

# FINAL TECHNICAL REPORT / RAPPORT TECHNIQUE FINAL

## ANNEX 12C - UPDATED SMALL-SCALE POULTRY

### PRODUCTION MANUAL

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IDRC Grant / Subvention du CRDI: 107982-001-Scale Up of Homestead Food Production for Improved Nutrition in Cambodia (CIFSRR Phase 2)



# “Family Farms for the Future (FF4F)” Revised Small Scale Poultry Production Manual



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# **HKI's Enhanced Homestead Food Production Program in Cambodia Small Scale Poultry Production**

## **Why poultry rising is needed?**

Protein deficiency is one of the major problems for rural livelihoods. Beef, muttoms are becoming very expensive which is beyond purchase capacity of the poor people. In order to meet the protein deficiency household poultry production can play an important role for family nutrition, income and livelihood. Moreover, Eggs provide protein and micronutrient for children's growing bodies and contain vitamins for keeping young children healthy. Young children between 1-3 years of age need protein more than adults. Children that do not have enough protein and nutrients can suffer from physical and mental retardation. Consequently, they become weak and are easily affected by diseases. Eggs are expensive too and most of the rural poor household can't afford. So, by raising poultry with minimum care, household can increase egg production and consumption by family members especially children

## **What is the present status of poultry rising in Cambodia?**

Apart from rice cultivation, almost all the families in Cambodia raise chickens as additional livelihood. On average, each household 2-6 chicken, which 80% is scavenged with minimal care. There are less households raise more than 10 hens.

Presently, smallholder famers can earn relatively high income from their chicken raising, which enable them to ensure food security, to cover family expenses such as medication and children's education, etc. More important is egg production. Chicken can also improve the nutrition status of family, especially children and women through increasing the consumption of egg and meat, liver that are rich in micronutrients. In addition, poultry litter can use as fertilizer for growing vegetables. Normally, small-scale chicken rising needs less capital, labor and time.

## **What are the problems of chicken rising in Cambodia?**

Even though the market prices of local chicken are currently remarkably high, farmers are observed yet to extend their raising and trying to apply the standard techniques but existing practice is highly risky. Following are main problems for chicken rising:

- Limited access to get quality services the Village Animal Health Worker (VAHW).
- Lack of trained VAHW on poultry/chicken management
- Lack of access of poultry vaccines at the local level.
- Farmers don't know proper breed selection and improvement.
- A high rate of seasonal mortality is recorded, and some time all chickens are died.
- Household don't practice the integrated actions for chicken diseases prevention and treatment.
- Households don't provide quality feeds to chicken regularly, especially to chicks.
- Farmers don't construct proper chicken houses, which include pen for sleeping and hatching, chick pen and bio-security fence.
- Chicken theft in village has discouraged farmers from continuing with the business.

### **What are methods of chicken rising?**

Depending on the purpose of poultry production, there are mainly two methods of poultry rising, these are scavenging and confined in poultry case or house and mixed method which is combination of two. If household live in an urban or peri-urban setting, you probably want to keep the birds confined - with a fenced run outside their coop for fresh air and sunshine. If you want them to eat fresh grass and have room to roam, then scavenging method.

If you're interested in raising chickens for meat, not eggs, you'll need to do things a little bit differently. But in our FF4F project, we primarily focus to increase egg production. "Laying hen" is a common term for a female, grown chicken that is primarily for laying eggs. Some chickens are, while others are primarily for eggs, and some are dual-purpose. Raising laying hens is a different process than raising chickens for meat. Most laying hens will live 4-5 years, laying eggs nearly daily for about three of those years.

So, we encouraged our target group to follow mixed methods where they will have a poultry house with a fenced run outside their coop for fresh air and sunshine. If it is difficult considering resource availability, then we can follow scavenging methods but need to ensure supplementary feeding and better housing for increasing egg production.

### **What poultry breed we need to promote for FF4F?**

There are mainly two types of chicken breeds are raised in Cambodia such as local and hybrid Breed which are imported from other countries. Local breeds are commonly raised by Cambodian smallholder farmers, while hybrid breeds are raised on a big scale commercial production of meat and egg.

