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Join Government - United Nations Programme to Fight Highly Pathogenic Avian Influenza (HPAI)

IMPROVING BIO-SECURITY PRACTICES TO CONTROL HIGHLY PATHOGENIC AVIAN INFLUENZA



TRAINEE GUIDE

United Nations - Government of Vietnam
Joint Programme to Fight Avian Influenza

Sub-Project: An Integrated Approach to Poultry Health and Safe Poultry Production

Implemented by the Emergency Centre for Trans-boundary Animal Disease (ECTAD) of the Food and Agriculture Organization of the United Nations and the Department of Livestock Production (DLP), Ministry of Agriculture and Rural Development (MARD)

AN INTEGRATED APPROACH TO POULTRY HEALTH
AND SAFE POULTRY PRODUCTION

TRAINEE GUIDE

Improving Bio-Security Practices To Control Highly Pathogenic Avian Influenza

Vietnam June 2011

Food and Agriculture Organization of the United Nations

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In-service Bio-security and Good Production Practices

A.1. KEY FACTS/SPECIFIC RELEVANT EPIDEMIOLOGY

1. Avian Influenza

Avian Influenza is a dangerous disease since it can kill all poultry on a farm.

Avian Influenza is a dangerous disease since it can spread rapidly to other farms and to the whole country.

Avian Influenza is dangerous since some types of Avian Influenza (HPAI) can make humans sick and even die.

Avian flu can be infected through contact between sick poultries to healthy poultry and transmit by movement of poultry and HPAI virus ……by people.

2. Cause And Virulence

Avian Influenza is a disease caused by a virus. This disease can present different forms:

- Severe and generalized clinical signs = Highly Pathogenic Avian Influenza (HPAI)
- Mild and respiratory clinical signs = Low Pathogenic Avian Influenza (LPAI)
- No clinical signs.

3. Natural Hosts

Domestic fowl, ducks, geese, turkeys, guinea fowl, quail and pheasants are susceptible. Disease outbreaks occur most frequently in domestic fowl and turkeys. A particular isolate may produce severe disease in turkeys but not in chickens or any other avian species. Many species of wild birds particularly water birds and seabirds are also susceptible, but infections in these birds are generally sub-clinical. http://www.fao.org/avianflu/en/clinical.html - top

4. Epidemiology

Vietnam has experienced a large number of poultry flock outbreaks of H5N1 over the past 6 years and 115 human cases to date. A large disease control programme has been undertaken, focusing on modified stamping out and progressively targeted vaccination. Whilst the number of reported outbreaks has significantly diminished, sporadic disease occurrence continues to be reported and there is growing evidence that infection is chronically entrenched in some areas of Vietnam.

The epidemiology of HPAI is believed to differ based on different agro-ecological conditions. Broadly these may be considered as Northern Vietnam, Central Coastal Vietnam, Central Highlands and Southern Vietnam (including the Mekong). Each zone experiences different epidemiological

patterns due to differences in climate, farming systems, poultry population and trading patterns connecting zones to other zones and other countries.

It is important to make a basic distinction between areas believed to be endemically infected and those experiencing infections due largely to the movement into zones of infected poultry or poultry products. Currently the Mekong Delta is believed to be endemically infected, the Red River Delta may be endemically infected (not yet determined), other areas of Vietnam are believed not to harbour endemic infection on a long-term basis (note the situation can change and could be influenced by disease control programmes).

Endemic Areas

Endemic areas require a reservoir poultry sub-population to permanently maintain infection. Infected flocks generally do not show clinical signs of disease. Other sub-sections of the susceptible poultry population are infected when HPAI virus circulating in the reservoir flocks 'spills over' into non-reservoir susceptible flocks. Typically this appears as clinical disease, an outbreak. The frequency of contact between flocks is important to maintain reservoirs.

There are three main components that may contribute to ***HPAI virus reservoirs***:

