eggs (including collection of inspection samples, hereinafter the same) shall be conducted by a livestock testing and inspection agency (hereinafter referred to as "City/Province Livestock Inspection Agency") established by Animal and Plant Quarantine Agency and local governments to conduct sanitary inspections of livestock products. However, for detection test, it can also be conducted by the Ministry of Agriculture, Food and Rural Affairs (MAFRA) and the Ministry of Food and Drug Safety.

Article 4 (Inspection subjects)

Inspection is subject to edible eggs produced from domestic chickens, ducks, and quails.

Article 5 (Duties of Inspection Agency)

The duties performed by inspectors of City/Province Livestock Inspection Agency are as follows.

1. Inspection of edible eggs by City/Province and provision of farm guidance
2. Establishment of inspection plan for each City/Province
3. Quarterly reporting of inspection result
4. Reporting of detection test if a separate detection test is conducted

Article 6 (Handling and collection guidelines to inspection samples)

① Sampling for edible eggs inspections shall be collected directly by visiting edible eggs selective packaging companies, edible eggs collection and sales companies, or breeding farms spawning chickens, ducks, and quails.

② If sampling is carried out at business sites of selective packaging companies and collection and sales companies of edible eggs pursuant to Section 1, relevant records and others should be maintained in order to trace the farms that collect samples.

③ For farms, not compliant to acceptance standards pursuant to Article 13 and Article 14, direct visit should be made to corresponding farms and samples collected.

④ Guidelines to sampling and handling for inspection of edible eggs shall be in accordance with attached Table 6 of Food Standards and Specifications

(Notification by Ministry of Food and Drug Safety) and Enforcement Regulations of Livestock Products Sanitary Control Act for each farm spawning chickens, ducks, and quails. However, the amount of sampling (collection) for the inspection of residues in edible eggs shall be according to attached Table 1.

Chapter 2. Inspection of Edible Eggs

Article 7 (Inspection type and items)

① Inspection types and items for edible eggs shall be as follows.

1. Foreign substance inspection
2. Testing of spoiled, rotten eggs
3. Monitoring inspection
   A. Microbiological test: Salmonella Enteritidis, Salmonella Typhimurium, Salmonella Thompson
   B. Residues inspection: Animal medicine and drugs, pesticides, etc.
4. Regulatory inspection of residues: Considering annual inspection plan, the head of City/Province Livestock Inspection Agency must decide at own discretion, but include the residues not compliant as result of monitoring inspection of corresponding farms over the past three years.
5. Detection test: Aimed at microorganisms and residues required by the agencies conducting detection test

② Despite Section 1, the Minister of Agriculture, Food and Rural Affairs may adjust inspection items, if deemed necessary due to hygiene and safety issues at home and abroad, or if the Minister of Food and Drug Safety requests adjustment such as addition of relevant inspection items.

③ If intended to conduct detection test, the Director of Food and Drug Safety and the Minister of Agriculture, Food and Rural Affairs should determine inspection items separately, establishing a plan and implement. However, if the Minister of Agriculture, Food and Rural Affairs conducts detection test, the relevant plan should be notified to the Director of Food and Drug Safety.

④ The head of City/Province Livestock Products Agency, the head of National Institute of Food and Drug Safety Evaluation, the Director of Regional Food and Drug Safety Administration, the head of Animal and Plant Quarantine Agency should cooperate in sampling, inspections, etc. if detection tests deemed necessary and are requested by the Minister of Agriculture, Food and Rural Affairs or the Director of Ministry of Food and Drug Safety.

Article 8 (Inspection acceptance criteria)

Inspection acceptance criteria of edible eggs are as follows.

1. The surface of edible eggs shall be free from foreign substances, which may cause harm to human health, such as feces, blood, egg contents, feathers, and etc.
2. Edible eggs should not be spoiled or rotten.
3. Microorganism (Acceptance criteria): Salmonella Enteritidis, Salmonella Typhimurium, and Salmonella Thompson should not be detected in edible eggs aimed for human consumption without processing or heating.
4. Residue (Acceptance criteria): In accordance with Food Standards and Specifications (Notification by Ministry of Food and Drug Safety), the residues acceptance criteria of eggs, such as animal medicines, pesticides, and etc. should not be exceeded.