Local breeds are mostly raised by smallholder farmers since long time. Local breeds are small, slow growth performance and less egg productivity, but they are diseases and climate

resistance, suitable for small scale raising in rural area due self-incubation of their own eggs, ability for chicks' care, self-scavenging, good meat and always high market prices. There are many local breeds found in Cambodia such as Kork, Sampov, Prochul, Kandong, Che, Samlei, Kragnas, Khmao and Skuoy.

Hybrid breeds have special characteristics like high growth rate and lay more eggs, but less resistance to local climate and diseases, they also need high quality feed (which has to be provided every day). In term of production, they need good care and needs high cost inputs, and they have been raised on a big scale. So, considering the local practice of chicken raising, disease resistance and high market value, FF4F will promote local breeds. However, to increase the egg production in local breed, we need to ensure quality feeding to the local breed.

### **How can we make house for poultry birds?**

Housing is important to protect chickens from predators, thieves, rain, wind, and very hot or very cold weather. Attacks from dogs, cats, rats, owls, hawks and other predators may destroy even adult chickens. It is necessary to protect our chicken folk against the adverse weather, parasites and diseases. Good chicken houses may be built from wood, stone, concrete, adobe, brick, bamboo, and sheet metals. The following parameters need to be taken into account before construction of poultry house.

#### **Location**

Poultry house needs to:

- I. Protect against wind but permit some air movement.
- II. Prevent too much heat from the sun and
- III. Allow enough drainage to prevent wet floors.
- IV. Provide enough shade and roof overhang, especially in hot climates.

#### **Temperature Control**

Very hot or cold weather may create poor conditions in poultry houses. When the drinking water is too warm, the birds fail to drink. Frozen water creates special problems in cold weather.

#### **Ventilation**

Air movement within the house is important to prevent smothering. Chickens need more fresh air per unit of body weight than any other farm animal. Wide open sides or windows are important in hot climates. Air movement should not be blocked by bushes or other buildings.

#### **Moisture Control**

Chickens need a lot of water. Layers may need more than a liter each day in hot climates. Slatted or wired floors may be used to provide good drainage. Drinking excessive amounts of water may be a cause of wet droppings.

## Space

A crowded chicken is an unhappy, unproductive chicken that may peck other chickens so severely that they die. Putting too many birds in a small space is a waste of money.

In your chicken coop, plan for at least this much space

<b>Age (Weeks)</b>	<b>Number of Chickens</b>	<b>Space Needed</b>
Up to 6 weeks	15	1 sq. m/9 sq. ft.
Up to 16 weeks	5	1 sq. m/9 sq. ft.
17 weeks and up	3-4	1 sq. m/9 sq. ft.

Larger chickens, higher temperatures, very humid weather, or wet litter require more floor space.

## Roof

The roof should be entirely rainproof. Allow for adequate shade and light.

## Floor

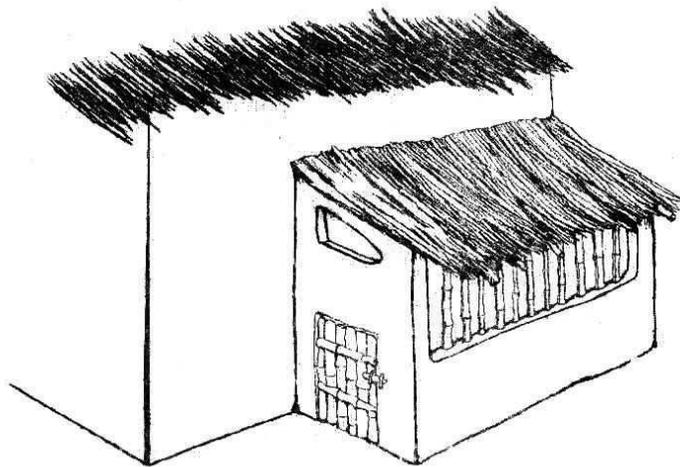
Most chicken house floors are dirt or heavy clay but concrete floors with wire mesh in them are ideal to keep rats out. Adequate drainage should be planned. Easy to clean out systems for manure need to be considered.

## Animal and Bird protection

At night, protection against thieves, dogs, cats, rats, weasels, owls and day-time protection against wild animals, hawks and eagles should be planned. Wire mesh is often used.