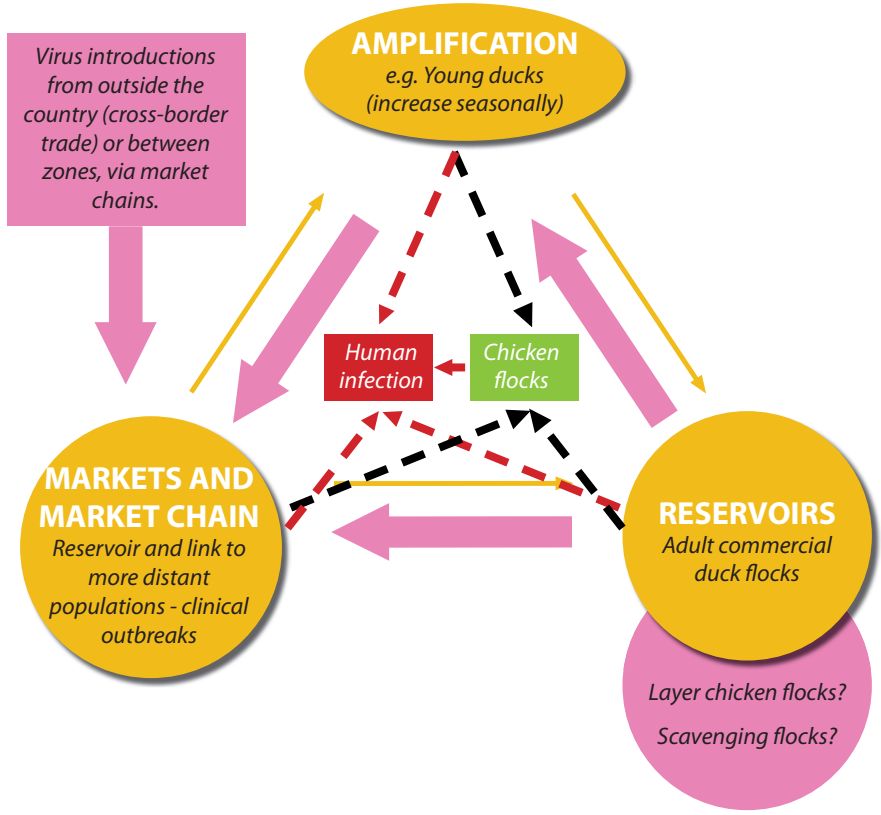
- ***Duck flocks***: particularly flocks older than 4 months in which infection may be sub-clinical and production systems (particularly free-grazing) leading to high flock contact rates with low levels of bio-security;
- ***Chicken layer flocks*** which are incorrectly vaccinated or have weakened immune systems (due to disease, stress, transport or poor nutrition). Infection may also be sub-clinical;
- ***Market chains*** (Large live-bird markets, holding yards, slaughter houses, intermediaries): Birds from reservoir flocks are regularly detected with virus in markets in endemic areas and may result in direct bird to bird infection and/or persistent contamination of market premises with viable HPAI leading to further indirect infection of birds via movements of materials contaminated with feces containing HPAI virus). Virus can be moved around the markets, farms and trader premises by poultry trade.

Cycles of infection can be maintained without outbreaks being reported for extended periods of time. Figure 1 illustrates the spill-over of infection from reservoirs into susceptible flocks.

Incursive Infection Areas (non-endemic or epidemic)

In these areas the poultry population, the environment and HPAI virus characteristics do not result in continuous cycling of virus infection. Periodically HPAI virus may be introduced from an endemic area into a non-endemic area through movement of poultry, poultry products, objects contaminated with HPAI virus or very rarely by wild bird movements. There may be local spread from flock to flock after infection is introduced but eventually the infection dies out and the area becomes free of infection again.

DIAGRAMMATIC REPRESENTATION OF ELEMENTS POTENTIALLY INVOLVED IN HPAI INFECTION TRANSMISSION CYCLES AND SPILL-OVER FROM RESERVOIRS TO SUSCEPTIBLE FLOCKS



Environmental Contamination:

Environmental contamination and persistence of virus in the environment (e.g. farms, ponds, canals, rice paddy field, markets is relatively short-lived in the warm Mekong Delta environment but persistence can be long enough to extend the opportunities for indirect infectious contact to take place and therefore to facilitate the maintenance of persistent cycles of infection.

In the cooler winter months in Northern Vietnam environmental persistence of virus would be considerably longer than in the Mekong Delta. Faecal contamination of the environment could act as a short term virus reservoir in some circumstances, particularly in the free-range duck and scavenging poultry populations, especially with higher contact rates between flocks and where ambient temperatures are low (winter months in northern Vietnam).

The role of scavenging flocks

Both scavenging (subsistence) chicken and duck flocks have significant contact with commercial duck flocks (particularly indirect contact via environmental contamination). These flocks if infected might continue infection transmission cycles or may be 'dead-ends' and not result in substantial spread of infection. Whilst it is believed that commercial poultry are the main driver for spread of infection, the lesser role of small but numerous subsistence flocks is not well understood.

