Sri Lanka Exotic Disease Emergency Plan (SEDEP)

Highly Pathogenic Avian Influenza – Sri Lanka
Revised on 2022/2023

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Content

1. Introduction

Sri Lanka Exotic Disease Emergency Plan (SEDEP) is a set of technical guidelines prepared by the Department of Animal Production and Health, describing the emergency approach to an exotic animal disease. SEDEP for HPAI is developed for the preparedness of Highly Pathogenic Avian influenza (HPAI), to prevent early detection and, if it enters Sri Lanka, control, spread, and eradicate the disease in the shortest possible time, limiting the risks of human infection while minimizing the economic impact. Highly pathogenic avian influenza (HPAI) is caused by the type A influenza virus. It is lethal to poultry, both wild and domesticated birds, and potentially fatal to humans. The disease is not reported in Sri Lanka but is still considered a high-risk country due to the occurrence of a significant number of epidemics in neighboring countries, India, Bangladesh, and Pakistan, and the country's location is via migratory bird fly way routes. The restrictions on poultry imports and vigilant surveillance of domestic and wild birds cause the freedom of Sri Lanka from the disease until now. However, there was one case of LPAI incidence in Bingiriya North Western Province, in a commercial layer farm reported in 2012.

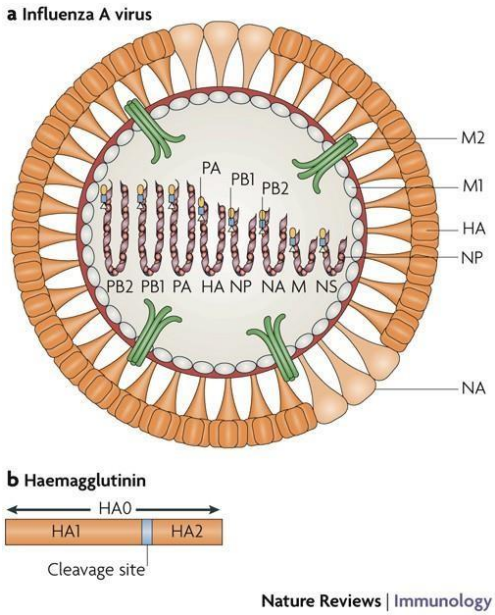
The SEDEP for HPAI is the guidance for the Department of Animal Production and Health (DAPH) to prevent HPAI in Sri Lanka. The first version of SEDEP for HPAI was issued in 2004/2005 in the early days of the HPAI crisis in the world. It has been subjected to review and update periodically, with modifications to diagnosis, prevention, and control measures if the HPAI enters the country. The second version was published with modifications to the first version in 2005/2006. The third version of SEDEP for HPAI was published in 2010/2011. It is recognized that updating the SEDEP is important, as it has not been updated for years. The objective of this document is to update SEDEP for HPAI to fulfill its requirement for a new version.

The SEDEP is formulated considering the recommendations of WOAH, FAO, and WHO. This document provides updated information and measures to be taken to prevent HPAI from entering the country, including early detection via surveillance, suspicious case investigation, laboratory diagnosis, outbreak management, and eradication. It also includes the identification of pre- planned alert teams in the DAPH structure, legislation, declarations, compensation schemes, movement control, media releases, and budgeting. The expected outcome is to continue Sri Lanka as a HPAI-free country with prompt alertness, systematic surveillance, and, with early detection of an outbreak if it enters, control to prevent the spreading of the disease through the implementation of SDEP.

2. Overview of Avian Influenza

2.1 Etiology

All Influenza viruses are RNA viruses and belong to the family Orthomyxoviridae. The influenza viruses of this family are categorized into types A, B, C, and recently D based on the antigenic character of the nucleoprotein and Matrix proteins. The hosts for influenza A are avian species and mammals. Avian influenza is caused by influenza Type A virus (influenza A) and is broadly categorized based on a combination of two glycoproteins on the surface of the influenza A virus: hemagglutinin, or "H" proteins, of which there are 16 (H1-H16), and neuraminidase, or "N" proteins, of which there are 9 (N1-N9). Many different combinations of "H" and "N" proteins are possible, and each combination of H and N is considered a different subtype (Eg: H5N1, H3N1). Further antigenically related viruses within a subtype are referred to as a lineage.



M2-Matrix Protein 2

M1- Matrix Protein 1

HA-Hemagglutinin

Structure of Avian Influenza virus

2.2Classification of Avian Influenza by WOAH

Avian influenza viruses are classified as either "low pathogenic" or "highly pathogenic" based on their genetic characterization and the severity of the disease they cause in poultry. According to WOAH guidelines, the following criteria are used.

2.2.1. Highly Pathogenic Avian Influenza (HPAI)

If any AIV is lethal for >75% of 4 to 8-week-old susceptible chickens within 10 days following intravenous inoculation or has an intravenous pathogenicity index of more than 1.2 in six-week-old chickens. However, with the advancement of science, sequencing of the cleavage site of the Hemagglutinin molecule (HA) is studied and interestingly presence of multiple basic amino acids such as arginine or lysine was noted in all the HPAI strains.

HPAI strains often cause fatal infections in chicken and turkey. All the HPAI strains up to date belong to H5 or H7 hemagglutinin protein type however, not all H5 or H7 are HPAI.

2.2.2. Low Pathogenic Avian Influenza (LPAI)

Some AIV strains cause only minor illness in poultry and even may not show any clinical signs of disease within the flock. These AIV strains are LPAI. Some AIV containing H5 or H7 can also be LPAI.

2.2.3Notifiable Avian Influenza (NAI)

However, in the field, H5 or H7 LPAI virus strains may mutate into HPAI viruses. Hence all the AIVs containing H5 or H7 regardless of their pathogenicity are considered Notifiable Avian Influenza.

2.3 Global distribution of AI

The prevalence of avian influenza has been increased. Between 2013 and 2022, ninety-five (out of 182) WOAH member countries reported nearly 21,249 AI outbreaks in poultry. Thirty-four AI virus subtypes were identified and ten were new HA/NA subtypes of AIV. Among these subtypes, 15 were HPAI and 19 were LPAI. Among these ninety-five countries, forty-two countries annually reported AI outbreaks. The European and Central Asian countries reported most of the outbreaks. AI outbreaks are continuously occurring in 2023 too in several countries.

2.4. Epidemiology

Susceptible species

AI virus is infective for almost all commercial, domestic, and wild avian species. Infections in monkeys, pigs, ferrets, horses, cattle, felines, seals, and whales have been reported.

Chickens and turkeys: Chickens and turkeys are highly susceptible to infection and clinical disease.

Ducks and geese: Ducks and geese are susceptible to infection with all AI virus strains, but only some very virulent viruses produce clinical disease. AI virus is commonly isolated from these species in endemic areas. Their potential as reservoirs is considered to make waterfowl a major source of virus for poultry.

Guinea fowl, quail, pheasant, and partridge: Guinea fowl, quail, pheasant, and partridge are susceptible to infection and clinical disease.

Crows: There are a few reports that reveal that crows can be susceptible to AI infection.

Other wild birds: AI viruses are readily recovered from free-flying aquatic birds throughout the world. No significant disease problems due to AI are known to occur in these birds. However, research suggests that the huge pool of viruses in wild birds, especially waterfowl, in which the virus replicates in the intestine, provides the opportunity for new combinations of H and N subtype viruses to arise through genetic re-assortment.

Incubation period

The incubation period is highly variable for HPAI, from a few hours to 2–3 days. The WOAH Terrestrial Code (2021) gives a maximum incubation period of 14 days for regulatory purposes. The less virulent strains have a very variable incubation period, but their transmissibility should ensure that many sick birds would be seen in the early stages of an outbreak. An incubation period extending to 16 days, for both LPAI and HPAI, has been recorded.

Persistence of virus

General Properties/Environment

AI viruses are sensitive to warm temperatures, but they remain viable for longer periods in cold and humid environments. Environmental conditions have a marked effect on virus survival outside the bird. Survival is prolonged in aerosols with low relative humidity and low temperature, and low temperature and high moisture levels prolong survival in feces.

AI virus can survive in feces for at least 35 days at 4°C, and survival of virus in dust in poultry houses has been reported for two weeks after depopulation. AI virus can survive within the poultry house environment for up to five weeks.

The virus is stable over a pH range of 5.5–8 and, is destroyed by the acidic and alkaline pH. AI virus can be isolated from lake water where waterfowl are present (Hinshaw et al 1979). The virus may remain infective in lake water for up to four days at 22°C and over 30 days at 0°C.

Acidification of potentially contaminated drinking water to pH 2.5 or chlorination should minimize the spread of infection.

The presence of lipids in the AI virus envelope makes the virus highly susceptible to disinfectants, including detergents, but only if items have been properly cleaned before they are disinfected.

Wild birds

AI virus is infective for almost all wild avian species, which are important reservoirs for the virus. AI virus that is highly pathogenic for domestic poultry could emerge from the pool of viruses in wild birds at any time.

Waterfowl

Wild aquatic birds, such as waterfowl and seabirds, are important reservoirs and can shed the AI virus for up to one month, compared with two weeks in domestic species. AI virus from waterfowl can remain viable in feces and water for up to 32 days.

Wild birds other than waterfowl

AI virus has been recovered from autolysis carcasses of wild birds (other than waterfowl) after 23 days at 4°C. The virus has been isolated from captured exotic species, but the duration of virus excretion is not known.

Live poultry

Viruses can be carried in chicken and turkey and shed in feces and from the respiratory tract for at least two weeks and up to 30 days after recovery from the disease while the virulent viruses can be carried by other avian species without signs of clinical disease. The importance of the spread of live poultry became apparent in the 2004 eastern Asia epidemic. cloacal shedding can continue for longer than 30 days after infection in the presence of immunosuppressive diseases or other physical stresses.

Carcasses

AI virus survives for several days in carcasses at ambient temperatures, compared with a few weeks at refrigeration temperatures. There is insufficient data on the spread of the virus from fresh, frozen, and processed meat, but this has not been highlighted as an important method of transmission in outbreaks. Birds processed during the viremic stage will contaminate other carcasses with blood or fecal material containing the virus. Packaging and the drips that develop during storage are also important, as both can be contaminated with viruses from infected carcasses.

Meat products

HPAI virus can be found in skeletal muscle due to systemic infection and poses a risk of transmission. It should be noted that HPAI Asian H5N1 was isolated from infected duck meat and AIV can persist in poultry meat products.