## Night Shelter

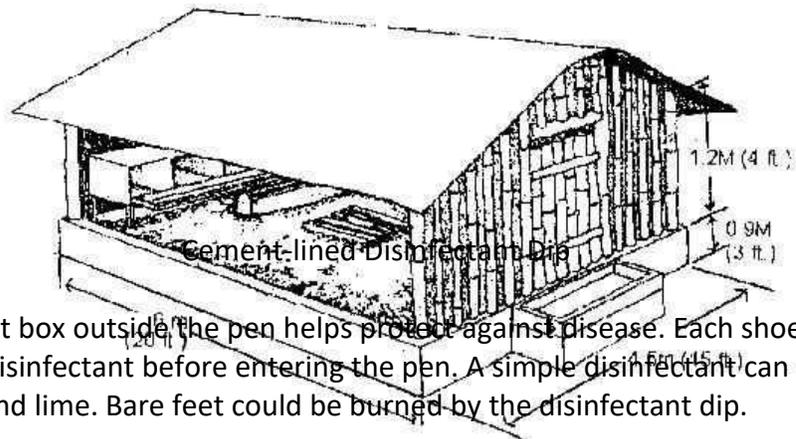
Night shelter for 20 adult chickens attached to family house or other building. Allow about 939 sq. cm (1 sq. ft.) per bird. Use deep litter or keep floor clean. In areas with heavy rains, allow generous roof overhang.



## What are the different housing systems for poultry birds?

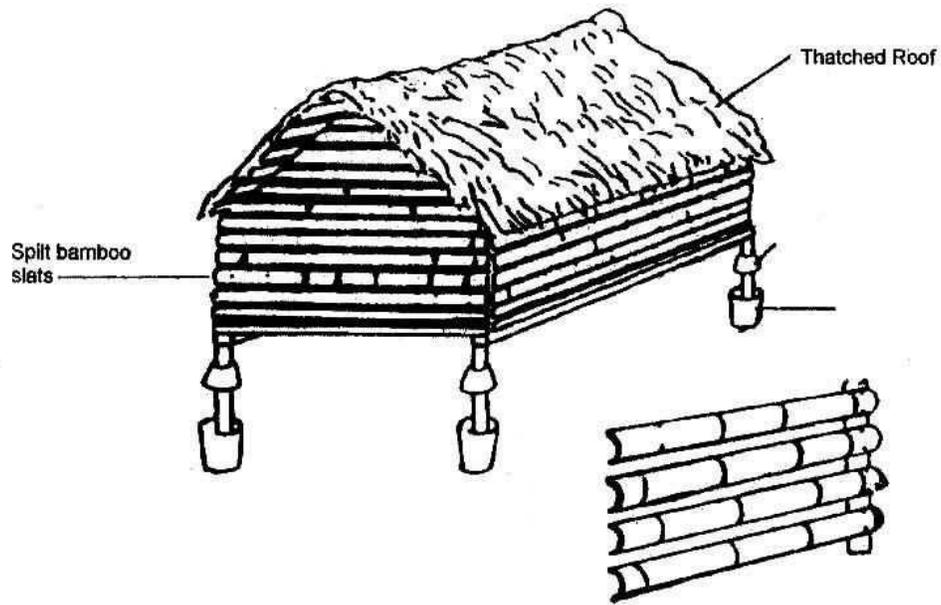
### 1. Deep Litter House

The deep-litter house should be built for warm climates. This house can hold 200 broilers or 100 layers.



The disinfectant box outside the pen helps protect against disease. Each shoe must be dipped in the disinfectant before entering the pen. A simple disinfectant can be made by mixing water and lime. Bare feet could be burned by the disinfectant dip.

### 2. Wood or Bamboo Cage House

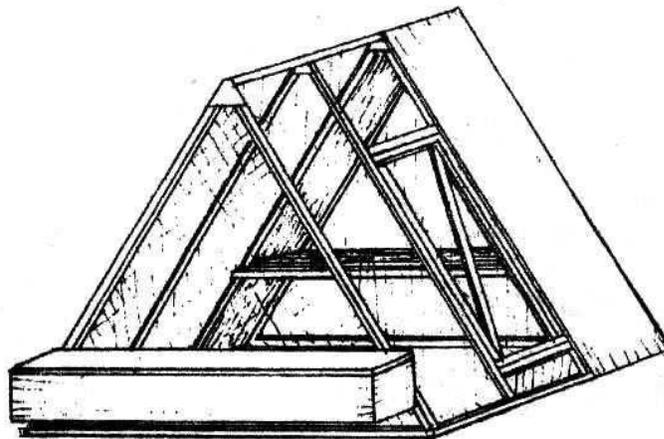


Bamboo caged house with a thatched roof. Note the barriers on the legs keep out rodents and snakes.