The role of wild birds in Vietnam

Wild birds are the natural hosts of low pathogenic Avian Influenza but there is no evidence to support wild birds maintaining an active reservoir of infection in Vietnam. Migratory waterfowl might in the future be responsible for the introduction of new AI viruses into Vietnam with potential for recombination but current information is strongly suggestive that poultry trade movement and not wild birds have driven recent H5N1 HPAI epidemiology in Vietnam.

It is probable that endemic bird species which share habitats with domestic poultry have been infected with HPAI but their role as potential 'bridge' species appears very limited.

At this time, with significant virus isolations occurring routinely in domestic avian species, the role of wild birds in maintaining HPAI in Vietnam therefore appears to be of low significance.

A more detailed description of the epidemiological situation of HPAI in Vietnam can be obtained in *A description of the epidemiology and infection transmission dynamics of HPAI in Vietnam and potential control options using risk based and zonal approaches (FAO, 2011).*

5. Incubation Period

- The incubation period is 3 to 5 days in general but may be longer. Maximal incubation period is 21 days as defined by the OIE Terrestrial Animal Health Code. http://www.fao.org/avianflu/en/clinical.html - top

6. Clinical Signs

The clinical signs are very variable and are influenced by factors such as the virulence of the infecting virus, species affected, age, sex, concurrent diseases and environment.

- The disease appears **suddenly** in a flock, and **many birds die:**
    - Either very quickly without having appeared sick.
    - Or with minimal signs of depression, little food intake, ruffled feathers and fever.
    - Other birds show weakness and a staggering gait. Sick birds often sit or stand in a semi-comatose state ("sleepy") with their heads touching the ground.
- Some animals, especially younger birds may show neurological signs.
- Hens may at first lay soft-shelled eggs, but soon stop laying.
- Combs and wattles are dark red to blue and swollen and may have pin-point hemorrhages at their tips.
- Profuse watery diarrhea is frequently present, and birds are excessively thirsty.
- Respiration may be fast and labored.
- Hemorrhages may occur on unfeathered areas of skin, especially the shanks of the legs.

- The mortality rate varies from 50% to 100%: at least half of the poultry die.

In broilers, the signs of disease are frequently less obvious with severe depression, inappetence, and a marked increase in mortality being the first abnormalities observed. Oedema of the face and neck and neurological signs such as torticollis and ataxia may also be seen. The disease in turkeys is similar to that seen in layers, but it lasts 2 or 3 days longer and is occasionally accompanied by swollen sinuses.

In domestic ducks and geese the signs of depression, inappetence, and diarrhea are similar to those in layers, though frequently with swollen sinuses. Younger birds may exhibit neurological signs. **Adult ducks show milder clinical signs and infected birds may exhibit very few or no obvious clinical signs.**

http://www.fao.org/avianflu/en/clinical.html - top

> ***HPAI is very similar to Newcastle disease.***
> ***Must suspect HPAI when seeing important & rapid death in poultry!***

7. Pathology

Avian Influenza can and does infect humans, particularly those handling birds which have died of Avian Influenza. For that reason, **birds suspected to have died of HPAI should not be subjected to post-mortem unless done by an appropriately trained person using personal protective equipment and according to safety guidelines.**

Birds that die of acute disease may show minimal gross lesions, consisting of dehydration and congestion of viscera and muscles. In birds that die after a prolonged clinical course, haemorrhages occur throughout the body, particularly in the larynx, trachea, proventriculus and epicardial fat, and on serosal surfaces adjacent to the sternum.

There is extensive subcutaneous oedema, particularly around the head and hocks.

8. Zoonosis

HPAI is a zoonosis: human beings may be affected and die.

9. Vaccination

Inactivated oil-emulsion vaccines are effective in reducing mortality, preventing disease, or both, in chickens, ducks and turkeys. These vaccines, however, may not prevent infection in some individual birds, and if infected could shed virulent virus. Nevertheless, the amount virus shed is considerably less than that of non-vaccinated and infected birds.

10. Laboratory Diagnosis

HPAI is difficult to differentiate from other diseases without the laboratory tests, but the paraveterinarian should not wait for the test results before implementing some control

measures. The techniques for collecting specimens are not presented in this manual. Veterinarians who received adequate training on these techniques can only do this collection of specimens. They normally take samples from sick animals but also from healthy animals. They have to sample at least 6 animals per farm.

11. Treatment

There is no treatment for HPAI.

REMEMBER

AI is a potentially devastating disease which can be infected through contact with other birds, vehicles, equipment and personnel traveling between farms, markets and abattoirs.