Article 9 (Inspection method)

① In principle, the inspection method stated in each Subparagraph of Section 1, Article 7 shall be conducted in accordance with Food Standards and Specifications (Notification by the Ministry of Food and Drug Safety), but may be conducted using the test method in the "Handbook to Hazardous Substances in Livestock and Fishery Products" specified by the Director of National Institute of Food and Drug Safety Evaluation, for the purpose of efficient test of inspection items set by annual inspection plan.

② For residue monitoring inspection, after performing precision quantitative tests or simplified quantitative tests, precision quantitative tests can be performed on positive samples.

Article 10 (Verification test and others)

① As result of the test in accordance with a microbiological test, when presumed to be Salmonella Enteritidis (Salmonella Typhimurium, Salmonella Thompson and required for final verification, the request of such verification can be made to the head of Animal and Plant Quarantine Agency by attaching test reports obtained from in-house inspections, such as tests of separate strain and biochemical characteristics, etc.

② The head of Animal and Plant Quarantine Agency shall notify corresponding inspection agency about the test result of final verification on separated strains requested by the head of City/Province Livestock Inspection Agency.

Article 11 (Maintenance of inspection records, etc.)

The head of City/Province Livestock Inspection Agency shall prepare and maintain

relevant documents, such as inspection reports, and keep them for three years from the date of final entry.

Article 12 (Measures for spoiled and rotten eggs with foreign substances)

① If not suitable as result of inspection on foreign substances, spoiled eggs, and rotten eggs, the head of City/Province Livestock Products Agency should notify competent mayor, county governor, the head of autonomous Gu office (referred to as "the head of Gu office", hereinafter the same).

② When notified by the head of City/Province Livestock Inspection Agency pursuant to Section 1, mayor, county governor, the head of Gu office should instruct corresponding farms to take appropriate measures, such as removing foreign substance, spoiled eggs, and rotten eggs.

Article 13 (Measures to non-compliance of microorganism acceptance criteria)

① When detecting Salmonella Enteritidis, Salmonella Typhimurium, Salmonella Thompson as result of edible eggs test, the head of City/Province Livestock Inspection Agency shall notify mayor, county governor, and the head of Gu office about such result, and investigate the cause of contamination, such as the verification of livestock specifications management status.

② The head of City/Province Livestock Inspection Agency shall conduct the test described in each Sub-paragraph on the farms that Salmonella Enteritidis, Salmonella typimurium, Salmonella Thompson are detected, as result of edible eggs test.

1. For farms that Salmonella is detected, within 2 weeks after the detection,

samples must be collected and tested again, and total 4 times of inspections be performed continuously every 2 weeks.

2. If Salmonella is detected again as result of the test pursuant to Subparagraph 1, within two weeks after the detection, samples should be collected and tested again, and total 4 times of inspections be performed continuously every 2 weeks.

③ If farms detected Salmonella Enteritidis, Salmonella Typhimurium, Salmonella Thompson, or provided them with the guidance to improvement measures, the head of City/Province Livestock Inspection Agency shall notify (report to) mayor, governor and the head of Animal and Plant Quarantine Agency about the status of non-compliant farms pursuant to attached Form 1.

④ When notified by the head of City/Province Livestock Inspection Agency in accordance with Section 1, mayor, county governor, the head of Gu office (hereinafter referred to as "the head of Si/Gun/Gu office") should take measures based on each of the followings.

1. Take appropriate measures for corresponding edible eggs not to be supplied for human consumption without processing or heating.

2. Provide instruction and guidance for improvement measures for preventing Salmonella contaminations of edible eggs, such as complete disinfection of livestock barns, farming tools, and access control to outsiders for the farm concerned.

Article 14 (Measures to non-compliance of residue acceptance standards)

① If residue acceptance standards is not in compliance as result of inspection result of edible eggs, the head of City/Province Livestock Inspection Agency shall designate them as residue non-compliant farms for six months based on

the date of inspection completion, notify the head of Si/Gun/Gu office about designation status of residue non-compliant farms on attached Form 2, and investigate the cause of residue by conducting inspection on specifications management of corresponding farms according to attached Form 3.

② The head of City/Province Livestock Inspection Agency shall conduct a regulatory inspection on farms designated as residue non-compliant pursuant to Section 1 after taking measures to suspend shipments as follows, and allow shipments of edible eggs for sale when passing each regulatory inspection.