**What are the equipment's needed for poultry house?**

Movable Chicken Tiller

With the movable chicken tiller, you can move the chickens from one place to another so that



they can eat fresh green grass and fertilize the soil. As the birds scratch the soil with their feet, they naturally mix their fertilizer into the soil. The chickens are given food and water for a few weeks before the tiller is moved and another area is naturally fertilized.

**What is water requirement for chicken?**

Chickens need water every 15 to 20 minutes. Making certain way there is enough water for the chickens is one of the most important jobs of the caretaker. You will need enough space around the waterier for all the chickens to drink without being crowded.

Chickens of any age should never be left without clean, cool water!

Approximate Water Consumption for 100 Chickens

Age in Weeks	Daily Water	Space Needed (length)
0-1	2 liters 0.5 –1.0 gal	0.7 m 30 in.
2-4	8 liters 2.0-4.0 gals.	1.0 m 40 in.
4-9	15 liters 4.0-8.0 gals.	1.5 m 60 in.
9 -17	19 liters 5.0 gals.	2.0 m 80 in.
Above 17 weeks	36 liters 9.5 gals.	2.5 m 100 in.

Very important Note: In hot, dry climates, chickens may drink up to four times the above amounts of water. Watch the water level carefully. You may need to give more water to them more often. Never allow chickens to run out of clean water. Chickens need clean, cool, fresh drinking water at all times. A chick may be able to survive several days without feed but if they do not have water, they will die quickly. An adult chicken without water for a day in hot weather may also die. Birds drink a lot of water to cool the body in hot weather. “Flushing” may happen when hens go without water for short periods of time – they will then drink too much water and get diarrhea.

### **What nutrients are required for poultry birds?**

Energy is needed by chickens to move, eat, digest, grow, provide body heat and produce eggs. Good energy sources are corn, milo, wheat and soybeans. Grains that are good for people are good for chickens. Chopped root crops and bananas can also be given. Spoiled meat, onions and other strong flavored food may give a bad taste to the eggs and should not be fed to the birds. Potato peelings can be fed to chickens if they are cooked. Vegetable peelings and green tops of vegetables are also good.

To make egg shells strong, chickens also need calcium. Good sources of calcium are dried, crushed (make sure you dry and crush them) eggshells fed back to the birds and crushed oyster shells. You may also want to use commercial feed as part of your chicken’s diet. Commercial feed is already mixed and well balanced. As the chickens lay their eggs you can sell or trade eggs for commercial feed.

### **What are the feed for poultry farming?**

Good poultry feed contains all the elements including energy, proteins, water, vitamins & minerals. A balanced feed ensures good growth performance, good health and quality of

reproductive function of chickens, egg production Inadequate amount of these nutrients results in slowly growth of chicken, being weakness and sensitive to diseases and less egg production.

### Home Made Chicken Feed

4 can yellow corn or broken rice	1 can dry ipil-ipil leaf meal or Dry leaves of cassava/Moringa
1 ½ cans rice bran	1 tablespoon salt
1 can dry fish meal or 2 parts fresh fish or ground snails	1 handful powdered shell/ agricultural lime
1 can ground mug bean or soy bean seeds	

Note: Double the recommended amounts if ingredients are not in dry form. Use dried azolla or dried filter cake to replace part of the rice bran.

#### **A. Other Low - Cost Poultry Feeds**

- Bananas
- Fingerlings
- Snails
- Termites
- Fly maggots
- Azolla
- Filter cake\* (dried and good)
- Earthworms

\* Filter cake is the dark brown-black sediment after clarification and filtration during the manufacture of sugar.

Local premix preparation: Cassava root, rice bran and fish and sugar cane molasses.

### **What are the characteristics of a healthy bird?**

It is very important for the poultry owner to learn how to detect an unhealthy or sick bird, so the necessary steps can be taken to control infections. General behavioral and physical observations provide a good indication and the table below lists the main characteristics of healthy and unhealthy birds. Healthy birds may be able to fight against many diseases and infections by themselves whereas unhealthy birds will have significant difficulties in fighting diseases, and are also more likely to then pass the diseases on to other birds in the flock. It is also important to isolate unhealthy or sick birds from the healthy flock in order to ensure a minimum of infection within the flock and to reduce losses.