A.2.DISEASE AGENTS, THE MODES OF TRANSMISSION AND RÍSK FACTORS

Disease agents	Characteristics of disease agent	Example
Microorganism	▪ Are the organism that can not see by eye. ▪ Main damaging effect: spread fast and cause the economic loss; ▪ Vaccination is a good way to prevent the microorganism including bacteria and virus	
	Bacteria: • can be seen by microscope; • can be treated by antibiotic	Disease cause by bacteria in poultry: • Fowl Cholera • Salmonellas
	Virus disease • Can not be seen by normal microscope' • Can not be treated by antibiotic	Disease cause by virus in poultry: • Newcastle • Avian Influenza

Parasites	▪ Including: Endoparasite and enzootic ▪ Damaging effect: take the nutrition away which causes sickness of poultry	Coccidiosis

Infectious disease are the disease that caused by bacteria or virus which can be spread quickly. For example: AI, fowl cholera

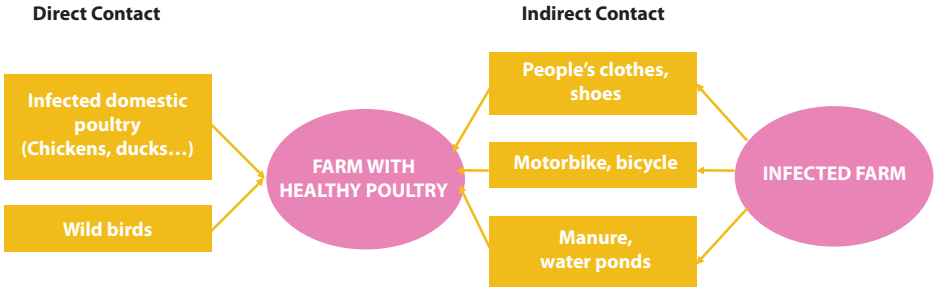
1. Modes Of Transmission

Disease agent infiltrate into the body of poultry through eyes, nose, mouth, ear, anus and skin by main modes as following:

- Direct transmission: From poultries to their eggs; through contacts between sick poultries to healthy poultry or by bite, touch, tread or copulate
- Indirect transmission:
  - Human: personnel traveling between farms, markets and abattoirs
  - Clothes and shoes of people who have contacts with poultries, poultries' supplies, products (poultries' raising farmers, egg suppliers, chicken buyers, village animal health workers, workers, visitors, etc.)
  - Tools, machines, or equipments for poultry production
  - Vehicles, different means of transportation
  - Other animals like birds, mice or rats, dogs, cats, and insects
  - Feces, contaminated wastes
  - Wild birds
  - Other animal species, viscera of sick animal

2. How HPAI Infects Poultry

The virus may enter a poultry farm through various ways:



Disease Transmission Diagram

Sick or dead poultry
Living poultry that carries disease agent in its body

Direct transmission

Other healthy poultry

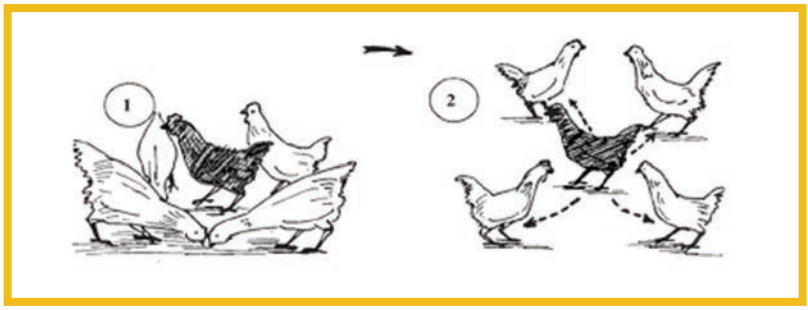
Sick or dead poultry
Living poultry that carries disease agent in its body

In-direct transmission

- Workers and Other visitors: such as poultry/ poultry product collectors, vet workers, feed supplier... (hands, legs, shoes, clothes…)
- Farming tools Infected
- Other animal Wild Birds, feces, manures, vehicles

