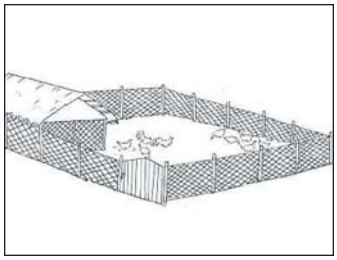
5 Taking action to enhance biosecurity all along the food chain

5.1. Secured primary production farming systems[14]

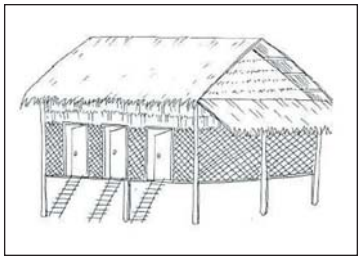
While there is a need to reinforce biosecurity measures in sectors 1 and 2 farms, priority must be given to sectors 3 and 4 farms and associated communities where humans live in close proximity to the animals being raised by them or other community members[15]. The key biosecurity measures recommended include the following:

- **Keep the wild birds away** – It is important to keep wild birds and ducks, natural reservoirs of the virus, off farms. Many species can be infected but will not show any signs of disease. They can excrete the virus for 30 days and contaminate feed, and shared water sources e.g. ponds. Therefore, poultry should be kept in a protected place[16]: a fenced park, under the house protected by a fishing net or better, a secured poultry pen. They must also have access to clean water and feed.

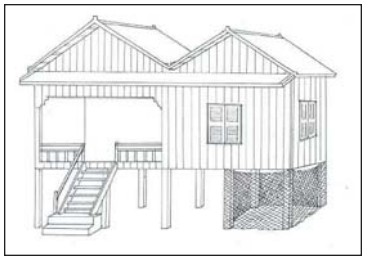
Ensure All-in, all-out i.e. ensuring that all birds from a shed / pen are sent to the abattoir or market. Workers should then clean and disinfect the premises / shed / pen effectively (no visible feathers or faeces remaining) before the arrival of a new flock. This practice would contribute immensely



Fenced park



Poultry pen



Poultry kept under the House, behind a fishing net

14 Let us stop the killer virus at source! - Preventive measures to stop the spread of Bird Flu (Draft), WHO/FAO/OIE November 2005. www.wpro.who.int/avian

15 FAO/OIE/WHO Consultation on avian influenza and human health: Risk reduction measures in producing, marketing and living with animals in Asia, Kuala Lumpur, Malaysia, 2005. http://www.wpro.who.int/health_topics/food_safety/

16 Prevention and control of avian flu in small scale poultry. A guide for veterinary paraprofessionals in Cambodia, FAO, 2005. http://www.fao.org/ag/againfo/subjects/documents/ai/AI-paravets-guide.pdf

in the containment of the avian flu. Unsold birds should not be returned to the farm, but be slaughtered and sold as processed meat.

- **Avoid multi-age poultry farms**[17] as partial sale of birds from commercial farms presents a greater biosecurity risk than the sale of the entire batch of birds as recommended under all-in, all-out production. This is primarily because birds remaining in the farm are exposed to catchers or other workers, who customarily move from farm to farm and can readily spread infection if H5N1 virus is circulating in the area.
- **Proper vaccination** of domestic poultry, which ensures that the vaccine matches the circulating strain of virus, is considered to be a useful tool as part of an overall integrated strategy for the control of H5N1. It must be implemented in accordance with existing standards and procedures for vaccination, including in backyard flocks in rural and urban settings. Poultry are usually vaccinated with a vaccine made from inactivated viruses which itself does not pose a food safety risk. Such procedures would ensure that no asymptomatic infected bird would enter the food chain. Therefore, where there are appropriate monitoring programmes in place, vaccinated poultry can enter the food chain without particular risk to the consumer.
- **Prevent** movement of poultry from one farm to another[18] as H5N1 infected birds, if any, on one farm may transmit the virus to flocks on the other farm.
- **Clean** and disinfect the premises and equipment on farms - Install a disinfectant pool at entrance to each poultry shed / pen and ensure vehicles entering the farm are not contaminated.
- **Limit** the access of visitors to areas where poultry are housed and provide clean protective clothes, including boots, to people visiting the farm. This is important as clothing and footwear are important means by which the virus can spread.
- **Obtain** feed from a clean, dependable source. Store feed properly so that it is bird-proof, insect-proof, and rodent-proof. Obtain water from a clean source and ensure it is free from contamination. Drinking water, if sourced from ponds or from a doubtful source, should be chlorinated.
- **Instruct** animal health workers to guard against spreading infection

[17] Poultry birds of different age are kept by farmers to spread their income and to avoid the financial risks associated with having all birds entering the market on the same date

[18] Costs and Benefits of regulatory Control in Wet Markets in Hong Kong , WHO (WPRO), Draft 02, 2004

accidentally from during their visits to other farms.