<b>Healthy birds</b>	<b>Unhealthy or Sick birds</b>
Alert and on guard	Tired and restless
Bright eyes and comb	Dull eyes and comb

Walk, run, stand, and scratch continuously - sit for short periods	Sit or lie down for prolonged periods
Eat and drink normally	Eat and drink less
Lay eggs normally	Lay less or stop laying eggs
Smooth and neat feathers	Ruffled and loose feathers
Soft compact droppings	Wet droppings with blood or worms, Diarrhea, sometimes smelly
Breathe quietly	Cough, sneeze and breathe noisily

The following are the list of simple rules for disease prevention. These can be combined with regular observations of the above symptoms.

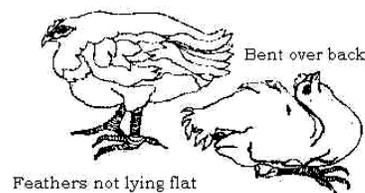
1. Give access to the right feed and clean water, in particular for small chicks
2. Build shelters against wind and rain
3. Clean houses regularly and apply lime wash on the floor and the walls
4. If necessary, provide dry litter regularly
5. Do not put too many birds together
6. Different species of poultry, for example hens, turkeys, pigeons, ducks and guinea fowls should be kept separate
7. Separate chicks from adult birds except from the mother hen
8. Vaccinate chicks against the most important diseases and revaccinate if necessary
9. Isolate and treat sick birds – if medication is not available then kill the sick birds Burn or bury killed birds

### What are symptoms of chicken diseases?

Chicken Diseases symptoms

You can tell a chicken is sick when:

- ✓ It does not eat.
- ✓ It keeps away from other chickens.
- ✓ It does not move around much.
- ✓ It has a bent-over back.
- ✓ It has ruffled feathers that do not lie down flat.



### What to do when diseases symptom is noticed?

Take the sick chicken away from the others. Put it in a cage by itself so that the others do not get the disease. Medicate if needed. Sometimes young chickens look sick, but are cold and need additional heat.

Ways to vaccinate chickens are different with each disease and type of vaccine. Always follow the veterinary drug store directions on how to store and administer. Destroy any unused vaccine. Some vaccinations and health control practices have to be repeated every three months. It is good to have someone help you hold the chickens as you give the vaccine. Follow advice by experienced poultry men.

### **How to prevent the diseases?**

1. Vaccinate for specific diseases. Check with local authorities for all vaccination recommendations and schedules.
2. Get chicks only from blood-tested Pullorum and Mycoplasma-free (Chronic Respiratory Disease) breeders.
3. Provide nutritionally balanced feeds complete with vitamins, minerals, amino acids, and energy to prevent diseases caused by poor nutrition.
4. Never introduce older birds into a young flock.
5. Prevent visitors (including neighbors), wild flying birds, rodents and especially other poultry men from entering your chicken coop.
6. Avoid visiting neighbor's flocks and returning to your own without a complete change of footwear and clothing.
7. Keep dirty crates, egg cartons, feed sacks and other contaminated items from poultry houses.
8. Establish and "All in, all out" rule – keep birds of one age together.
9. Practice sanitary clean-up and waiting period (2-weeks minimum) before introducing a new flock to used pens. Exposure to direct sunlight kills many germs.
10. Remove dead birds immediately and get rid of them by burning or deep burial.

### **What are the common diseases of poultry birds and how to cope with the diseases?**

#### **Heat Stroke Caused by Hot Weather**

Chickens do not perspire when it is hot – they pant and hold their wings out from their bodies. When the temperature is more than 37.8°C (100°F), chickens may die from heat stroke. Make sure chickens have plenty of shade and cool drinking water. Completely open all areas for air flow. Add extra waterier or buckets of water to reduce crowding. Spray with water especially if any deaths occur. Spray the ground or deep litter during the heat of the day.