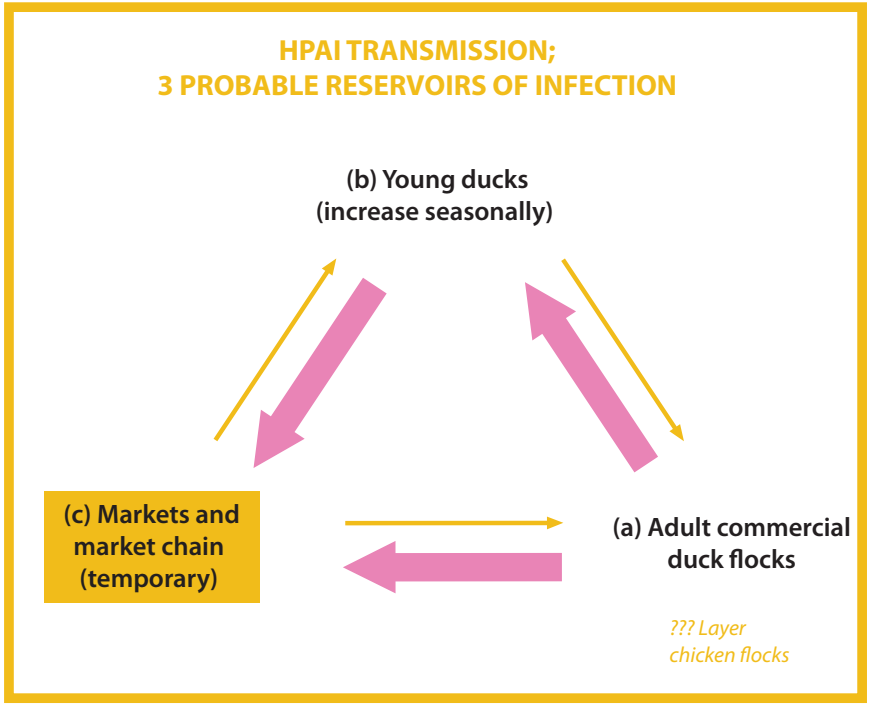
…….

Other healthy poultry



3. Reservoirs of H5N1 HPAI And Its Spread

- H5N1 HPAI has no long-term reservoir outside live animals.
- The role of wild birds as a long-term reservoir of infection (maintaining the virus) **is unclear**.
- There is a very clear reservoir of the virus in domestic poultry, particularly ducks, and possibly other captive wild birds.
- Live infected birds produce virus for several days or weeks with clear clinical signs.
- Ducks may excrete virus for up to 17 days, more typically 5-7 days
- A 500 bird duck flock may be infected for estimated duration 4-6 weeks. This contributes to virus 'reservoirs
- Infected domestic birds are the most dangerous source of virus.
- Inanimate objects (fomites) contaminated with secretions, in particular faeces from infected birds are the next most dangerous source of virus.
- Air-borne spread is not significant.
- Wild birds can introduce infection but this is uncommon compared with spread between domestic poultry.



4. Potential Transmission Routes

- HPAI virus is routinely detected in Live bird markets and there is a potential for live birds and objects contaminated with feces which leave markets and return to farms carrying HPAI virus with them and infecting new flock.

- It is not clear how important waste water and contamination of water courses with infected feces is but they should be considered a potential risk
- Wild birds have been shown to be a very low risk in disease transmission in Vietnam

5. Risk Factors

Risk factors are those factors which increase the probability or likelihood of an unwanted outcome occurring. *Example: smoking cigarettes is a risk factor which increases the chances of developing lung cancer.*

Risk factors on an area basis (e.g district/ province)

- Seasonal high risk period (based on past experience and increase in poultry- potentially Tet related but also rice grazing season and wedding season- base on experience)
- High Duck flock density
- High Chicken flock density (less significant than duck density)
- High levels of market linkage, market activity
- Movement of flocks (to market, inward for grazing of rice paddy etc)
- Previous occurrence of disease (not strictly a risk factor, rather a predictor of future occurrence)

Risk factors at the farm level

- Non-Vaccination
- Low bio-security standards and poor farm management
- Different species kept commercially on a single farm (i.e commercial chickens and ducks on the same premises)
- Farm size- smaller scale commercial sector appears to have majority of outbreaks
- Duck flocks have higher risks
- Supply of new birds from markets/ unknown health status flocks

6. Ranking Of Risk Factors

High risk

- Live (infected) birds moving to a farm, or a market (sick or sub-clinically infected)
- Infected feces contaminating objects which move from an infected farm to another farm or market
- Dirty cages/baskets, egg boxes, motorbikes/vehicles
- Shoes of farmers, traders, vets!!!

Medium risk

- Exposure of birds to an environment contaminated by infected feces
- Live bird markets, rice paddy fields, ponds

Low and very low risk

- Wild birds
- Rivers
- Airborne transmission is only significant over very short distances (several metres)

REMEMBER

- **Virus can enter your farm through the introduction of birds carrying virus!**
- **Do not purchase birds from unknown source!**
- **Contamination from poor waste management, live bird entering farm with sub-clinical infection or incubating infection are major risk factor**

A.3. DISEASE CONTROL APPROACHES

Disease control can be achieved by a number of different techniques such as stamping out, movement control and quarantine, vaccination, market hygiene, bio-security and good livestock production practices. Whilst for some diseases a single intervention may be successful, disease control is most effective and efficient when control measures are used in combination with each other. This document focuses on bio-security but it should be considered that bio-security will be used in combination with other disease control techniques.