Table eggs and egg products

Although severely affected birds will stop laying, eggs laid in the early phase of the outbreak could contain the AI virus in the albumen and yolk and/or on the shell according to the experimental infection. The virus can penetrate cracked or intact shells and, more significantly, contaminate the egg fillers. The survival time on the eggs and fillers is sufficient to allow wide dissemination.

Egg products such as egg powder and liquid eggs could be another source of the virus. However, the temperature used in the process can inactivate AIV.

Hatching eggs

AI virus has been isolated from eggs laid by infected breeding hens. However, there will be fewer chances for hatching of chicks in the hatchery.

Poultry byproducts

Rendered meals, produced from boned-out skeletons, viscera, blood, feathers, feet, heads, necks, off cuts, are added to poultry feed as poultry offal meal and tallow. They may also be added to pet foods.

Poultry offal meal and pet foods are usually cooked at above 100°C for several minutes to more than one hour, which is sufficient to kill the AI virus. However, if the procedure is not carried out properly or the cooked product is subsequently contaminated by an unprocessed product, the AI virus could persist in the by-product for several weeks.

Waste products/ Fomites

All unwanted byproducts of processing, all products that go into the production of rendered meals, wastes from hatcheries, laboratories (cultures and specimens, dead birds), farms, processing establishments, and egg marketing establishments (unsaleable eggs), as well as chicken manure and litter, are considered as waste. AI virus has the potential to persist in these products and could be spread by vehicles that transport them unless the products are treated before movement. The persistence of the virus in feces and respiratory secretions is of major importance. Their stickiness facilitates spread over a wide geographical area on footwear,

clothing, equipment, and other fomites. This is the main way infection is transmitted between premises.

Modes of transmission

Not all strains of AI viruses are highly transmissible to poultry; highly and lesser pathogenic viruses can begin with low transmissibility but, following passage through flocks, transmissibility as well as pathogenicity for the host can be increased in the field.

The significance of live poultry markets in generating and spreading HPAI has been observed in several countries. Live market movements have also assisted the dissemination of LPAI viruses in some countries.

In recent times, dissemination of HPAI virus between flocks has been primarily attributed to:

- The movement of infected birds (including vaccinated birds); and
- The actions of humans in moving feedstuff, personnel, equipment, and vehicles into and from premises that are contaminated with infected feces or respiratory secretions.

Contamination of personnel and fomites is now being considered as the principal way that infection spreads during outbreaks.

Aerosols may cause some secondary spread during AI outbreaks.

Wild birds

Direct or indirect contact with waterfowl is the most likely source of infection in poultry.

Live poultry

Transmissibility in poultry varies enormously between AI virus strains and contact with feces or respiratory secretions is important.

Eggs

Vertical transmission via infected eggs has never been proved, although the AI virus has been detected on the shell surface and in the yolk and albumen of eggs, suggesting that the potential for spread exists. Normal incubation temperatures of 38.7°C in the early stages of embryo development may be lethal to the AI virus, or infected embryos may be killed by the virus early during incubation. Persistence through the incubation process is most likely through shell contamination.

Fomites

AI can spread very rapidly and can be carried over long distances by transport of contaminated materials such as bird cages, pallets, egg rays/boxes, manure, feed, and contaminated clothing, equipment, and vehicles.

Other vectors

There is no evidence to suggest that invertebrates are involved in the inter-epidemic maintenance of transmission. However, there is a possibility of mechanical transmission by either invertebrate or vertebrate vectors through contact with infected feces, although such transmission would be infrequent.

2.5 Diagnosis of the disease

2.5.1 Clinical signs

The clinical signs of AI infection are variable and influenced greatly by the virulence of the viruses involved, the species affected, age, immune status, the existence of concurrent infections, and the environment. The pathogenicity in chickens can vary during an outbreak.

HPAI

- Generally causes a multisystemic disease associated with high morbidity and mortality
- In acute cases of sudden death (per acute), clinical signs may not be seen and mortalities occur as early as 24 hours after the first sign of the disease, and frequently within 48 hours. In other cases, more diverse visible signs are seen, and mortalities can be delayed for as long as a week. Overall mortality rates for acute/acute cases of nearly 100% have been reported.
- Clinical signs in chickens and turkeys include severe respiratory signs with excessively watery eyes and sinusitis, cyanosis of the combs, wattle, and shanks, edema of the head, ruffled feathers, diarrhea, and nervous signs. The last eggs laid after the onset of illness frequently have no shells.

The disease in turkeys is similar to that seen in chickens but is often complicated by secondary infections such as fowl cholera, turkey coryza, and colibacillosis.

LPAI

- Clinical signs in chickens and turkeys range from inapparent to mild or severe respiratory disease and can be confused with infectious laryngotracheitis and other respiratory tract infections.
- Mortality may vary from 3% to 15 %. High mortalities to 90% have been recorded in young turkey poults.
- Egg production in layers can drop by up to 50%, with recovery to normal in 2–4 weeks.

2.5.2 Pathology

Gross lesions

In many cases, poultry dying from the per acute form of the disease lack visible gross lesions; such chickens die on day 1 or day 2 after infection. With the acute infections recorded in some countries, there have been severe lung congestion, hemorrhage, and edema in dead chickens; other organs and tissues appeared normal.

In the acute form of infection, more diverse visible lesions are evident. Chickens have ruffled feathers, congestion and/or cyanosis of the comb and wattles, and swollen heads. The changes in the comb and wattles progress to depressed areas of dark red to blue areas of ischemic necrosis. Internally, the characteristics of acute infections with viruses causing HPAI are hemorrhagic, necrotic, congestive, and transudative changes. The oviducts and intestines often have severe hemorrhagic changes. As the disease progresses, the pancreas, liver, spleen, kidney, and lungs can display yellowish necrotic foci. Hemorrhages (petechial and ecchymotic) cover the abdominal fat, serosal surfaces, and peritoneum. The peritoneal cavity is frequently filled with yolk from ruptured ova, associated with severe inflammation of the air sacs and peritoneum in birds that survive 7–10 days. Hemorrhages may be present in the proventriculus, particularly at the junction with the gizzard.

In infections such as mildly pathogenic AI, lesions may be seen in the sinuses, characterized by catarrhal, sero-fibrinous, mucopurulent, or caseous inflammation. The tracheal mucosa may be oedematous with an exudate varying from serous to caseous. The air sacs may be thickened and have a fibrinous to caseous exudate. Catarrhal to fibrinous peritonitis and egg yolk peritonitis may be seen. Catarrhal to fibrinous enteritis may be seen in the caeca and/or intestine, particularly in turkeys. Exudates may be seen in the oviducts of laying birds.

2.5.3 Differential diagnosis

Avian influenza could be confused with several other diseases that have similar clinical symptoms. Diseases that can cause large numbers of sudden deaths of birds include:

- Newcastle disease
- Acute fowl cholera
- Infectious laryngotracheitis
- *Escherichia coli* cellulitis of the comb and wattles; and
- Acute poisonings
- Management mishaps (i.e: power failures)

2.5.4 Laboratory Diagnosis

As pathological changes are not pathognomonic for the disease, diagnosis of AI needs to be confirmed by the isolation and characterization of the causative virus.

As a screening test, Rapid antigen detection is carried out to detect viral antigen. For the confirmation of the disease, either Virus Isolation (Egg Inoculation, Haemagglutination (HA), Haemagglutination Inhibition (HAI) Test or Reverse Transcriptase Polymerase Chain (Rt – PCR) is performed. Enzyme-Linked Immunosorbent Assay (ELISA) is being used for Sero-Surveillance.

	Type of Test	**Time**
Screening Test -Antigen Detection	Rapid antigen detection	30 minutes
For Confirmation -	* Embryonated chicken Egg Inoculation * Haemagglutination * Haemagglutination Inhibition Test	4 – 7 days 1 day 1 day (Altogether 7-9 days)
For Conformation Direct RNA Detection	ReverseTranscriptase Polymerase Chain (RT –PCR) Reaction. Real-time RT-PCR	2 days 6-8 hours
For Sero Surveillance	Enzyme-Linked Immunosorbent Assay (ELISA)	1 day

2.6 Risk factors associated with the introduction of Highly Pathogenic Avian Influenza (HPAI) into Sri Lanka

Sri Lanka being an island, the risk of introducing the disease into the country could be minimized, if the ways of introducing the HPAI infection into the country can be identified and strict preventive measures are taken.

Possible sources of entry into Sri Lanka

The virus could be introduced through:

1. Wild birds and migratory birds.
2. Import of live poultry or poultry products and by-products from other

countries.

3. Import of pet birds from other countries.
4. Smuggling of pet birds, poultry, and poultry meat from other countries.
5. Infection carried by international passengers and fomites.

Migratory birds and wild birds

Due to the geographical location, a large number of migratory birds annually reach Sri Lanka from September to November mainly through the Central Asian flyway into Northern, Eastern, Southern, and Western regions. These birds begin to leave the country by February. Migratory birds arriving via the eastern flyway route settle in the Northern region such as Mannar and the Western flyway route settle in Kumana Park, Wilpattu, etc. It is very difficult to identify and reach the locations of these flyway risk areas and bird sanctuary areas where these migratory birds are resting or settled. Further, wild birds and some aquatic birds from infected countries or flying via infected countries may enter and contaminate the surface water of lakes or lagoons where backyard indigenous chicken may get infected.

3. Poultry production systems, biosecurity, and marketing in Sri Lanka

3.1 Poultry production system

Poultry is the biggest and the most dynamic livestock entity in Sri Lanka. It started as a government-supported program in the 1950s the industry developed steadily. After the 1990s exponential growth of the industry was recorded with the private sector investments which eventually developed further as a commercial industry. The industry is mainly in the hands of the private sector and few companies dominate the industry output and export little quantity of meat and meat products. The growth is more prominent in the broiler sector, where as no remarkable growth in the layer sector. There are three grandparent breeder farms located in Matale, Colombo, and Kalutara Districts for the production of broiler parent and no layer grandparent operation in the country. There are 32 broiler parent farms and 11 layer parent farms for the production of commercial poultry in the country (Annual report 2022).

The majority of the countries' breeder and commercial poultry farms, feed manufacturing plants, and processing/further processing establishments are concentrated in the Western (WP) and North-Western provinces (NWP).

Commercial poultry

In broiler operations, **t**here are outgrow (large scale), buyback, and small to medium-scale farmers in the country. The scale of operations and management practices varied markedly from area to area. It ranged from large-scale closed-house operations to small-scale open-house operations.

Back yard poultry

The backyard poultry farms are distributed throughout the country with high density in Nothern and Easterns Provinces. These small-scale, semi-intensive free-range and backyard systems make a substantial contribution to rural communities. The birds require minimal medical interventions limited to individual bird treatment either due to the existence of disease resistance strains or free range management.