#### **Newcastle Disease**

Signs of Newcastle Disease:

- ✓ Loss or drop in egg production in mild cases

- ✓ Bad egg shell quality
- ✓ Diarrhea
- ✓ Nervous signs such as twisted necks
- ✓ Difficult breathing
- ✓ Mortalities – varies depending on severity of infection

This disease cannot be cured; however, in mild cases, production returns after two or three weeks. If mortality is severe, it is necessary to kill all the chickens. After killing all the chickens, clean the chicken house and all the feeders, drinkers, nesting boxes and perches with a disinfectant. You can eat the chickens that did not look sick. After cleaning and disinfecting, new chickens that have been vaccinated for Newcastle Disease can be placed in the chicken house.

You can stop young chickens from getting Newcastle Disease by giving them vaccine. The vaccine must be kept in a refrigerator until you are ready to use it. As soon as it is out of the refrigerator it should be used quickly.

There are different types of vaccine to prevent young chickens from getting Newcastle Disease: eye drop, injection, putting the vaccine in the water. The veterinary drugstore should supply information about how and when to use the vaccine.

### **Coccidiosis**

This disease is common in chickens starting from a very young age.

If a chicken has Coccidiosis it may show the following:

- ✓ Diarrhea – may be bloody
- ✓ Listless, droopy and weak
- ✓ Not eating – off feed
- ✓ Appear cold - show ruffled feathers
- ✓ Mortalities

There are several drugs for treating Coccidiosis: Liquid Amprol used for 3 to 5 days at the treatment level and for 7 to 10 days at the prevention level; Sulfamethazine (Sulmet) or Sulfadimethazine (Albon) at the label's recommended level. Adding 2 teaspoons of sugar per liter of water may make it more palatable.

### **Fowl Pox Disease**

If a chicken has this disease, lumps grow on its head and inside its mouth. It is a very common disease and can easily come from other people's chickens. To get rid of Fowl Pox, paint the lumps or scales with Tincture of Iodine or First Aid Ointment every day until they go away. No treatment is effective for lumps inside the throat.

To prevent Fowl Pox, inject all your chickens with Fowl Pox vaccine when they are 8 weeks old. The vaccine package usually includes a needle or applicator for administering the vaccine.

### **Chronic Respiratory Disease:**

This disease is common when chickens are overcrowded or stressed from some other reason (chilled, moving, vaccine reaction, etc.).

When chickens have this disease:

- ✓ They show respiratory symptoms.
- ✓ They have wet noses.
- ✓ They have swollen or puffy eyes.
- ✓ They sneeze and cough.
- ✓ They become weak, listless, off-feed and have ruffled feathers.\

If your chickens get Chronic Respiratory Disease, improve the ventilation, reduce ammonia fumes, and provide fresh air. It may be necessary to increase the brooder or house temperature. Medicated water containing Terramycin or Sulmet is helpful.

### Parasitic diseases

#### ***External parasites***

Chicken is always infected from the external parasites when the environment of chicken rearing is not clean.

**Clinical symptoms:** Chicken shows the sign of having difficulties in sleeping, having decreased food intake, restlessness, injured from scratching or pecking due to inches, having decreased egg production, losing weight and anemia. The external parasites are lice, mites, fleas, etc.

#### **Treatment and prevention:**

- Use harsh tobacco or mosquito repellent spray in area suspected of external parasite presence.
- Use Iodine and Antibiotics for the treatment of wounded areas on chickens.
- Keep chicken site clean regularly.
- Use tobacco or lemon grass in the nests of brooders.
- Eliminating insects – chickens' sleeping ground should be kept clean every day and make a dust bath for chicken with ash 20% and sand 5%.

#### ***Internal parasites***

Households have never thought about internal parasitic diseases that can affect the growth of chicken. Internal parasites consist of round worms, Tenia (Tape worm), etc.

**Clinical symptoms:** Chicken infested with internal parasites is skinny, get diarrhea, has worms present in feces, swollen eyes and sensitive to infectious diseases.

#### **Treatment and prevention:**

- De-worm chickens with Levamisole: one sachet of 2 g for 5 kg of body weight in the feed.
- De-worm chickens with immature grains of Ipil Ipil or fruit of areca palm, crushing them and mix with feed or water.

- De-worm 1-month old chicken and re-deworm 1-2 months later.
- Apply regular sanitation.

### **Avian Influenza Disease**

Avian Influenza is a new disease which hit Cambodia in 2004. It is caused by a virus that not only infects domestic poultry and wild birds, but also transmits to and cause death in human.