1. Bio-Security Concepts

What is Bio-security?

Bio-security is the implementation of measures that reduce the risk of the introduction and spread of disease agents; it requires the adoption of a set of attitudes and behaviours by people to reduce risk in all activities involving domestic, captive exotic and wild birds and their products (from Bio-security for Highly Pathogenic Avian Influenza, issues and options. FAO Animal Production and Health Paper No. 165. FAO 2008)

Bio = Life
Security = Protecting
Bio-security = Protecting Life

- Bio-security is the implementation of measures that reduce the risk of the introduction and spread of disease agents.
- It is the process of keeping germs away from poultry and poultry away from germs.
- Bio-security requires the adoption of a set of attitudes and behaviors by people to reduce risk in all activities involving domestic, captive exotic and wild birds and their products
- Bio-security may not cost too much money, it is mainly good practices to use in your farm.
- Principles of bio-security can be applied in both large-scale animal production units and backyard or small-scale animal production units.
- For small-scale poultry production, bio-security consists on various, simple, sometimes zero-cost measures that will:
    - Keep microbes away from poultry.
    - Keep poultry away from microbes.

- Do not forget that bio-security will help to protect your farm against every disease, not only HPAI.

Bio-security Plan = A systematic design, implementation and follow-through plan that would guarantee the maximum protection of a farm from the entry and spread of pathogenic microorganisms that might cause disease and lost of profit.

Key issues and options of bio-security plan for Small-scale commercial producers:

- Participatory field work required to establish which bio-security measures are feasible and sustainable, to produce and disseminate extension messages, and to monitor and report on uptake and impact of these messages.
- Bio-security should emphasize the creation of physical barriers against infection and to control access; this may require some public funding.
- Cleaning of inanimate objects should be the second step.

As well as segregation, emphasis should be placed on thorough cleaning with soap and water of all inanimate objects from outside the farm that may come into contact with the poultry. Where disinfectant can be readily obtained, its use should be promoted.

Farmer message: Bio-security measures control many diseases which improves profitability of farm- good incentive for farmers to implement measures

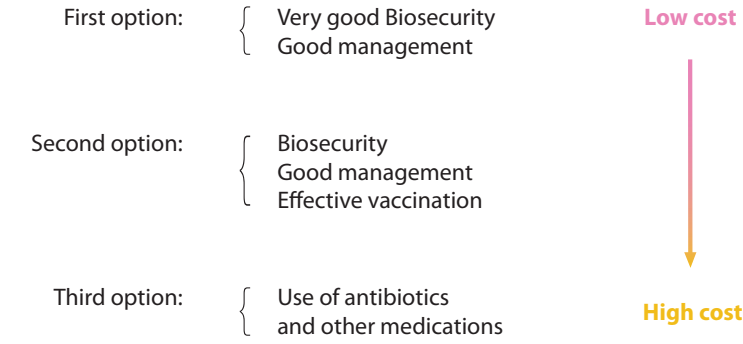
Why is bio-security important?

Bio-security is an effective and relatively low-cost disease prevention option which can control multiple infectious diseases through the application of a standard set of measures.

An example of comparative analysis between the costs of disease and the costs of preventative measures to prevent disease

COST	LAYERS (US$/100 eggs produced)	BROILERS (US$/10 Kg of meat produced)
Cost of disease		
Treatment	0.025	0.02
Lost production	0.168	0.3
Vaccination	0.017	0.2
Total	**0.21**	**0.52**
Cost of prevention Better Housing, Better equipment Procedures & education		
Total	**0.16**	**0.16**

USA Data



REMEMBER:

- **Avian Influenza- a disease of birds, spread by people!!!**
- **Prevention of diseases is cheaper than Treatment!**

B.1. GENERAL PRINCIPLES OF BIO-SECURITY

HPAI is a disease spread mostly by the actions of PEOPLE, therefore BIO-SECURITY is important to control spread

Bio-security is about reducing the risk of the introduction and spread of infection by doing correctly of three important actions:

Separation	→	Prevent contamination
Cleaning	→	Remove contamination
Disinfection	→	Kill any remaining virus

- Separation is the most important and effective step. It is the strongest form of bio-security and where effort should be placed if at all possible
- Cleaning is the next most effective step. If all dirt is removed, there is little left for the virus to be carried by
- Disinfection is important but is the least reliable step of bio-security. Its effectiveness depends on many factors, in particular the quality of the cleaning process.

a. Separation means keeping potentially infected animals and contaminated objects away from uninfected animals.