Duck

The duck farming is not well organized in the country. The majority of ducks have been reared in the backyard with two to three ducks in households mainly in rural villages. Few farms have more than 10 ducks but their management practices are not targeting for quality production of duck meat or eggs. There is mix operation of backyard chickens and ducks in many rural areas of the country

3.2. Bio-security in poultry operations

Biosecurity is the most important practice for the prevention and control of diseases in poultry operations. It is more concerned and high in grandparents and breeder operations. Large-scale commercial farms are at a moderate level of biosecurity. However, it is low in small-scale operations (less than 1000 flock size). The biosecurity monitoring program in poultry breeder operations has been conducted for years by DAPH. The poultry breeder farms and hatcheries are graded in this program to value their management approach and biosecurity measures. The breeder farm authority considers vaccination as a must for identified diseases in the breeder operation. Commercial farms also follow vaccination for common poultry diseases. They follow a vaccination schedule and type of vaccine depending on the disease situation of the area.

3.3 Processing and Marketing

There are 16 poultry processing establishments and 8 further processing establishments registered in DAPH in 2022 for the production of chicken meat and meat products for local and

export markets. Chicken meat such as whole chicken, chicken parts, macerated chicken etc. and various chicken products such as sausages, meatballs, ham, salami, etc. are produced in these processing/further processing establishments. The small-scale processors provide chicken meat to farm shops or live birds to the less organized wet market. The backyard operation provides few birds to the wet market or sells to consumers directly who seek backyard chicken meat mostly in rural areas.

The eggs are marketed through the supermarket chain as well as retail shops and farm shops. The majority of farms do not have their supply chain so, the egg collectors directly purchase eggs from farms. Most of the time, the eggs are neither sorted nor cleaned. The clean eggs and dirty eggs are packed together during transportation and stored. Some large-scale layer farms provide clean and graded egg packs to supermarkets. The backyard poultry egg production is low and is sold at the farm gate with higher prices than commercial layer eggs.

4. Veterinary Service in Sri Lanka

4.1. Government Sector

Department of Animal Production and Health

The Department of Animal Production and Health (DAPH) is the competent authority responsible for the veterinary service in the country. It is the main technical arm and the premier state organization for Animal Production and Animal Health in Sri Lanka. The Director General of the DAPH provides national leadership and direction for upgrading and maintaining a healthy animal population in the country. The DAPH coordinates and reports the animal disease status of the country to the World Health Organization for Animal Health (WOAH). In addition, the DAPH coordinated with WHO, FAO, and International Health Regulations (IHR) regarding food safety with public health significance.

The DAPH comprises a central DAPH under the national government (Head Quarters) and, nine provincial DAPH that represent nine administrative provinces consisting of 25 district veterinary offices and 337 divisional veterinary offices covering the whole country. The delivery of field-level services is carried out by the Government Veterinary Surgeon (GVS) responsible officer of the divisional veterinary office (also known as Government Veterinary Office - GVO).

The central DAPH operates through six technical divisions namely Animal Health, Animal Breeding, Veterinary Research, Livestock Planning and Economics, Veterinary Regulatory Affairs, and Human Resources Development. The Veterinary Regulatory Affairs (VRA)

Division is entrusted with responsibility for the implementation of the legislation. One of its main functions is to facilitate the international trade of animals and products of animal origin while minimizing the associated risks of introducing animal disease causative agents and public health significance diseases to the country. Animal Health Division (AHD) is responsible for animal disease surveillance, prevention and control of endemic animal diseases, and preparedness for exotic diseases. There are 25 district veterinary investigation centers (VICs) distributed all over the country for the implementation of the activities of AHD. The Veterinary Research Institute which functions under the central DAPH is responsible for research works and provides technical products and specialized services in the diagnosis of disease in animals. The activities related to animal genetic resources and providing quality breeding materials to the country are the main responsibilities of the Animal Breeding Division. The Livestock Planning & Economics Division is responsible for project formulation, coordinating development programs, and monitoring economic evaluation. The Human Resource Development Division is responsible for the development of technically competent human resources and ensures efficient and effective technology transfer. The Veterinary Drug Control Authority (VDCA) and feed registrar are responsible for regulating mechanisms of veterinary pharmaceutical/veterinary biological products and animal feed respectively in Sri Lanka

Other institutions

The veterinarians in state institutions namely, Local Government Veterinary Authorities, Public Health Veterinary Services under the Ministry of Health & Indigenous Medical Services, Department of Wild Life Conservation, National Zoological Gardens, and National Livestock Development Board (NLDB)

4.2 Private sector

The private sector involved in veterinary services includes private clinics, veterinary hospitals, laboratories, and private livestock production systems (pharmaceutical industry, private farms, feed mills, animal origin product processing/further processing industries).

The veterinarians involved in disease diagnostic services, treatment of diseased animals, management of private farms, advisory services, quality testing of products to facilitate local/export markets, supplying drugs and, chemicals and biological, play an important role to the veterinary service in Sri Lanka.

The Faculty of Veterinary Medicine and Animal Science is also involved in providing diagnostic training and laboratory services.

4.3 Supportive services

Feed and pharmaceutical supply are the main supportive services supporting the private sector of the poultry industry. Over 95% of the compounded feed produced within the country is consumed by the poultry industry. There are 45 feed manufacturers who produce around 70% of the poultry feed requirement. The rest is produced as self-mixed feed by farmers and is used mainly in the commercial layer industry.

Pharmaceuticals are directly supplied to the farms or are sold in farm shops or registered pharmacies. A registered veterinarians' prescription is needed for the purchase of the pharmaceuticals.

5. Standards for high pathogenic avian influenza prevention, control, and eradication

The early detection and reporting of disease outbreaks allowing rapid response is identified as the first defense against HPAI by WOAH. Further, WOAH indicates HPAI as a notifiable disease, highly lethal to poultry, and has the potential to infect humans. In addition, WOAH emphasizes the importance of the policy of culling of infected and close contact birds. WHO has recommended that all HPAI outbreaks should be promptly stamped out and advocates protections for workers in depopulation and disposal activities of poultry to avoid human infection of AI which may lead to an influenza pandemic.

5.1. International standards for mitigating the animal and public health risk of HPAI This is mainly based on the international standards stipulated by the Word Organization for Animal Health (WOAH) and has been developed according to the provisions of Chapter 10.4 of the WOAH International Animal Health Code.

General

- It should be taken into note that, a notification of infection of birds other than poultry, including wild birds, with influenza A viruses of high pathogenicity, or infection of domestic or captive wild birds with low pathogenicity avian influenza viruses does not affect the high pathogenicity avian influenza status of the country or zone. Therefore, the WOAH member countries should not impose bans on the international trade of poultry

commodities in response to such notifications, or to other information on the presence of any non-notifiable influenza A virus in birds (WOAH International Animal Health Code).

- High pathogenicity avian influenza means an infection of poultry by any influenza A virus that has been determined as high pathogenicity in accordance with the WOAH Terrestrial Manual (https://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/3.03.04_AI.pdf)
- An occurrence of infection with a high pathogenicity avian influenza virus is defined by the isolation and identification of the virus or the detection of specific viral ribonucleic acid, in one or more samples from poultry.

A. Safe commodities for import and transit

- When authorizing the importation or transit of the following commodities, veterinary authorities should not require any conditions related to high pathogenicity avian influenza, regardless of the high pathogenicity avian influenza status of the exporting country or zone:

- Heat-treated poultry meat products in a hermetically sealed container with an F0 value of 3 or above. (F0 value, the thermal lethality time required to eliminate all microorganisms present in foods, by exposing them to a temperature of 121.1ºC and it is expressed in minutes).
- Extruded dry pet food and coated ingredients after extrusion
- Rendered meat-and-bone meal, blood meal, feather meal, and poultry oil
- Washed and steam-dried feathers and down from poultry and other birds.

B. Country or zone free from high pathogenicity avian influenza

In case of import or transit, it would be highly important for the importing country to decide when the exporting country should be considered as free from high pathogenicity avian influenza.

In that case, a country or zone may be considered free from high pathogenicity avian influenza when:

- Infection with high pathogenicity avian influenza viruses is a notifiable disease in the entire country by country legislation.

- There is an ongoing awareness program is in place to encourage reporting of suspicions of high pathogenicity avian influenza and to aware risks of avian influenza viruses risks and the specific biosecurity and management measures to address them.
- Absence of infection with high pathogenicity avian influenza viruses, based on surveillance, in accordance with Chapter 1.4. and Articles 10.4.26. to 10.4.30 of WOAH Terrestrial Animal Health Standards, has been demonstrated in the country or zone for the past 12 months.
- Commodities are imported to the country in accordance with Articles 10.4.7. to 10.4.22 of WOAH Terrestrial Animal Health Standards.

C. How to establish a containment zone within a country or zone free from high pathogenicity avian influenza

In the event of outbreaks of high pathogenicity avian influenza within a previously free country or zone, a containment zone, which includes all epidemiologically linked outbreaks, may be established to minimize the impact on the rest of the country or zone.

D. Recommendations for importation from a country, zone, or compartment free from high pathogenicity avian influenza

The veterinary authority of the country should require the presentation of an international veterinary certificate attesting to the following.

- The poultry showed no clinical signs of avian influenza on the day of shipment
- The poultry originated from a country, zone, or compartment free from high pathogenicity avian influenza
- The poultry originated from a flock that was monitored for avian influenza viruses and was found to be negative
- The poultry are transported in new or appropriately sanitized containers.
- In a case, if the poultry have been vaccinated against avian influenza viruses in the country of origin, the nature of the vaccine used, and the date of vaccination should be stated in the international veterinary certificate

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D.1 Recommendations, if a country is required to import live birds, other than poultry Regardless of the high pathogenicity avian influenza status of the country of origin, Veterinary Authorities should require the presentation of an international veterinary certificate attesting that:

- On the day of shipment, the birds showed no clinical signs of avian influenza
- The birds had been kept in isolation facilities approved by the veterinary services since they were hatched or for at least 28 days (i.e. two flock-level incubation periods) before shipment and showed no clinical signs of avian influenza during the isolation period;
- A statistically appropriate sample of the birds was subjected, with negative results, to a diagnostic test for avian influenza within 14 days prior to shipment
- The birds are transported in new or appropriately sanitized containers.
- If the birds have been vaccinated against avian influenza, the nature of the vaccine used, and the date of vaccination should be stated in the international veterinary certificate.