1. For edible eggs produced by farms designated as residue non-compliant, initial sample collection date should be set and inspected considering a withdrawal period of animal medicines and molting of livestock.
2. For the first regulatory inspection, it should be conducted at least once on edible eggs stored on the farms for sale.
3. For the second regulatory inspection, it should be conducted at least once on edible eggs produced on the collection day more than two weeks after completing the first regulatory inspection.
4. If pesticides and others, remaining in livestock's body and edible eggs for a long time, are detected exceeding residue acceptance criteria, it should be inspected in accordance with Subparagraph 2 and 3, but regulatory inspections can be conducted three consecutive times per each round.

③ If the result of residue regulatory inspection exceeded residue acceptance criteria, such fact should be notified to the competent head of Si/Gun/Gu office, and residue regulation inspection pursuant to Section 2 be conducted. For corresponding farms, inspection should be performed with six months extension of designation period of residue non-compliant farms based on completion date of regulatory inspection.

④ When notified from the head of City/Province Livestock Inspection Agency in

accordance with Section 1 and 3, the head of Si/Gun/Gu office should provide corresponding farms with guidance and instructions regarding improvement measures for residue prevention. If the result of residue regulatory inspection exceeded residue acceptance criteria, necessary measures should be taken not to supply corresponding quantity for eating, in accordance with attached Table 9 associated with Article 18 of Livestock Products Sanitary Control Act and Article 19 of Enforcement Ordinance of the same Act, and Article 24 of Enforcement Regulation of the same Act.

⑤ For residue non-compliant farms according to residue monitoring inspection and residue regulatory inspection, if verified as non-compliant to the regulation of Section 3, Article 85 of Pharmaceutical Affairs Act, based on the result of inspection to the cause of residue pursuant to Section 1, the mayor and provincial governor shall impose fines in accordance with the regulation of Section 1, Article 98 of the same Act, or request to the head of Si/Gun/Gu office to impose it.

Article 15 (Cancellation to designation of residue non-compliant farms)

① As result of conducting inspection in accordance with Subparagraph 2 and Subparagraph 3, Section 2, Article 14, for a case not in compliance with residue acceptance criteria two consecutive times, and as result of conducting inspection in accordance with Subparagraph 4, Section 2, Article 14, for a case not in compliance with residue acceptance criteria six consecutive times, the designation of residue non-compliant farms can be cancelled even if such designation period has not elapsed.

② When designating or cancelling residue non-compliant farms, the results of inspection on corresponding farms shall be reported (notified) to mayor and governor, or the head of Animal and Plant Quarantine Agency, and if they are

designated as residue non-compliant farms, the status of designation pursuant to attached Form 2 and the inspection result on the cause of residue pursuant to attached Form 3 should be attached respectively.

Article 16 (Regulatory inspection to farms with high possibility of residue non-compliance)

① The head of City/Province Livestock Inspection Agency may conduct inspections on edible eggs produced from spawning chicken, duck, and quail farms with high possibility of residue non-compliance as follows.

1. If the residue exceeded acceptance criteria as result of inspection on livestock groups scheduled to be shipped by spawning chicken, duck, and quail farms
2. If the residue exceeded acceptance criteria as result of inspection on livestock groups shipped from spawning chicken, duck, and quail farms to butcheries
3. If acceptance criteria were exceeded as result of inspection on residues in accordance with Section 4, Article 12 of Livestock Products Sanitary Control Act
4. If pesticides and others are detected as result of inspection on environmental samples, such as excrements and feed in livestock farms
5. If suspected that residues remain in edible eggs produced by the corresponding farm, after inspector or relevant public official visit and conduct inspection on spawning chickens, ducks, and quail farms, in accordance with Article 19 of Livestock Products Sanitary Control Act

② In terms of inspection under Section 1, such inspection should be performed on edible eggs stored and produced for sale by corresponding farms, and if found non-compliant, relevant measures should be taken pursuant to Article 14. And if appropriate, the shipment of such edible eggs should be allowed.