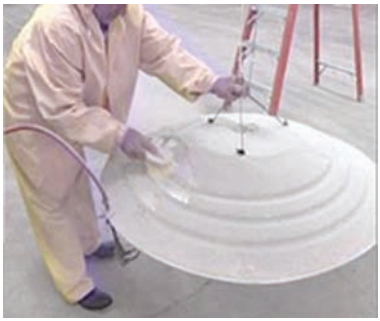
This requires a barrier, either actual or conceptual. Nothing crosses the barrier unless it has to.

The barrier can be

- Physical (fence),
- Temporal (time between visits) or
- Procedural (changing footwear and outer clothes)

Perimeter is best marked by a fence, but this is not always possible

Limited and controlled access points (lock the gate)



b. Cleaning

Cleaning means that the surfaces of the object must be visibly clean with no dirt left that is visible to the eye

This cannot be done with a garden spray / knapsack sprayer.

Cleaning needs effort. Scrubbing brushes for smaller items such as boots and high pressure washers for bigger items such as vehicles

High pressure = 110-130 bar

Cleaning with a detergent/disinfectant solution is OK, but it must be CLEAN afterwards as well as disinfected.

c. Disinfection

There are many disinfectants capable of inactivating the virus. The important elements are that they be used at the correct concentration and be in contact with the clean surface for long enough to act.

Influenza A viruses are inactivated by soap and detergents, so thorough cleaning with soap and water should be effective so long as the detergent is left on the surface.

Disinfection can be improved by DRYING, or at least leaving the cleansed and disinfected object overnight to dry itself.

Periodical cleaning and disinfection of

- Poultry house
- Equipment

First clean and wash with detergent all organic matter.

Then use approved disinfectant at the correct concentration and quantity

The lesson of this is that you cannot expect disinfectant to come into contact with a virus that is hidden inside even small amounts of other material

Additionally, many disinfectants are inactivated by organic material

It is impossible to disinfect anything that is visibly dirty

Effective cleaning removes 90% of contamination

Effective disinfection following effective cleaning removes the remaining 10%

Ineffective cleaning followed by disinfection removes <90% of contamination

REMEMBER

- **The actions of people are fundamental in applying bio-security.**
- **Separation is the most effective and disinfection the least effective.**

B.2. GOOD PRACTICE OF PRODUCTION METHODS FOR POULTRY FARMER

Key Points On Good Practice Of Production Methods For Poultry Farmer:

- Good production practices are a series of actions which improve management of livestock production, improving profits and reducing disease. Include a recommendation to vaccinate duck flocks and larger commercial chicken flocks, following advice of vet authorities.
- Key issues of bio-security good practice of small-scale commercial poultry producers:
  - Purchase breeding animals (DOC or DOD) from clear origin (good production practice, guarantee) and should be attached with animal quarantine and vaccination certificate
  - Separate new-bought poultries at least 2 weeks after buying and obverse them regularly, if the poultries do not show any sickness symptoms, then they can be placed together with the old poultries;
  - Keep poultry in its houses or fenced areas;
  - Separate different kinds of poultry;
  - Raise poultry in good conditions such as: enough food, safe drinking water,
  - appropriate raising density;
  - Limit potential disease carriers to enter the breeding areas, including human, including farm/ family members animal husbandry tools, and other domestic livestock.
  - Wash hands by soap before and after contacting with poultry;
  - Change clothes and must change shoes when entering or exiting raising areas;
  - Regularly clean and disinfection of farming equipment, poultry houses and raising areas;
  - Limitedly buy live birds without knowing of the origin to slaughter and eat at home, do not throw away poultries' waste after slaughtering to poultry raising areas.
  - "All in – all out"

REMEMBER

- **Rely on yourself to keep your farm free of disease!**
- **Live animals manufacture and multiply and transfer the virus easily**
- **Do not let poultry free!**
- **Build fence to restrict movement to own farm**
- **Good entrance management**
- **Keep your poultry from contacting other flocks**
- **Routine cleaning and disinfection**
- **All in- all out**