D.2 Recommendations for importation of day-old live poultry from a country, zone, or compartment free from high pathogenicity avian influenza

In the case of importation of day-old poultry, the Veterinary Authorities should require the presentation of an international veterinary certificate of testing the following.

- The day-old live poultry had been kept in a country, zone, or compartment free from high pathogenicity avian influenza since they were hatched.
- The day-old live poultry were derived from parent flocks that were monitored for avian influenza viruses and were found to be negative at the time of collection of the eggs from which the day-old poultry hatched; or
- The day-old live poultry that hatched from eggs that had had their surfaces sanitized in accordance with WOAH International Standards

  The day-old live poultry were transported in new or appropriately sanitized containers
- If the day-old live poultry or the parent flocks have been vaccinated against avian influenza, the nature of the vaccine used, and the date of vaccination should be stated in the international veterinary certificate.

D.3 Recommendations for the importation of day-old live birds other than poultry

Regardless of the high pathogenicity avian influenza status of the country of origin, Veterinary Authorities should require the presentation of an international veterinary certificate attesting the following.

- On the day of shipment, the birds showed no clinical signs of avian influenza.
- The birds were hatched and kept in isolation facilities approved by the Veterinary Services.
- A statistically appropriate sample of the parent flock birds was subjected, with negative results, to a diagnostic test for avian influenza at the time of collection of the eggs.
- The birds were transported in new or appropriately sanitized containers.
- If the birds or parent flocks have been vaccinated against avian influenza, the nature of the vaccine used, and the date of vaccination should be stated in the international veterinary certificate.

D.4 Recommendations for importation of eggs for human consumption from a country, zone, or compartment free from high pathogenicity avian influenza

In the case, if the country imports eggs for human consumption, the Veterinary Authorities of the exporting country should require the presentation of an international veterinary certificate attesting that:

- The eggs for human consumption were produced and packed in a country, zone, or compartment free from high pathogenicity avian influenza.
- The eggs for human consumption were transported in new or appropriately sanitized packaging materials and containers.

D.5 Recommendations for the importation of egg products from poultry

Regardless of the high pathogenicity avian influenza status of the country of origin, Veterinary Authorities should require the presentation of an international veterinary certificate attesting that:

- The egg products are derived from eggs that meet the requirements of relevant WOAH international standards, or the egg products have been processed to ensure the inactivation of high pathogenicity avian influenza viruses, in accordance with the WOAH International Standards.
- It also should attest that the necessary precautions were taken to avoid contact of the egg products with any source of high pathogenicity avian influenza viruses.

D.6 Recommendations for importation of fresh poultry meat from a country, zone, or compartment free from high pathogenicity avian influenza

Veterinary Authorities of the exporting country should require the presentation of an international veterinary certificate attesting that the entire consignment of fresh meat comes from poultry complies with the following.

- Originated from a country, zone, or compartment free from high pathogenicity avian influenza.
- Slaughtered in an approved slaughterhouse/abattoir in a country, zone, or compartment free from high pathogenicity avian influenza and were subjected to ante- and post- mortem inspections in accordance with Chapter 6.3., with favorable results.

D.7 Recommendations for the importation of meat products from poultry

Regardless of the high pathogenicity avian influenza status of the country of origin, Veterinary Authorities should require the presentation of an international veterinary certificate attesting the following.

- The meat products from poultry are derived from fresh meat which meets the requirements of WOAH International Standards, or
- The meat products from poultry have been processed to ensure the inactivation of high pathogenicity avian influenza viruses in accordance with the WOAH international standards.
- The necessary precautions were taken to avoid contact with the meat products from poultry with any source of high pathogenicity avian influenza viruses.

D.8 Recommendations for the importation of poultry products not listed above and intended for use in animal feeding, or for agricultural or industrial use

Regardless of the high pathogenicity avian influenza status of the country of origin, Veterinary Authorities should require the presentation of an international veterinary certificate attesting the following.

- The commodities were obtained from poultry that originated in a country, zone, or compartment free from high pathogenicity avian influenza, and the necessary precautions were taken to avoid contamination during processing with any source of high pathogenicity avian influenza viruses.

OR

- These commodities have been processed to ensure the inactivation of high pathogenicity avian influenza viruses using; moist heat treatment for 30 minutes at 56°C; or heat treatment where the internal temperature throughout the product reached at least 74°C; or any equivalent treatment that has been demonstrated to inactivate avian influenza viruses.

AND

- The necessary precautions were taken to avoid contact of the commodity with any source of high pathogenicity avian influenza viruses.

D.9 Recommendations for the importation of feathers and down from poultry

In relation to the importation of feathers and down from poultry, the Veterinary Authorities of the exporting country should require the presentation of an international veterinary certificate attesting the following.

- The commodities originated from poultry as described in OIE international standards. and were processed in a country, zone, or compartment free from high pathogenicity avian influenza; or
- The commodities have been processed to ensure the inactivation of high-pathogenicity avian influenza viruses using one of the following:
  - Fumigation with formalin (10% formaldehyde) for 8 hours.
  - Irradiation with a dose of 20 kg.
  - Any equivalent treatment which has been demonstrated to inactivate avian influenza viruses.

AND

- The necessary precautions were taken to avoid contact of the commodity with any source of high pathogenicity avian influenza viruses.

D.10 Recommendations for importation of hatching eggs of poultry from a country, zone, or compartment free from high pathogenicity avian influenza

Veterinary Authorities should require the presentation of an international veterinary certificate attesting the following.

- The hatching eggs came from a country, zone, or compartment free from high pathogenicity avian influenza.

- The hatching eggs were derived from parent flocks that were monitored for avian influenza viruses and were found to be negative at the time of collection of the hatching eggs; or
- The hatching eggs have had their surfaces sanitized in accordance with OIE international standards
- The hatching eggs are transported in new or appropriately sanitized packaging materials and containers.
- If the parent flocks have been vaccinated against avian influenza, the nature of the vaccine used, and the date of vaccination should be stated in the international veterinary certificate.

D.11 Recommendations for the importation of hatching eggs from birds other than poultry

Regardless of the high pathogenicity avian influenza status of the country of origin, Veterinary Authorities should require the presentation of an international veterinary certificate attesting the following.

- A statistically appropriate sample of the parent flock birds was subjected, with negative results, to a diagnostic test for avian influenza 14 days prior to and at the time of collection of the hatching eggs.
- The hatching eggs have had their surfaces sanitized in accordance with point OIE internal standards.
- The hatching eggs are transported in new or appropriately sanitized packaging materials and containers.
- If the parent flocks have been vaccinated against avian influenza, the nature of the vaccine used, and the date of vaccination should be stated in the international veterinary certificate.

D.12 Recommendations for importation of poultry semen from a country, zone, or compartment free from high pathogenicity avian influenza

Veterinary Authorities should require the presentation of an international veterinary certificate attesting that the donor poultry,

- Showed no clinical signs of avian influenza on the day of semen collection.
- Kept in a country, zone, or compartment free from high pathogenicity avian influenza.

D.13 Recommendations for the importation of semen from birds other than poultry

- Regardless of the high pathogenicity avian influenza status of the country of origin, Veterinary Authorities should require the presentation of an international veterinary certificate attesting that the donor birds,
- Kept in isolation facilities approved by the Veterinary Services for at least 28 days (i.e. two flock-level incubation periods) prior to semen collection;
- Showed no clinical signs of avian influenza during the isolation period.
- Subjected, with negative results, to a diagnostic test for avian influenza within 14 days prior to semen collection.

5.2 Regulations, recommendations, and Guidelines for prevention control and eradication of HPAI in Sri Lanka

Considering Sri Lanka is free of HPAI up to now, its' major approach on prevention and control of HPAI in poultry is stamping out, including the possible use of pre-emptive slaughter of poultry which will be at risk of contracting the disease. The vaccination of poultry as an adjunct to stamping out and pre-emptive slaughter or as an effort to control the spread of the disease will not recommended. Stamping out approach will be adopted for LPAI infections in poultry farms depending on the biosecurity status and LPAI prevalence.

A joint circular (circular No. 01-19/2006) on the guideline for the collection and transport of specimens was issued on 15th March 2006 by the Ministry of Health and DAPH.

The DAPH has developed a set of regulations and guidelines for pre-planned alertness to prevent, control, and eradicate HPAI, several committees and teams for national coordination and response mechanism, investigation of suspected cases, destruction/depopulation and disposal as the preparation of preplanned alertness. In a situation of confirmed cases or an outbreak, reporting structure, declaration, media handling, and guidelines for prevention, control, and eradication have been defined in SEDEP. Further, a vigilant surveillance program is implemented in Sri Lanka for early detection of AI. The DAPH regulates and guides the importation of poultry and poultry products to Sri Lanka. In that, any person/ organization intending to import poultry and poultry products should obtain prior approval from the Director General of the Department of Animal Production and Health (DG/ DAPH) under the provisions of Animal Diseases Act no. 59 of 1992.

5.2.1 Recommendations on avian influenza in Sri Lanka

The Department of Animal Production and Health follows the WOAH recommendations as a guideline to prevent HPAI from entering the country (refer to Chapter 5.1). If HPAI gains entry to Sri Lanka, the poultry industry agreed with DAPH to control and eradicate the disease in the shortest possible time, limiting the risk of human infection and minimizing economic impact, by implementing the following strategies.

- S*tamping out* by destruction of all birds on infected premises (IPs) where there is clinical disease or evidence of active infection with HPAI virus, and the sanitary disposal of destroyed poultry and contaminated poultry products to remove the source of infection.
- Possible *pre-emptive slaughter* of birds on other premises, depending on information derived from the tracing, surveillance, and study of the behavior of the disease;
- Q*uarantine and movement controls* on poultry, poultry products, and associated items in declared areas to prevent the spread of infection;
- D*econtamination* of facilities, products, and associated items to eliminate the virus on IPs and to prevent spread in declared areas;
- T*racing and surveillance* to determine the source and extent of infection and to establish proof of freedom from the disease;
- I*ncreased biosecurity* at poultry establishments;
- A *public awareness campaign* to promote cooperation from industry and the community; and
- Protection of *public health*, by requiring that personnel engaged in eradication activities be vaccinated (with the currently available human vaccine), treated with antivirals (if appropriate), and wear protective clothing.

5.2.2 Appointing pre- planned alert committees and teams

The committees have been established at national and local levels to be alert and response in a disease situation (refer to Chapter 11). In the case of disease confirmation, the DAH/ DAPH and the relevant PD(s) are requested to be in readiness to mobilize for the response mechanisms.