Article 17 (Measures to non-compliance at distribution stage of collection and inspection)

① If the criteria pursuant to Article 8 are not in compliance as result of collection and inspection on business sites of selective packaging companies of edible eggs and collection and sales companies of edible eggs, Minister of Food and Drug Safety and the head of City/Province Livestock Inspection Agency should notify about the inspection results including information of producing farms pursuant to attached Form 4, to the Minister of Food and Drug Safety, Ministry of Agriculture, Food and Rural Affairs (MAFRA), the head of Animal and Plant Quarantine Agency, mayor, governor, the head of other City /Province Livestock Inspection Agency, and the head of Si/Gun/Gu office who administer corresponding farms.

② When notified of the results in accordance with Section 1, the head of City/Province Livestock Inspection Agency and the head of Si/Gun/Gu office of corresponding farms should take actions pursuant to Article 12, Article 13, or Article 14.

Chapter 3. Report details

Article 18 (Utilization and reporting of inspection results)

① The head of City/Province Livestock Inspection Agency shall provide the inspection results of corresponding chicken, duck, quail farms to livestock owners, the head of Si/Gun/Gu office to utilize them for farm sanitary management.

② The head of City/Province Livestock Inspection Agency shall notify (report to)

mayor, governor and the head of Animal and Plant Quarantine Agency about the results of quarterly edible eggs inspection by the 10th of the first month of following quarter pursuant to attached Form 5 and 6.

③ The head of Animal and Plant Quarantine Agency shall collect quarterly results of edible egg inspections by City/Province, and notify (report to) Minister of Agriculture, Food and Rural Affairs and Minister of Food and Drug Safety by the end of first month of following quarter.

④ Mayor and governor should notify Minister of Agriculture, Food and Rural Affairs via the head of Animal and Plant Quarantine Agency about the results of imposing administrative fines pursuant to Section 3, Article 85 of "Pharmaceutical Affairs Act" according to attached Form 7 by the 10th of first month of following quarter.

⑤ The head of Animal and Plant Quarantine Agency should use the data information notified by the head of City/Province Livestock Inspection Agency to reflect edible eggs inspection plan for the following year, or to administer non-compliant farms such as posting the status of microorganisms and residue non-compliant farms on website of Livestock Products Safety Management System.

Article 19 (Report on inspection plan)

① The head of City/Province Livestock Inspection Agency shall establish a detailed plan for inspecting edible eggs for the following year, in consideration of the number of spawning chickens, ducks, and quails farms in relevant area of concerned year, and notify (report to) the mayor and governor, the head of Animal and Plant Quarantine Agency by the end of October each year.

② The head of Animal and Plant Quarantine Agency should collect inspection

plans for edible eggs for the following year, and report to the Minister of Agriculture, Food and Rural Affairs by the end of November every year.

③ In consultation with the Director of Food and Drug Safety, the Minister of Agriculture, Food and Rural Affairs should determine microorganisms and residues subject to edible eggs inspection, and the volume of inspection subjects for each City/Province Inspection Agency for the following year, and notify mayor, governor, the Director of Food and Drug Safety, and the head of Animal and Plant Quarantine Agency in December every year.

Chapter 4. Business support and others

Article 20 (Technical education and Blind Test)

① Director of Food and Drug Safety or the head of Animal and Plant Quarantine Agency may provide technical training for the agents exclusively responsible for testing edible eggs at City/ Province Livestock Inspection Agency in the following cases.

1. When the head of City/Province Inspection Agency requests consignment education for edible eggs inspector, if deemed necessary
2. If Minister of Food and Drug Safety determines re-education is necessary, or requests the related education, as result of Blind Test on City/Province Livestock Inspection Agency
3. If technical training is necessary, such as transferring the latest inspection methods, and others

② Director of Food and Drug Safety shall conduct a Blind Test at least once a year to improve inspection ability of edible eggs inspector and for the standardization among inspection agencies, and notify about the results to the Minister of Agriculture, Food and Rural Affairs and mayor, governor.

③ If deemed necessary based on results of Blind Test analysis pursuant to inspection results of Section 3, Article 18 and the results of Blind Test analysis pursuant to Section 2, the Minister of Food and Drug Safety and the Ministry of Agriculture, Food and Rural Affairs may check and provide advice to City/Province Livestock Inspection Agency about the status of edible eggs inspection.