- **Exclude** poultry from the home; also prohibit farm workers from rearing their own poultry at home.
- **Effective management of hazardous wastes** - Proper disposal of carcasses and other hazardous waste (liquid and solid) needs to be enforced.

- All dead birds and other contaminated objects (for instance: faeces, blood, feathers) must be destroyed properly[19] as soon as possible throughout the day:
  - **Burying** - Dig a hole (far from the poultry sheds) put some quicklime at the bottom and on the borders of the hole; put all the birds and objects in the hole; cover with quicklime; cover with earth.
  - **Incineration,** if suitable incineration facility is available.

More detailed information on biosecurity measures for primary production farming systems in rural and/or urban settings to be found at http://www.fao.org/and http://www.oie.int/

5.2. Safe transport

- **Avoid transportation of people and live animals together, especially poultry, ensuring a separate enclosure for each.** This will reduce the risks of potential AI transmission directly as well as indirectly through faecal depositions.
- **Use only clean and disinfected transport vehicles** for movement of poultry and eggs. Do not reuse dirty vehicles, littered with faecal matter, without proper cleaning and disinfection, as the H5N1 virus can survive in organic faecal matter for several days. During vehicle cleaning and disinfection, the main areas to concentrate are wheels, wheel arches, chassis and underbody, if possible; the trailer / area where poultry are transported; cages; sheeting or other covers on the vehicle
- **Do not cage birds in excess** of the cage capacity. The H5N1 virus can spread by air if birds are kept closely together as well as from faecal matter, which may contaminate the bird's feathers, on account of less space. Preferably, cage capacity should not be less than 300 cm^2 per kg, with a height of not less than 30 cm[20].
- **Use waste trays** - If birds with cages are stacked on top of each other, use waste trays underneath the cages for collecting poultry droppings, which can then be safely disposed along with other hazardous waste by burying. The trays used should be of the same size as the cages.

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[19] Prevention and control of avian flu in small scale poultry, A guide for veterinary paraprofessionals in Cambodia, FAO, 2005. http://www.fao.org/ag/againfo/subjects/documents/ai/AI-paravets-guide.pdf

[20] Costs and Benefits of regulatory Control in Wet Markets in Hong Kong, WHO (WPRO), Draft 02, 2004

- **Avoid collecting and transporting birds from different farms or collection centres in the same vehicle** and avoid transportation of birds from one farm / collection centre to another or from the market back to the farm / collection center, as H5N1 infected birds from a farm or a market may transmit the virus to other healthy flocks.
- **Do not transport poultry with other birds and animals,** as this increases the likelihood that Avian Influenza viruses will enter other animal / bird populations, risking infection and reassortment with the other influenza viruses, leading to emergence of new strains of influenza viruses.
- **Give preference to non-wooden / bamboo cages:** Use cages made of materials like plastic or non-toxic metal that can be easily cleaned and disinfected.

5.3 Biosecurity in wet markets

- **Segregation of species** - When introducing poultry to the market, maintain the separation of species by keeping separate species in different cages.
- **Ensure all-in, all-out i.e.** bringing in and taking out a flock at one time. This would imply selling all birds on site. Avoid returning unsold birds to the farm, as they may be infected and may carry back the virus. Prior arrangements must be made for birds that are unsold.
- **Slaughtering zones** - Strictly ensure a separate area for poultry slaughtering, processing away from the selling area. This will improve biosecurity and reduce the likelihood that products or consumers in other areas get contaminated.
- **Processing equipment and work surfaces** - Use non-toxic, impervious and easily cleanable work surfaces (e.g. chopping boards, work tables). Avoid use of wooden surfaces, wooden knives as they cannot be cleaned.
- **Processing - Ensure proper scalding of poultry before de-feathering.** Use hot, potable water for scalding and change the scalding water frequently.
- **Customer orientation** - Do not allow or permit the customers to touch and inspect live poultry before purchase; **discourage selling live poultry to customers**.
- **Cold Chain facilities** - Though the virus survives low temperatures, adherence to the cold chain is vital from the food safety perspective. Ensure chillers and chilled display cabinets are used with back-up power supply.