- The members of the National Animal Health Committee (NAHC) are to be in readiness to convene the Inter-Ministerial Emergency Response Committee for Avian and Pandemic Influenza (IMERC–API).

- The DAH plays a supportive role to DG/DAPH in all the above activities. In addition, the National Emergency Response Committee (NERC), and PD/DAPH of the area in which the suspected premises are situated, alert the Chief Secretary and the Secretary of the relevant Provincial Ministry, prepare to convene the Provincial Emergency Response Committee(PERC), and drafts the „Proclamation Notice" in consultation with the GVS(s).
- The DPD (DVS) of the relevant district briefs the District Secretary, prepares to set up the Local Disease Control Centers (LDCC), and communicates the GVS of the area assists the DPD (DVS) in the above activities, briefs the Divisional Secretary and discusses the feasible boundaries for the disease control areas, recommends disease control area boundaries to PD.
- DPD and LDCC communicate with leaders of community organizations to get support in the community-based surveillance activities to be more vigilant, and carry out clinical surveillance around the suspected premises for GVS of the area.
- The Veterinary Investigation Officer (VIO) of the area conducts rapid diagnostic tests in contact premises identified during the epidemiological investigation and other premises identified to be at risk.

However, the alert will be called only when the NAHC decides that the suspected condition is NAI and needs an emergency response.

The main active teams have been identified to carry out specific functions and prepare for emergencies of HPAI. There are two teams

1. District Emergency Team (DET)
2. Depopulation and Disposal Team (DDT)

<u>District emergency Team (DET)</u>

District Emergency Team comprised three members namely

- Deputy Provincial Director (DPD)/District Veterinary Surgeon (DVS),
- Veterinary Investigation Officer (VIO) of the district
- Research Assistant (RA) of the Veterinary Investigation Centre (annex 2 Members of DET).

  The teams of each district are appointed by the Director Animal Health/DAPH. In a situation of suspected HPAI case, after the preliminary investigation performed by the GVS of the area, the relevant DET investigate the case as they are instructed. The main responsibility of DPD/DVS in the DET is to facilitate coordination at the district level.

The Veterinary Investigation Officer is responsible for the investigation of the suspected case, field-level testing (screening), sample collection, dispatching, and reporting the situation to the relevant authority (DG/DAH/PD). The research assistant assists the VIO with the whole process. Refer to Annex 3 for a detailed description of activities and responsibilities

Depopulation and Disposal Team (DDT)

Three depopulation and disposal teams are formed for each district (annex 5- members of DDT). Composition of the DDT

- Veterinary Surgeon
- Livestock Development Officer
- Dispensary Laborer
- A member from the local government
- A Police Officer

In addition to the DAPH officers, a member from the local government and a police officer are also included. The member from local government will facilitate DDT to identify a common place to bury animals and transport carcasses. In addition, he will provide vehicles to dig the pit even inside the farm. The police officer will be supportive of handling a crisis in the infected farm since the farmer would be panicked with the disease and the idea of slaughtering birds. They will be appointed in a disease-confirmed situation with the communication of the relevant authority in the area by provincial DAPH to get their support for the process of depopulation. The DDT is headed by the veterinary surgeon other than the government veterinary surgeon of the infected premises. The order of depopulation and disposable will be given to NERC and then to DDT by DG/DAPH based on the recommendation of the National Animal Health Committee. The technical guidance will be provided by the National Emergency Response Committee (NERC) to DDT.

DDT is provided antiviral if necessary as advised by the Medical Officer of Health (MOH) in the relevant area. They should be provided with Personal Protective Equipment (PPE) which includes a cap, goggles, face mask, gloves, Overall, boots, and shoe cover and having the required standard in accordance with the national occupational health and safety guidelines for Avian Influenza.

5.2.3 HPAI case reporting

Case definition**:**

The sudden death (less than 4 hours) of birds in a flock with or without petechial hemorrhages, swelling of feet, cyanotic comb, swollen head, petechial hemorrhages over chest and legs, nasal discharge, salivation, head drop, drop in egg production and decreased feed intake are suspected as HPAI.

If GVS suspects (according to the case definition) HPAI, the case should be reported to DET and PD after the preliminary investigation. The veterinary investigation officer performs the investigation and communicates with DAH during or just after the investigation, before he leaves the suspected premises about the HPAI screening test (AI diagnostic test kit) results and the clinical situation. VIO communicates with VRI (VRO virology) to arrange sample dispatching before leaving the suspected premises. The Veterinary Virology Laboratory (AVL) of Veterinary Research Institutes will carry out laboratory testing and the results will be reported to DVRI/DAH and DET. The information is reached to DDT via DET/DAH/PD and initiates depopulation, disposal, and decontamination (annex 1-HPAI reporting structure and chapter 8 Investigation and Reporting). They will be provided technical guidance by NERC via PERC.

5.2.4 Disease Control Zones and Movement Control

The important first steps will be to define the boundaries and announce the restrictions in that area to control the spreading of the disease. The DG/DAPH declares the boundaries of the infected area (refer to Annex 13 Format for proclamation).

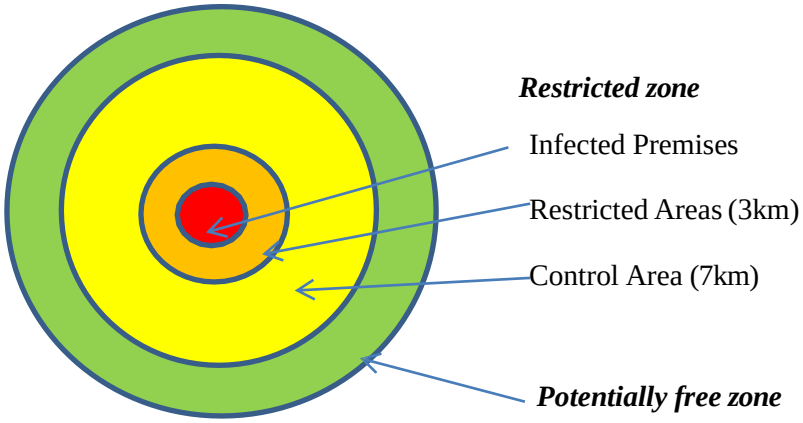
There will be a declaration of two major disease control areas (Fig.1).

- Restricted area (RA) with a radius of 3 km around all IPs (infected premises). More than one RA may be declared in an outbreak
- Control area (CA) encapsulating each RA, with a boundary no closer to the RA boundary than 7 km, to form a buffer between the infected and free areas. This will help the disease to be within the RA and will have its level of restrictions.

The Restricted Area (RA) will be subjected to strict quarantine, and movement controls on items identified as risk material. The movement of manure and litter from these premises will be prohibited. The equipment (egg boxes/crates, live bird crates, etc.) and eggs (table and fertile) may need to be destroyed on-site. The movements of people and vehicles will be controlled and

personal and vehicle decontamination will be required before leaving the premises. Farmers will be advised to prevent other species of birds from entering the premises. Pets will be confined. RAs will be subjected to strict movement controls during investigations.

Fig 1. Restricted and control areas



The initial boundary of the CA may correspond with the district or other geopolitical border, but the boundary will be amended based on epidemiological evidence obtained over time and in line with accepted disease control measures. A national standstill for containment of AI infections will not be adopted, since it would have a severe negative effect on the operations of the poultry industry and the welfare of poultry. The movement controls should not hinder the movements of the general public unless human infection with the outbreak is occurring. The quarantine arrangements for humans will need to be imposed in agreement with health authorities. Industry support for the eradication program through strict bio-security measures on poultry farms will be vital.

Zoning could be introduced as soon as possible after the epidemiological investigations have been completed and the extent and severity of the disease have been determined, to minimize the spreading of the disease. Zoning requirements must be adequate to meet international standards and WOAH guidelines. It is established based on the geographic areas, and infection status. The potential free zone is outside CAs which is known as the surveillance zone. To achieve free zone status, sero-surveillance would be required to prove freedom within the surveillance zone (CA). If an outbreak of HPAI is rapidly spreading, establishing RAs and CAs containing all IPs as soon as possible will allow rapid investigation of the extent of infection and facilitate the application of zoning. The relevant factors for establishing zones are as follows:

Limits should be set based on natural, artificial, or legal boundaries

- Documentation should be prepared using the guidelines defined by the WOAH Scientific Commission for Animal Diseases, taking account of any specific matters in the relevant chapter of the WOAH Terrestrial Code for HPAI
- For industry's operational purposes, each zone should be self-sufficient in poultry operations, including slaughtering.

All the restrictions associated with zoning need to be acceptable to the poultry industry.

5.2.5. Declaration and media handling

If the diagnostic tests are found to be positive for HPAI, a proclamation in respect of the restricted area is issued by the DG/DAPH and will appear in the gazette (refer to annex.13). There will be a press release by the DG/DAPH with the proclamation and sequel to that quarantine measures are to be implemented in the restricted area. The coordination of the activities of the outbreak will be headed by the DAH.

The initial media communication confirming HPAI needs to be issued by the DG/DAPH. When the disease investigation and laboratory confirmation procedures are in progress the PD of the provincial DAPH or other officer nominated by DG/DAPH will comment on the epidemiology and the other technical information on the disease when they are interviewed by the media. The disease outbreak announcement to the media will be done by the DG/DAPH

6. Prevention, control, and eradication plan in Sri Lanka

Many activities related to HPAI have been conducted continuously for almost 20 years with the initiation of the recent outbreak of the world. As Sri Lanka is free of HPAI up to now, it is necessary to maintain free status and prevent the introduction of the disease to the country**.**

The following approaches are identified and planned to prevent and, in case of introduction, control and eradication of HPAI in Sri Lanka

- Early detection and reporting
  - Surveillance
  - Suspected case reporting/preliminary investigation
- Investigation, diagnosis, and disease reporting
- Outbreak management
- Training and awareness
- Risk management and communication
- Post outbreak activities

6.1 Early detection and reporting

Sri Lanka follows the WOAH Guidelines on Avian influenza surveillance, for uninfected countries.

Surveillance

Avian influenza surveillance is a key component in emergency preparedness for the disease in Sri Lanka. It provides early information on the probable emergence Avian Influenza virus in the country and it plays a major role in the early warning system against the introduction of this exotic disease.

The main areas included in surveillance are

a. National surveillance program conducted in activity related to the poultry industry, migratory bird location, etc. (refer to Chapter 7)
b. Surveillance of imported poultry, poultry products, and pet birds (live birds/ meat/ eggs/ hatching eggs/ egg products) by which HPAI can be introduced to the country.