Article 21 (Business support and supervision)

In order to efficiently conduct edible eggs inspection at City/Province Livestock Inspection Agency in accordance with Livestock Products Sanitary Control Act and Regulations on Food and Drug Testing and Inspection, mayor, governor should provide the guidance and supervision in regards to ensuring sufficient technology experts, offering technical education, and securing necessary budget as well as the status of fines imposed by the head of Si/Gun/Gu office.

Article 22 (Review deadline)

The validity of this notice should be reviewed every three years as of January 1, 2019 (refer to December 31 of every third year), in accordance with "Regulations on Issuance and Management of Directives, Established Rules, and Others (Presidential Directive)."

2. Regulations on Biosecuriy Management of Breeding Farms and Hatcheries [Ministry of Agriculture, Food and Rural Affairs Notification No. 2022-119, Dec. 8, 2022]

Article 1 (Purpose)

The purpose of this guideline is to prevent occurrence of livestock infectious diseases and contribute to the development of livestock industry by specifically prescribing matters necessary for bioserurity management, such as vaccination, recording and preparation of livestock transactions and inspection of livestock infectious disease.

Article 2 (Definition) The meaning of terms used in this guidelines is as follows.

1. "Breeding chicken (including grand parent stock, pure line, and others, hereinafter the same)" means a reproductive chicken with pure characteristics of a breed, referring to the breeding stock pursuant to Article 2 of Livestock Industry Act.
2. "Chicken breeding farm" refers to the livestock breeding facilities that raise breeding chickens, produce and sell the seed eggs obtained from such chickens (including entrusting the work to others), in accordance with Article 5 of Enforcement Rules of Livestock Industry Act.
3. "Hatchery" refers to artificial incubation facilities that engage in hatching and selling (including entrusting the work to others) of seed eggs produced by cross-breeding between seed rooster for meat and spawning hen (hereinafter referred to as "eggs for white crossbreed chicken").

4. The term “Bring in” refers to the act of bringing new livestock into breeding facilities.

Article 3 (Applicable area)

① This guideline applies to breeding farms and hatcheries approved by the “Livestock Industry Act.”

② In context of the application of this guidelines, the livestock breeding facilities for consignment chicken breeding at breeding farms shall be regarded as the chicken breeding farms.

Article 3-2 (Livestock infectious disease subject to inspection)

The following is livestock infectious diseases subject to regular inspection pursuant to Articles 7 through 11-2 by the head of City/Province Livestock Disease Prevention Agency.

1. Pullorum disease
2. Fowl typhoid
3. Chicken mycoplasma gallisepticum infectious disease

Article 4 (Prohibition of vaccination and others)

① In accordance with Section 1, Article 15 of Act on Livestock Infectious Diseases Prevention (hereinafter referred to as the “Act”), owner or manager of breeding chickens (hereinafter referred to as the “Owner and others”) shall not conduct vaccinations for pullorum disease or fowl typhoid, and shall not use antibacterial drugs that affect test results one month before conducting inspections pursuant to Article 8.

② When necessary to verify if Owner and others of breeding chicken properly implemented in accordance with Section 1, the inspection agency pursuant to Article 7 may conduct tests on whether vaccinated, or whether residues of antibacterial drugs exist on corresponding breeding chicken or seed eggs produced by such chickens.

Article 5 (Recording and preservation of livestock transaction records)

① Pursuant to Section 1, Article 16, Owner and others of breeding chicken should record and keep transaction records of such chickens and seed eggs for two years, and Owner and others of butcheries should prepare transaction records of seed eggs, eggs for white crossbreed, chicks, keeping them for two years.

② Transaction records under Section 1 shall be according to attached Form 1.

③ If veterinary inspector requests transaction records under Section 1, Owner and others of breeding farms or butcheries shall not refuse, disturb, or avoid them without reasonable grounds in accordance with Section 4, Article 7 of the Act.

Article 6 (Guidance and Supervision)

① The mayor, county governor or the head of Gu office of autonomous district (hereinafter referred to as the "Mayor and County governor") should conduct inspection at least once a quarter, on current status of breeding, such as if Section 1, Articles 4 and Section 1, Article 5 were implemented, and the status of bringing in new breeding chickens.

② If the violations are found as result of on-site inspection under Section 1, Mayor and County governor should impose fines to corresponding breeding farms or butcheries for each violation pursuant to Article 60 of the Act and instruct supplementation of the non-compliance.