Separate selling area observed in some wet markets *(WHO, 2006)*

- **Hygiene, sanitation and waste management**[21]:
  - **Compulsory rest days** – The live animal markets in many areas might be working seven days a week. Having compulsory rest days periodically would facilitate emptying, cleaning and disinfecting the entire market regularly. This would improve hygiene and prevent build up of pathogens and H5N1 virus load
  - **Hygienic cages** – Cages holding poultry should not be placed below cages with other birds, to prevent cross-contamination with faeces. If unavoidable, place waste trays under the cages. Ensure adequate ventilation and lower stacking crates so as to help reduce infection.

Use of plastic cages: easy to clean and wash *(WHO, 2006)*

  - **Cleaning facilities** – Set up a separate area to clean and disinfect cages. Cages should be made of material easy to clean and disinfect. Hand washing basins with soap and potable water should be provided where humans and birds come into contact.
  - **Clean and disinfect premises and equipment** – Following slaughtering operations, clean and disinfect premises (floors, walls, work tables, slabs, racks etc.) and equipment (knives, hooks, killing cones, de-featherer, scalder, chopping board etc.) frequently.

[21] Let us stop the killer virus at source! - Preventive measures to stop the spread of Bird Flu (Draft), WHO/FAO/OIE November 2005. As from March 2006, final version available at: www.wpro.who.int/avian

- **Drainage system** – Ensure drains are covered, sloped well and facilitate flow of effluent in a direction opposite to the process flow (e.g. blood and scalding water from slaughtering area should not flow towards the forward process flow areas like selling area).
- **Personal protective gear** – Ensure workers in slaughtering and selling operations wear clean, light coloured protected clothing, including clean aprons and rubber boots everyday and avoid using the same clothes and boots back home.
- **Personal hygiene** – Ensure the workers handle live poultry and engage in slaughter only after a thorough handwash with soap and potable water. Hands should be washed frequently with soap and potable water and particularly after change of processes. Following slaughter and processing, the workers should preferably take a bath at the market personnel facilities or change into clean clothes and shoes after washing hands, arms and feet thoroughly with soap and potable water and drying with clean towel / cloth.

- **Effective management of hazardous waste** – Proper disposal of carcasses, blood and other hazardous waste (liquid and solid) disposal needs to be enforced.

- All dead birds and other contaminated objects (for instance: blood, feathers) must be destroyed properly[22] as soon as possible during the day through proper burying or incineration, as mentioned earlier.

- **Disease detection**
  - **Monitoring** – Poultry in the market should be continuosly assessed for sickness. Collaborate to conduct regular surveillance, sampling and analysis along with market associations, local health authorities and veterinary authorities.
  - **Notification** – Report diseased or dead birds immediately to health and veterinary authorities. Appropriate action should then be taken by the authorities.
  - **Traceability** – Support efforts to ensure that the source of sick birds is traceable back along the production and marketing chain.

- **Food safety training and awareness**
  - Train the market community associations, market stall owners, workers and local health authorities

22 Prevention and control of avian flu in small scale poultry, A guide for veterinary paraprofessionals in Cambodia, FAO, 2005. http://www.fao.org/ag/againfo/subjects/documents/ai/AI-paravets-guide.pdf

in basic food safety aspects and measures to be taken for mitigating infection risks from Avian Influenza.

5.4 Consumption - Safety at Customers' and Consumers' end

- **Avoid buying live poultry/ birds and then slaughtering at home and/or in food service establishments.** Slaughtering, de-feathering and degutting poultry birds can be risky if infected.
  - Where available, buy processed, chilled and hygienically packed raw poultry meat from an established and reputed market place and preferably from an accredited Hazard Analysis Critical Control Point (HACCP) food safety systems certified company.

- **Keep Clean** – When preparing food, follow good hygiene practice. Clean and sanitize work surface, equipment and utensils and wash hands frequently.

- **Separate raw and cooked food items** – Separate raw from cooked meat and other cooked food items. Use separate equipment and utensils such as knives and chopping boards for raw foods.

- Cook thoroughly - To ensure the safety of cooked meat, its juices must run clear and no parts of the meat should be red or pink. Ensure thorough boiling / roasting / frying (**core temperature of food should be more than 70 C**) as this kills the virus and other pathogens too.
  - Eggs from infected birds can harbour the virus both outside and within the shell and should therefore be cooked well (with no "runny" yolks) before consumption. Raw eggs should not be used in foods that will not be further heat-treated as, for example by cooking or baking.

- **Do not prepare and consume speciality raw dishes** made from birds or poultry raw meat and blood.

- **Keep food at safe temperatures** – From the food safety perspective, eat cooked food immediately and do not leave cooked food at room temperature beyond 2 hours. Keep cooked food steaming hot (more than 60°C) prior to serving.