Suspected case reporting

The information of early detection or notification of suspicious HPAI cases is made by the farmer or by a private veterinarian or any other individual should communicate immediately with the Government Veterinary Surgeon (GVS) of the area. The GVS performs a preliminary investigation and informs the district Veterinary Investigation Officer (VIO) of the area (refer to Chapter 8).

6.2 Investigation, diagnosis and disease reporting

The investigation of the suspected case, sampling, sending samples to the Veterinary Research Institute (VRI) for laboratory confirmatory diagnosis, and reporting to the relevant parties are the activities of the HPAI suspected case investigation (refer to Chapter 8).

6.3. Outbreak management

If the diagnostic tests are found positive for HPAI, the legislative declaration is made by the Director General of DAPH in a Gazette. The proclamation of the restricted area, movement control, and quarantine of birds/farms in restricted areas, and all the activities related to control and prevention of spreading are coordinated by the Director Animal Health/DAPH. All the committees such as the National Animal Health Committee (NAHC), National Emergency Response Committee (NERC), etc. will be activated to combat the outbreak situation (refer to

Chapter 11). In addition, the Local Disease Control Centre (LDCC) will be established. The District Emergency Team (DET) and Depopulation and Destruction Team (DDT) will be activated, parallel with aggressive special surveillance. The collaboration and coordination activities with the multi-sectoral approach to control and prevent the spreading of the disease between farms will be conducted. The public health risk will be analyzed, communicated, and addressed after the confirmation of the disease (refer to Chapter 9).

6.4. Training and awareness

As it is a free country for HPAI, the continuous routine education and awareness programs are conducted for stakeholders as well as the general public as follows

Table 1.AI routine training and awareness program

No.	Identified group	Awareness program	Time Schedule/responsibility
1	Range veterinary surgeon/Veterinary Investigation officers and vet staff	Update the world situation by sending WOAH update Training program	Once /year –HRD/ ICE
2	Medical doctors and staff	Update world situation/ training program	Once /year- Health Ministry
3	Poultry farmers/processors/feed distributors and pharmaceutical companies	Farmers meeting Poultry Industry meeting	1 farmer awareness/year- GVS 10-15 min ppt in Poultry industry meeting- DAH/DLP
4	General public	Distribution of leaflet	Available in every VS office

During an outbreak situation, special awareness programs are identified to prevent the spread of the disease among farms as well as prevent human disease.

Table 2. Awareness programs during an HPAI outbreak

Farmers' awareness of disease, control prevention,	Farmer training programs all over the country	DAPH
DAPH officers to refresh the knowledge and awareness of the picture of the existing current outbreak	Virtual discussion	DAH/DAPH
Poultry industry stakeholders (processors/feed industry/pharmaceutical)	Awareness in Poultry industrial meeting	DAPH, processors/feed industry/pharmaceutical)
General public on public health significance and precautions to be done	Media TV	Ministry of Health

6.5 Risk management and communication

Emergency risk management and communication are highlighted in the HPAI outbreak situation. There are two approaches

i. Avian Influenza emergency risk communication is planned to establish an HPAI communication task force and describe the roles and responsibilities of each task force member indicating their importance to the poultry sector and the country during the outbreak and to prevent further out break (annex Team in DET/DDT, responsibilities of DET/ DDT and Chapter 11)

ii. The communication with relevant authorized parties (DG/DAPH, DAH, PD, GVSs, VIOs), farmers, and other stakeholders effectively to take action stepwise during an outbreak (Annex. guidelines for DET/ DDT and refer to Chapter 11).

6.6 Post outbreak activities

Surveillance and restocking are the main activities for re-establishment of the poultry industry. The continuation of disease monitoring and reporting is needed. The upgrading of poultry farms and other related industries will be a challenge. The development of special community awareness programs is also important to the re-establishment of the poultry industry and other industries related to poultry (chapter 9 post-outbreak surveillance).

7. The National Avian Influenza Surveillance Program

The main objectives of surveillance are early detection of the disease for emergency response, and, support to design, improve, and amend the emergency preparedness plan, and also demonstrate the free status of the disease which facilitates trade.

The surveillance program is implemented in the filed by VIOs and they should maintain surveillance data in VICs (annex 16 HPAI surveillance register in VIC). The district VICs in the country send surveillance samples for laboratory testing to VRI. The laboratory findings are sent to VICs and summary reports are available in AHD. The quarantine officers are responsible for the sampling of the birds during the quarantine period and poultry products/by-products imported to Sri Lanka

The Action Plan for National HPAI Surveillance is annexed for the reference (annex 17)

7.1 The component of the National HPAI Surveillance Program

- Passive surveillance - Clinical surveillance (suspected case detection)
- Active surveillance - Sero-surveillance
  Targeted surveillance
  Special surveillance

A. Passive surveillance – Clinical Surveillance

Clinical surveillance is carried out in domestic poultry and other susceptible species to detect suspected cases.

Trigger Points for chicken in production sectors:

Sector	Trigger Points for chicken
Production Sector 1	Food and Water intake reduced by 20% for one day or mortality of 2 days
Production Sector 2	Daily mortality of 1% for 2 days
Production Sector 3	Daily mortality of 1% for 2 days
Production Sector 4	Daily mortality of 5% for 2 days

Poultry Production Sector 1: Industrial integrated system, high-level bio-security, birds/products marketed commercially

Poultry Production Sector 2: Commercial non-integrated poultry production system, moderate to high bio-security, birds and products marketed commercially

Poultry Production Sector 3: Commercial poultry production system, minimum bio-security, marketing via live bird markets

Poultry Production Sector 4: Village or backyard production, No bio-security, informal marketing

In addition, wild bird die-off serves as a trigger event.

If these trigger points are exceeded, the case should be reported for investigation. The reporting of suspected cases from the farmer/public to VS and DET (annex 1 HPAI reporting network).

B. Active Surveillance

Active surveillance is conducted to detect the presence of AI viruses or antibodies due to previous exposure in high-risk populations.

a. Sero-surveillance

The sero-surveillance is conducted among commercial layers considering high disease risk due to the high density of rearing and long life. The number of farms for sample collection is determined at 95% CI to detect 1% prevalence. The sample size within the farm is determined at 95% CI to detect 20% prevalence. (Annex 8 HPAI surveillance program -Sampling)

b. Targeted surveillance

The targeted surveillance is conducted to detect the presence of the virus in high-risk populations in wild birds/ migratory birds, backyard poultry, ducks, live bird markets (wet market), pet bird breeding establishments, and poultry processing establishments (representing commercial broilers). The sample size within a site is determined at 95% CI at least to detect 20% prevalence. In addition, the imported live poultry and poultry products are also included in the surveillance program for the presence of viruses on arrival and during on-farm quarantine.

-Targeted surveillance in wild birds/migratory birds

The identified hot spots are included considering the flyway of migratory birds.

The samples are collected from wild birds, migratory birds, and captured migratory water birds to trace the presence of AI viruses (annex 8 surveillance sampling plan)

-Targeted surveillance of backyard poultry in the vicinity of migratory bird locations

The back-yard poultry reared in the vicinity of migratory bird locations allows the birds to be in contact with the exotic birds. The samples are collected from all poultry such as chicken, duck, turkey, quail, guinea fowl, and geese reared under extensive management in areas of the vicinity of migratory bird locations within the radius of 3km (annex 8 surveillance sampling plan).

- Surveillance in ducks

As ducks play an important role in maintaining avian influenza infection and transmitting to other poultry species due to sub clinical infection and longer shedding periods, the duck samples are collected throughout the country (annex 8 surveillance sampling plan).

-Targeted surveillance in wet (live bird) markets

The samples are collected from live bird markets throughout the country (annex 8 surveillance sampling plan).

- Targeted surveillance in pet-birds breeding establishments

The samples are collected in identified medium to large-scale pet breeding establishments involved in breeding for commercial purposes in Sri Lanka (annex 8 surveillance sampling plan).

-Targeted surveillance in poultry processing establishments

The samples are collected from poultry processing establishments registered in DAPH, to track the virus circulating among commercial broilers (annex 8 surveillance sampling plan).

C. Surveillance of imported poultry and poultry products

The bird (pet birds, grant parent or parent birds, commercial poultry) tested for avian influenza on arrival and day 28 (before the end of the on-farm quarantine period). The samples from imported poultry products are collected for laboratory testing (annex 8 surveillance sampling plan).

The smuggling of birds in the Northern region and Negambo of Sri Lanka has been observed. The necessity of strict quarantine measures at the entry point is identified. It is important to prevent smuggling poultry, poultry products, and pet birds at the point of entry. Special attention goes to these areas for that reason.

D. Special surveillance

A special surveillance is conducted in a situation where serological positives (H5 or H7) are detected under routine surveillance, to verify the presence of virus in the surrounding area. The samples should be collected from a minimum of 5 backyard poultry farms (duck and swine if available) located within a 3km radius of the reported point of exposure to the virus.

Please refer to post-outbreak surveillance in Chapter 9.2

8. Investigation and Reporting

The suspicious case of Avian Influenza as to the case definition (refer to chapter 5.2.3 case definition) is supposed to be reported. The information of early detection or notification of suspicious HPAI case is made by the farmer or any other individual, or by a private veterinarian communicated immediately report to the government veterinary surgeon of the area (annex 7 Guideline for the farmer in a situation of suspicious of HPAI- preparation the guideline for VS to advise farmer)

8.1 Preliminary investigation

An initial investigation of poultry premises for HPAI will be carried out if

- Unusual mortality patterns in a poultry farm are reported to GVS of the area by a farmer, a village-level worker such as an LDI or a GN, etc., or a producer
- Clinical signs suggestive of AI are noted by a veterinarian (compatible with the case definition).

The preliminary Investigation is done by GVS of the area and, it includes history, the clinical picture of the disease, and mortality pattern. In addition, he does the initial risk analysis such as how close the suspected farm is to the wild/migratory bird sanctuary, the introduction of new birds, and any other suspicious factors. After the preliminary investigation, GVS inform to the DET and PD in a Whatsapp message and/or telephone call as to the given format (refer to annex 10)

8.2 Suspected Case Investigation

Following the initial investigation performed by GVS, a detailed investigation including the collection of samples and epidemiological investigation is performed by DET (annex 3 Guideline for DET).

The DET visits the suspected premises, screens the birds using a rapid diagnosis test kit, and carries out post-mortems irrespective of the results of the rapid tests (whether negative or positive). (annex 3 Guideline for DET).