Article 7 (Inspection agency)

The inspection under each Subparagraph of Article 3-2 should be conducted by Livestock Disease Prevention Agency (hereinafter referred to as the "City/Province Livestock Disease Prevention Agency") under special city mayor, metropolitan city mayor, and provincial governor (hereinafter referred to as the "Mayor/Governor").

Article 8 (Inspection cycle and others)

① The test of pullorum disease and fowl typhoid on breeding chickens is conducted by inspection agency every 16 weeks, 36 weeks, and 56 weeks after hatching. For the test of chicken mycoplasma gallisepticum disease, it is conducted between 56 and 60 weeks after hatching.

② Owner and others of breeding farms shall request for regular inspections under Section 1 to the head of City/Province Livestock Disease Prevention Agency.

Article 9 (Sample collection)

① The inspection under Article 8 should be conducted by collecting at least 30 chickens evenly and randomly in unit of livestock for the purpose of objective judgment of inspection results.

② Breeding chickens selected as inspection subjects should be marked or isolated to facilitate distinction for disease prevention measures, such as stamping out and others based on inspection results after collecting inspection samples.

Article 10 (Inspection to Pullorum disease and fowl typhoid)

① Pullorum disease and fowl typhoid tests shall be conducted in the following sequence.

1. First test: rapid serum plate aggregation reaction method

2. Second test: Enzyme Linked Immunosorbent Assay (ELISA)

3. Third test: Bacterial isolation and identification test

② The second test shall be conducted on samples confirmed positive in the first test in accordance with Subparagraph 1 of Section 1.

③ For the second test under Subparagraph 2 of Section 1 and Section 2, the third test shall be conducted for chicken coops that the positive rate of each coop is less than 10% of total number of primary test subjects.

④ The third test (bacterial isolation and identification test) pursuant to Subparagraph 3, Section 1 and Section 3 shall be conducted by the method specified in attached Table 1, and if the number of individual chickens tested positive in the second test is 4 or more, at least 4 chickens should be tested, and if less than 4 chickens tested positive, all of them should be tested.

Article 10-2 (Inspection to chicken mycoplasma gallisepticum disease)

① Chicken mycoplasma disease test shall be conducted in the following order.

1. First test: Enzyme Linked Immunosorbent Assay (ELISA)

2. Second test: Bacterial separation test

② For the first test under Subparagraph 1, Section 1, if the positive rate for each chicken coop is less than 30% of total number of test subjects, the second test shall be conducted for such chicken coop.

③ For more than 30 chickens including individual subjects tested positive and the ones showing show clinical symptoms in the 1st test, the second test shall be conducted using the method specified in attached Table 2 under Subparagraph 2, Section 1.

Article 11 (Judgment criteria to Pullorum disease and fowl typhoid)

① Judgment criteria for each inspection method under Article 10 shall be as follows.

1. As result of the second test, the positive rate of total number of 1st test subjects is 10% or more for each coop, it is determined as a positive group.
2. As result of the third test, for the chicken coop with bacteria separated in more than one chicken, it is determined to be a positive group.

② For the chicken coop with a positive rate of less than 10% in the first and second tests, if turns out as negative as result of third test, it is determined as a negative group.

Article 11-2 (Judgment criteria to chicken mycoplasma gallisepticum disease)

① Judgment criteria for each inspection method under Article 10-2 shall be as follows.

1. For the chicken coop with more than 30% of positive rate of the total number of test subjects, it shall be considered a positive group.
2. For the chicken coop with less than 30% of positive rate in the first test, if the result of second test is negative, it is determined as a negative group.

② For the chicken coop with bacteria separated in more than one chicken as result of the second test, it is determined as a positive group.

Article 12 (Conducting verification inspection and others)

① As result of the test under attached Table 1 or 2, if presumed to be Salmonella or Mycoplasma bacteria and final verification is necessary, the head of City/

Province Livestock Disease Prevention Agency may request for verification tests by attaching in-house test reports, such as separated strain and biological characteristics test to the head of Animal and Plant Quarantine Agency.

② The head of Animal and Plant Quarantine Agency shall notify corresponding inspection agency about the result of final verification test for separated strains, which is requested by the head of City/Province Livestock Disease Prevention Agency.