Annex 1: References

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Annex 2: Leaflet

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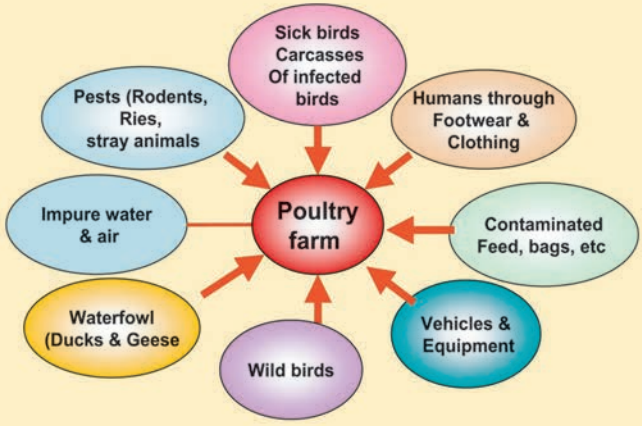
Joint Government - United Nations Programme to Fight Highly Pathogenic Avian Influenza (HPAI)

HPAI-key facts and specific relevant epidemiology

- **Avian Flu is a dangerous disease since it can kill all poultry on a farm, can spread rapidly and can make humans sick and even die.**
- **HPAI virus can be transmitted through contact between sick poultries to healthy poultry and transmit by movement, transportation of poultry** (and ……by people!!!)
  - Avian flu requires a protective environment, either in an infected bird or kept moist and not hot- poultry feces provide a good substance for the virus to survive in poultry
  - Avian Influenza is a fragile virus which is easily destroyed by common chemical.
  - AI can however be difficult to detect particularly in ducks where sub-clinical infection in ducks older than 5 months is occurring.
  - These are difficult to distinguish from several diseases including Newcastle disease, Infectious Bronchitis (IB).

HPAI can entry to poultry farm following many ways



Key risk factors of HPAI

High risk
- Live (infected) birds moving to a farm, or a market (sick or sub-clinically infected)
- Infected feces contaminating objects which move from an infected farm to another farm or market
- Dirty cages/baskets, egg boxes, motorbikes/vehicles
- Shoes of farmers, traders, vets!!!

Medium risk
- Exposure of birds to an environment contaminated by infected feces
- live bird markets, rice paddy fields, ponds

Low and very low risk
- Wild birds
- Rivers?
- Airborne transmission is only significant over very short distances (several metres)

Sourse:VSF-CICDA

Main reservoirs of HPAI virus :
- Adult commercial duck flocks
- Young ducks (increase seasonally)
- Markets and market chain (temporary)

HPAI virus - a disease of birds but spread by people!!!

Risk factor at the farm level

- Non – Vaccination HPAI virus
- Low bio-security standards
- Poor farm management (trader & visitor come in and out poultry farm)
- Different species kept on a single farm (chickens and ducks on the same premises)
- Purchase of new birds from market/ unknown health status flocks.

What is bio-security?

- Bio-security is all the measures that should be taken to prevent disease agents.
- Bio-security may not cost too much money, it is mainly good practices to use in your farm.
- Apply for backyard or small scale poultry production.

• If bio-security measures are not followed, we spend more time and more money to try and solve the disease when it does appear!!!

There are three principles for bio-security

1. Separation: Prevent contamination

2. Cleaning: Remove contamination

3. Disinfection: Kill any remaining disease agents

REMEMBER

- Avian Influenza- a disease of birds but spread by people!!!
- Prevention of diseases is always cheaper than Treatment.
- Prevention can be achieved by vaccination and by good bio-security and application of good production practices.
- A combination of risk reduction measures may be required
- Rapid identification/investigation and stamping out are required to control spread of disease when it has occurred.

Remember!!!
Prevention of diseases is always Cheaper than treatment!

Key points on good practice of production methods for poultry farmer

1. Purchasing & entering breeding poultry have to clear origin (The best way have a certifying quarantine) shouldn't purchase in live bird markets.
2. Changing clothes and shoes when entering or exiting raising areas.
3. Have " dirty areas" & "clean areas" when entering or exiting poultry.
4. Limited visitors.
5. Avoid birds and different animals such as: dog, cat, pig, mouse, different poultry… entering poultry farm.
6. Have fences surround raising area: have hold, tray/ gutter in front of gate, each area, separate raising areas.
7. Protect of food storage, safe drinking water
8. Do not use different tools in other areas, raising house, clean & disinfection tools
9. If poultry have the different ages, the farmer should go from chick /duckling to adult poultry and have boot, sandal for each area.
10. Vaccination as plan scheduled
11. Separate immediately the sick poultries
12. Raising & separating different poultry flock
13. "All in – all out" for coop, raising areas or poultry farm
14. Recording all activities and events occurred in the farm (industrial food, output egg, vaccine calendar, number and reason poultry die, entering new breeding, exiting poultry production …)

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