8.3 Suspected Poultry Processing Plant Investigation

If a suspicious case is detected by a veterinary surgeon of the poultry processing establishment with pathological signs similar to AI (refer to chapter 5.2.3 case definition), the information should be communicated immediately to the GVS and VIO (DET) of the district for

investigation. The veterinarian of the poultry processing establishment and the processing establishment authority should support and direct DET to visit the place for further investigation. The processing plant authority (manager and veterinary surgeon) helps the DET to collect information to trace the original grower farms, bird transport vehicles workers, etc. If it is suspected HPAI, the DET and poultry processing plant veterinary surgeon should make sure not to move any products or workers/staff out of the processing establishment till a definitive diagnosis is made. The GVS will be informed to be alert on the disease situation of the suspected grower farms and their surrounding farms until the report is received for further action.

8.4 Diagnosis of HPAI

8.4.1 Collection of pathological samples

In cases of suspected HPAI the following pathological samples must be collected and sent to the laboratory (annex 9. Guideline for clinical sample dispatch in an investigation).

The samples are

a. At least 5 moribund birds (for post-mortem examination)

b. Pooled tracheal and lung samples from at least 5 moribund birds

c. Pooled intestine samples from at least 5 moribund birds

d. Cloacal and tracheal swabs from healthy birds (also from waterfowl)

e. At least 10 blood samples (acute sera).

The collected samples should be sent according to the guideline (annex 9 Guideline for clinical sample dispatch in an investigation) and with the duly filled sample sending formats (annex 12 sample submission forms –HPAI investigation). The DET should submit the epidemiological investigation form (annex 15 epidemiological investigation form) to DAH after the investigation. In case of several outbreaks occurring in the same district, the DET is not supposed to undertake all investigations. Therefore identify a few veterinary surgeons in the district and train them on how to collect samples and keep them prepared with PPEs to undertake any emergency investigations. After the confirmatory diagnosis of the first case, the following sample collection from suspected farms should be limited to 5 dead carcasses (annex Guideline for DET).

8.4.2. Diagnosis in Animal Virological Laboratory, VRI

The samples sent by the DET (or GVS) are tested for the presence or evidence of infection with Influenza Type A. If the samples are serum then samples will be screened by ELISA for the

presence of antibodies against Type A influenza and positive samples will be tested by haem agglutination inhibition (HI) for H5 and H7 subtypes. If the samples are oro-pharyngeal swabs, cloacal swabs, or tracheal swabs from live birds and internal organs from dead birds, samples will be inoculated into 9-11days old embryonated chicken eggs for virus isolation and amniotic fluid will be tested for the presence of AI antigen by Haemagglutination/haemagglutination inhibition (HA/HI) or Real-Time RT-PCR. Samples can be directly tested by Real-time RT-PCR too. ELISA and Real-time RT-PCR will give results within a day whereas virus isolation would take 5-6 days. The time taken to issue RT-PCR is 8 hours after receiving samples to VRI and DDT will be activated after that (refer to chapter 2.5.5).

8.5 Reporting and communication

With the confirmation of the disease based on the VRI report, DET will communicate with DAH, PD, and DG/DAPH (annex 1 HPAI reporting structure). All the communications are made in real-time disease reporting in WhatsApp messages and telephone conversations.

The communications after the confirmation of the diseases are as follows (annex 1 HPAI reporting structure).

- DG/DAPH declares the operational phase immediately on receipt of VRI confirmation of HPAI or any other condition requiring an emergency response and informs all those who were alerted in the alert phase. The draft „Proclamation Notice„ is obtained from the PDs together with a situation update based on the investigation carried out by the DET and GVSs and, presented at the emergency meeting of the National Animal Health Committee (NAHC) convene to decide on the emergency response activities (Refer chapter 11 HPAI response committees).
- The NAHC informs the National Emergency Response Committee (NERC) and the National Emergency Cell (NEC) decides on such matters as the areas to be proclaimed and, the types of farms/units to be depopulated (technical guidance). DAH will convey these decisions to all relevant officers (Refer to Chapter 11 HPAI response committees).
- The NAHC also makes recommendations to the Inter-Ministerial Emergency Response Committee for Avian and Pandemic Influenza (IMERCAPI) and Joint Technical Committee on Avian and Pandemic Influenza (JTC-API) on assistance and support that may have to be offered by them to the emergency disease control program.

- The Secretary/Ministry will convene the IMERC-API in consultation with the Minister, table any recommendations received from the (JTC–API) and NAHC, and facilitate the assistance and support of the relevant agencies to the emergency disease control program.
- DAH will activate the NERC, and liaise with the PD to offer the necessary technical guidance and logistics support to the Local Disease Control Center (LDCC), and the VIOs and GVSs to implement preventive measures against the further spread of the disease, including vigilant surveillance activities.
- PD/DAPH in affected provinces will convene the Provincial Emergency Response Committee (PERC) in consultation with the relevant Chief Secretary and facilitate the assistance and support of the relevant agencies to implement the emergency disease control program. They will also liaise with the DAH to provide the necessary technical guidance and logistics support to the Local Disease Control Center (LDCC), and arrange for the appropriate representation at District Agriculture Committee (DAC) meetings of the DVS and GVS of the affected areas.
- The main responsibility of the DPD (DVS) in this phase is to establish and operate the first LDCC. The DPD will inform the District Secretary about the situation and request him to convene the District Agriculture Committee (DAC) and obtain the necessary assistance from the relevant agencies to implement the emergency disease control program. DPD may also be informed about the arrangements being made by PD/DAPH to represent the GVS or DPD of the affected area at the DAC. The GVS of the affected area will make further recommendations to the PD on disease control area boundaries, assist the DPD (DVS) in the establishment of the LDCC, liaise with the Divisional Secretary to obtain the necessary assistance for the LDCC, obtain the support of the police and Grama Niladhari‟s to implement movement restrictions, and liaise with the field staff and village organizations to implement community-based surveillance activities. The GVS should ensure that adequate preventive measures are in place against disease spread, and identify the immediate needs of personnel, equipment, and materials to undertake disease control activities in case the necessity arises.

There will be communications among many committees if the disease spreads to other areas as well.

- With the parallel with these activities, DET will carry out investigations in suspected premises in the area with increased vigilance and follow instructions issued by DAH from time to time. If the investigations are to be made for many farms in the same district by DET, DPD /DVS will not be able to be in the DET as he may be involved with other coordinating activities. In such a case, DPD/DVS will support the DET in coordinating activities in the investigation without physically visiting the suspected farms. However, additional GVS will be prepared with PPE for any emergency visit to suspected farms and sample collection (refer to Chapter 8.4.1)

8. 6 Management of the suspected premises

There will be a time gap between the sample sent to VRI and receiving the laboratory confirmatory results. The DET should inform the farm owner/authority not to send out birds/feed/eggs/vehicles and people/workers from the suspected premises until the VRI laboratory results are received. The DET should mark the demarcation with tape or rope to the entrance with the displaying of a notice on „infected place". It is the responsibility of the DET and GVS of the area to be aware of the situation and, ensure any product, item, or people are not moved out of the suspected premises until laboratory results are received (refer to annex 3 Guideline to DET).

8.7. Declaration

If the diagnostic tests are found to be positive for HPAI, infected premises (IP) and restricted areas (RA) are to be declared by DG/DAPH under the provisions of the Animals Disease Act No. 59 of 1992 (refer 5.2.4 Disease Control Zones and Movement Control**)**

The quarantine measures are implemented in the RA (Annex 13 format for Proclamation). A press release will also be issued by DG/DAPH. The premises where HPAI is detected should have a signage indicating DISEASE CONTROL AREA –KEEP OUT and fixed at the entrance to the premises in a prominent manner. With the proclamation being issued, an office will be established to coordinate the activities of the outbreak headed by the DAH

9. Outbreak Management

When the VRI laboratory report confirms the disease, DG, DVRI, DAH and NERC (technical expert team) altogether make decisions on the action to be taken for the infected premises. The

area veterinary surgeon communicates and makes sure the birds/feed/eggs/vehicles and people or workers of the infected premise are not moved out of the farm but should not visit the infected premises (refer to Annex 6 Guideline for DDT and Annex 7 Guideline for the farmer in a situation of suspicious HPAI outbreak situation). It is the responsibility of DET with the help of GVS to monitor the infected premises until Depopulation and Disposal Team (DDT) come into action. With the order of DG/DAPH, DDT enters the infected premises and initiates depopulation/stamping out disposal, and decontamination.

9.1 Depopulation, Disposal and Decontamination

The appointed DDT will attend in the process of depopulation disposal, and decontamination of the infected premises (annex 5 members of DDT). The DDT moves to the infected premises with all precautions to prevent exposure and carry out depopulation. The LDCC will be the supportive team for DDT with the process of depopulation/disposal and decontamination (refer to Chapter 11). The GVS of the area will always be head of the LDCC and responsible for the coordination with relevant authorities (annex 6 Guideline for DDT).

9.1.1. Depopulation/Destruction

The DDT carries out depopulation of the birds in the infected premises. If more than one infected premises are in the restricted area, other DDTs of the district enter the infected farms for depopulation. All poultry farms within a 10 km radius may be considered to be depopulated if the outbreak spreads to many farms from initially infected premises. However, it depends on the command of DG/DAPH based on risk analysis by NERC and NAHC.

The DDT should be facilitated with polythene bags, carbon dioxide cylinders, and other requirements for the task. It is the responsibility of DG/DAPH and PD/DAPH to take administrative and financial actions to provide material for the process of depopulation. With that, the LDCC, GVS of the area, and the office staff facilitate the requirement of DDT (refer to Chapter 5.2.2 and Annex 6 Guideline for DDT) however, make sure not to enter the infected premises.

The destruction of birds inside the shed with minimum handling reduces the exposure of workers to the virus and makes working with the recommended protective equipment more bearable as handling dead chickens produces less airborne contamination than live birds. In the process of depopulation, the sheds should be closed up. The birds need to be collected in an enclosed trailer or container or a polythene bag with suitable thickness and to be put inside another bag; and to

be gassed with carbon dioxide. On average, half a 45 kg cylinder of carbon dioxide is needed for the three cubic meter skips and three or more cylinders for the 20 cubic meter skips. Carbon dioxide should be added at a sufficient rate to ensure birds succumb before other birds are placed on top of them. The skips should be three-quarters (75%) filled with birds, sealed, and transported to the disposal site. Care must be taken to ensure no bird is still alive when dropped into the burial pit.

9.1.2. Disposal

It is important to ensure prompt and effective disposal of contaminated items such as dead birds, eggs, feed, and litter (if appropriate). Available methods include burial, incineration, burning, rendering, and composting.