Article 13 (Disease prevention duties of livestock Owner and others)

① In accordance with Article 16 of the Act, livestock carriers such as Owner and others shall apply for issuance of poultry transport approval under attached Form 4 to City/ County authority by no later than 7 days before transporting.

② Livestock carriers such as Owners and others shall carry a copy of poultry transport approval under attached Form 4 issued by corresponding City/County authority, and the seller hand over the copy of transport approval to the buyer at time of selling. However, valid period of transfer approval shall be seven days from the date of issuance.

Article 14 (Inspection to status of disease prevention control)

To check the status of disease prevention management on the farms determined as a negative group under Section 2, Article 11 and Subparagraph 2, section 1, Article 11-2, the inspection agency may conduct bacterial separation tests, or inspections under Article 9, 10, and 10-2 frequently, at time of pathological appraisal (animal disease diagnosis) due to occurrence of carcass (disposing). In such case, for the chicken coop with bacteria separated by the pathological appraisal, Subparagraph 2, Section 1, Article 11 and Section 2 of Article 11-2 shall apply.

Article 15 (Taking measures to inspection results)

① The inspection agency, which conducted the inspection of Pullorum disease, fowl typhoid, and Chicken Mycoplasma disease, shall notify (report to) competent Mayor and Governor and Mayor and County governor about the inspection results without delay according to attached Form 2 and Form 2-2.

② Mayor and County governor, who are notified (reported) of the outbreak of livestock infectious diseases under Section 1, shall instruct the owner of breeding chicken to take measures to dispose breeding chickens that are determined to be positive, as result of the test of Pullorum disease and fowl typhoid, in accordance with Article 20 of the Act.

③ Mayor and County governor shall order transport restrictions on breeding chickens from the chicken coops determined to be positive for Pullorum disease and fowl typhoid, as a result of the inspection, pursuant to Article 19 and Article 28 of the Act, prohibit its use as a breeding chicken, and take measures to prevent hatching of seed eggs produced by breeding chickens. In such cases, Mayor/County governor may recommend the owner of breeding chickens to ship the chickens raised in the same chicken coop to butcheries, for the purpose of disposing them within one month, in accordance with Article 21 of the Act.

④ Mayor and County governor shall order transport restrictions on breeding chickens of the chicken coops determined to be positive for chicken mycoplasma gallisepticum disease as result of the inspection, in accordance with Article 28-2, and prohibit its use as a breeding chicken, and take measures to prevent the hatching of seed eggs produced by breeding chickens. However, if disease prevention measures, such as cleaning and disinfection are taken to prevent the spread of livestock infectious diseases, under the guidance of livestock veterinary inspector, it is possible to ship them to butcheries or transport to contract breeding farms.

⑤ Mayor and County governor shall report about measures taken as result of inspection, to the Mayor and Governor without delay.

Article 16 (Report of inspection result)

① The head of City/Province Livestock Disease Prevention Agency shall enter into the Korea Animal Health Integrated System (KAHIS), monthly inspection results of Pullorum disease, fowl typhoid, and Chicken Mycoplasma diseases by the 10th of following month under attached Forms 3 and 3-2, and submit to the head of Animal and Plant Quarantine Agency (hereinafter referred to as "The head of Quarantine Agency").

② The head of Quarantine Agency shall report the inspection results under Section 1 to the Minister of Agriculture, Food and Rural Affairs by the 20th of the following month after the end of each quarter.

Article 17 (Special inspection)

① If deemed necessary for disease prevention, the Minister of Agriculture, Food and Rural Affairs may have the head of Quarantine Agency conduct inspections directly on breeding farms and butcheries.

② If necessary, the Minister of Agriculture, Food and Rural Affairs or Mayor and Governor may have the head of Quarantine Agency, or the head of City and Province Livestock Disease Prevention Agency to conduct inspection on breeding farms and hatcheries that supplied chicks to the farms with occurrence of Pullorum disease, fowl typhoid, and chicken mycoplasma gallisepticum disease.

Article 18 (Review deadline)

The Minister of Agriculture, Food and Rural Affairs shall review the validity of this notice every three years as of January 1, 2023 (refer to December 31, every third year) and take measures for improvement in accordance with "the Regulations on Issuance and Management of Directives, Established Rules, and Others."

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