- Dead birds, eggs, and contaminated feed need to be buried in the same infected premises. If there is no suitable burial site at the infected premises, arrangements should be made for burial elsewhere within the restricted area. If infected material must be transported for disposal, particular attention should be paid to prevent the spread of the virus. eg. truck body trays must be waterproof and all loads carefully covered with tarpaulin (canvas or oilcloth) to ensure that material cannot be blown out.
- The burial pit should be a minimum of 2 meters wide by 2 meters deep and enable disposal of 300 birds (medium weight 1.8 Kg.) per 1.3 meters of surface. The carcasses have to be covered by a layer of calcium hydroxide on the top, and then with a layer of earth at least 40 cm. depth.
- The dead birds have to be buried within 24 hours of death.
- Eggs and contaminated feed have to be buried or burnt.
- Manure and litter waste have to be preferably buried or burnt. If not can be composted inside sheds or otherwise on-site, eliminating the risk of spreading the virus during transport.
- Equipment and items that cannot be disinfected effectively have to be collected in a disposable bag and have to be incinerated.

Disposal of dead birds, poultry litter, and other contaminated waste is best done by burial. Sometimes this is not practicable or desirable because the required equipment is not available or

it would have adverse environmental effects, such as potential contamination of groundwater. In these circumstances, the best alternative might be composting.

Burial - Burial is best undertaken at the infected site. It is best to minimize the distance that infected material needs to be transported. However, in a situation of several infected foci would have to be depopulated and decontaminated in a given area, a common burial site outside the premises may be more efficient. The preferred equipment for digging burial pits is an excavator. This equipment is the most efficient available for the construction of long, deep vertically-sided pits.

Loaders, bulldozers, road graders, and backhoes (for small jobs) may be used if excavators are unavailable. Except for backhoes, all other equipment requires the continual movement of the machine over the site while digging the pit. The dimensions of the burial pit will be dependent on the equipment used, site considerations, and the volume of material to be buried. The preferred dimensions are for pits to be as deep as practically possible (reach of machinery, soil type, and water-table level being the usual constraints), with vertical sides. The gas production from decomposition within unopened carcasses may result in considerable expansion in the volume of the buried material to the extent that the surface of the closed pit may rise and carcasses may be expelled from the pit. Lime may be added to pits to prevent earthworms from bringing contaminated material to the surface after pit closure. Covering the carcasses with 40 cm of soil is suggested, and an unbroken layer of slaked lime [Ca(OH)2] before filling is completed. Lime should not be placed directly on carcasses because it slows, and may prevent decomposition. Inspection of the burial site after closure is recommended so that appropriate action can be taken in the event of seepage or other problems.

Composting - Biological decomposition, or composting, is an effective way of dealing with manure and litter waste and can be undertaken within sheds or otherwise on-site, thus overcoming the risks of disseminating the virus during transport. Composting should be done in a secure area not accessible to susceptible birds. The procedure requires the piling of carcasses with other bulky contaminated or non-contaminated material, such as wood chips, and straw bedding, to allow for proper aeration and cover with a biological filter (i.e., not whole plastic). The pile should not be pressed or otherwise compacted. The site selection is important – away from any residences, with at least 1 m of ground between the pile and any known water source, with any runoff water from the decomposing material collected and treated. Care must be taken to ensure that susceptible animals or pets (dogs) do not have access to the compost pile. The

temperatures for proper composition should reach 55-60°C within 10 days and the material kept in place for several weeks; at which time, mixing of the material within the pile should be done, but never pressed. Properly decomposing material at this time should be dark in color with minimal foul odor.

Burning/Incineration - A burning area outside an infected place may be the best option in situations where many infected foci would have to be depopulated and decontaminated in a given area and where a common burning site would be more practical. The principle is to place carcasses on top of sufficient combustible material, ensuring the arrangement of fuel and carcasses allows adequate airflow to enter the pyre from below, thus achieving the hottest fire and the most complete combustion in the shortest time. When loading of the carcasses is complete and weather conditions suitable, saturate the fire-bed and carcasses with diesel or heating oil (NOT PETROL) and prepare ignition points about every 10 meters along the length of the fire-bed. These can be made of rags soaked in kerosene. Remove all vehicles, personnel, and other equipment well away from the fire bed. Start the fire by walking into the wind and lighting the ignition points along the way. The fire must be attended to at all times and be re-fuelled as necessary, use a tractor with a front-mounted blade or a front-loader. Ensure any carcasses or parts thereof that fall off the fire are replaced on the fire. A well-constructed fire will burn all carcasses within 48 hours. The ashes should be buried and the site restored as well as possible.

9.1.3 Decontamination

Decontamination should be carried out with the recommended methods and using suggested detergents (annex 14 Recommended Disinfectant/ Chemical/Procedure)

Soapy water and detergents are the first choice for many items. The avian influenza virus is more easily destroyed than many other viruses therefore washing contaminated surfaces should always be with detergents (soapy water) or specific disinfectants. The most difficult material to be decontaminated is bird droppings, so it is essential to thoroughly clean and disinfect items that have been in contact with bird droppings - cages, shoes, and clothes before working with poultry/entering a place where poultry are kept.

Decontamination entails cleaning and disinfection of the infected site to remove all infective material.

- Litter – The surface of the litter has to be disinfected using 0.2% Citric acid and thereafter composted inside the shed or in the infected premises.
- The shed, cages, and other equipment need to be cleaned thoroughly and disinfected using 4% Sodium carbonate anhydrous for 30 minutes.
- Vehicles and other machinery have to be cleaned using soap or detergent allowing being in contact for 10 minutes and thereafter disinfected using 4% Sodium carbonate anhydrous for 30 minutes.
- Water tanks and water sources - chlorination by hypo chlorite or oxidation by chlorine dioxide to bring the pH to 2.5
- Personnel decontamination – Thoroughly with soap and detergent and decontaminate using 0.2% Citric acid for 30 minutes.

The clothing, footwear, crates, feed sacks, etc. have to be destroyed or if not decontaminated appropriately. The premises must be kept without susceptible species for 45 days (determined by the estimated survival time of the pathogen in the particular environment).

9.2 Post-outbreak surveillance

When the presence of HPAI is first detected in poultry, active targeted serological surveillance is operationalized at premises close to the infected premises and premises that have had significant contact with the infected flock through the movement of people, vehicles, and things or birds.

The special post-outbreak surveillance activities include as

- Dead bird surveillance – Dead bird surveillance will be performed twice a week for three weeks, and weekly status reports of flocks in the restricted and control areas. The surveillance will be carried out in flocks considered to be at risk after being exposed to the AI virus to determine if the infection has already spread to other farms. In addition, it will help to identify the source of the introduction of the virus to the initially infected farm.
- Active sero-surveillance in the control area – This will be carried out in a restricted area continuously for 12 months to determine the disease status. The premises with significant epidemiological contact outside will be identified by the chief epidemiologist and DAH and, such information is passed to the PD/DAPH and GVS of the area. These premises will be kept under strict surveillance. The farmers of such

premises will be aware of the clinical signs of AI and advised to communicate GVS in any suspicious case.

The HPAI surveillance program which is being conducted in the country will be continued other than post-outbreak surveillance (refer to Chapter 7).

9.3 Restocking

The agreed policy in Sri Lanka is to allow restocking in the restricted area only after 90 days of freedom from the disease based on active surveillance of sentinel birds for any signs of recurrence of the disease. The ducks may be used as sentinel birds. They are placed in the identified infected premises after the sero-monitoring for the presence of Avian Influenza A by ELISA. As time goes on cloacal and tracheal swabs can be collected and tested for the virus by RT-PCR. If there is no sign of disease at the end of the sentinel period, the premises are declared free of disease

The restocking of birds should be undertaken at all stages of production to decrease the likelihood of Avian Influenza or other diseases entering the recovered premises. The introduction of a small number of poultry farms from a disease-free area of the country, which are monitored daily for signs of disease is recommended. If there are any signs of disease occur, notification to the authorities must be done immediately and sampling of the sick or dead birds is a must to determine the cause for the clinical picture. If the poultry remain healthy full restocking can be carried out. The improvement of biosecurity should be instituted after restocking. The farms should be monitored through a sampling of dead birds in mortality or any suspicious clinical signs to rule out the disease.

Sri Lankas' current policy is not to use vaccination against AI. If a decision is made later on to restock with vaccinated birds, sentinel birds may have to be used among them to ensure that the vaccinated birds do not act as carriers of the virus.

10. Budgeting for compensation

10. 1Budgeting

The funds required to implement the emergency response will be provided by the government of Sri Lanka and international organizations. The expenses required for all the activities in the situation of a suspected case of HPAI are provided as in any other routine disease investigation. If the HPAI is confirmed with the initiation of depopulation/disposal and other activities related

to an outbreak situation, the DG/DAPH will communicate with the Inter-Ministerial Emergency Response Committee for Avian and Pandemic Influenza (IMERC–API) to receive funds locally. The DG/DAPH and National Animal Health Committee will prepare relevant communication with international funding agencies for the management of the outbreak.

10.2 Compensation

It is necessary to introduce a compensation scheme to support farmers due to the economic loss with the destruction of birds, eggs, feed, and other materials. The small-scale poultry farmers are to be paid 100% compensation. For the commercial industry groups, the government will pay a certain proportion of the losses. A separate vote with treasury approval needs to be established for the provision of compensation for depopulated birds on a farm. The other losses due to the destruction of eggs, feed in stores, etc. are not included in the compensation. With the confirmation of the disease, the destruction is initiated and the National Animal Health Committee (NAHC) identifies the compensation required for farms.

a. Eligibility for compensation

All poultry farms and breeder farms should be registered in the Department of Animal Production and Health. The poultry breeder farms and hatcheries should be registered in VRA/DAPH and commercial poultry farms/ farms should be registered at the government veterinary surgeon office of the area. It is necessary the renewal of registration of all the farms annually. These registered farms are eligible to receive compensation under this scheme. The other poultry (guinea fowl, geese, turkey, duck, etc.) also have to have active registration for commercial poultry to receive compensation under this scheme.

b. Estimation of compensation

The compensation scheme is as follows

Large-scale commercial farms (>100000 birds)	- 75 % of estimated value
Poultry breeder farms	- 75% of the estimated value
Medium-scale commercial farms (50000-100000 birds)	- 80% of the estimated value
Medium-scale commercial farm (10000-50000 birds)	- 85% of estimated value
Small-scale commercial farms (<10000 birds)	- 90% of estimated value
All other farms (backyard/guinea fowls/ ducks/pet birds, etc..)	- 100% of the estimated value

Compensation value for each of the farms will be estimated according to the set guidelines below.