#### ***Transmission***

- Direct contact between healthy chicken and infected one.
- Breathing, nasal mucus, discharge, feces and feathers.
- Contaminated materials and vehicles.
- Wild bird, etc.

#### ***Clinical symptoms***

- Many deaths of chickens
- Depression, drooping head, ruffling feathers, green diarrhea.
- Difficulties breathing, swollen head.
- Hemorrhagic on the leg and head, twisted legs.

***Treatment and prevention:*** There is no treatment for this disease.

- Burn or burry the sick or dead chickens.
- Do not sell the sick or dead chickens elsewhere.
- Use quarantine measure in the area hit by the diseases.
- Spray disinfectant (TH4) on the materials used and the site surrounding the pace where chickens are infected.
- Inform VAHWs, district vet and provincial vet or Department of Animal Health and Production.

#### **How eggs can be stored for long time?**

Eggs lose their quality rapidly in hot weather or if left in the sun. In hot weather, some farmers gather eggs 5 times a day and move them to cool storage. The best storage temperature for eggs is 4 to 13°C (40 to 50°F). If you do not have the use of a refrigerator, you may bury eggs in a clay pot in a shaded area. They may be placed on straw or a mat and covered with a damp cloth or straw. Soil around the pot should be moist but the eggs cannot be in water.

## **DUCK FARMING**

### **■ What are the advantages of duck farming?**

1. Ducks lay more egg per bird per year than chicken.
  2. The size of the duck egg is larger than hen egg by about 15 to 20 gms.
  3. Ducks require lesser attention and thrive well in scavenging conditions.
  4. Ducks supplements their feed by foraging. They eat fallen grains in paddy fields,
  5. insects, snails, earthworms, small fishes and other aquatic materials
  6. From commercial point of view, ducks have a longer profitable life. They lay well even in second year.
1. Ducks do not require any elaborate houses like chicken
  2. Ducks are quite hardy, more easily brooded and more resistant to common avian diseases
  3. Marshy river side, wet land and barren moors upon which chicken or no other type of stock will flourish, are excellent quarters for duck farming.
  4. Ducks lay 95 – 98% of their eggs in the morning before 9.00 AM. Thus saving lot of time and labor.

### ■ What are the breeds of duck?

Among the egg laying breeds, Khaki Campbell is the best producer. Individual egg production of almost an egg a day in this breed for well over twelve months has been recorded and flock averages in excess of 300 eggs per duck per year are not uncommon. Khaki Campbell ducks weigh about 2 to 2.2 Kgs, and drakes 2.2 to 2.4 Kgs. Egg size varies from 65 to 75 gms.

White Pekin is the most popular duck in the world known for table purpose. It is fast growing and has low feed consumption with fine quality of meat. It attains about 2.2 to 2.5 Kgs of body weight in 42 days of age, with a feed conversion ratio of 1:2.3 to 2.7 Kgs.

### ■ How incubation is made?

The incubation period of Khaki Campbell duck is 28 days. In forced draft incubators satisfactory results are attained at a temperature of 37.5 to 37.2o C (99.5 to 99o F). The wet-bulb reading on the thermometer should be 30 to 31oC (86 to 88oF) during incubation for the first 25 days and 32.7 to 33.8oC (90 to 92oF) for the last three days of hatching. Eggs are sprinkled with lukewarm water having sanitizer once a day from 2nd day to 25th day and cooled for a maximum period of half an hour. Candling is done on 7th day. The eggs are turned hourly. Eggs are transferred to hatcher on 25thday.

### ■ How can we make house for duck?

Ducks do not require elaborate houses. The house should be well ventilated, dry and rat proof. The roof may be of shed type, gable or half round. It may have solid or wire floors. The wire floors are not popular with breeders.

Under semi-intensive system the house should have easy access to outside run as the ducks prefer to be outdoors during the day time and even during winter or rains. The run should gently slope away from the houses to provide drainage. Normally a continuous water channel deep is

constructed at the far end, on both sides, parallel to the night shelter, in the rearing or layer house.

### ■ What are the feeds of duck?

Besides the limited amount of supplementary feed, the duck will consume frog, tadpole, mosquito and dragon fly larvae, and aquatic weeds which are generally not eaten by commonly stocked fish. With simplified semi-intensive rearing of ducks in ponds at relatively low densities, the protein content of supplementary feed can be lowered from the 18–19% digestible protein (required if raised in crowded pens) to about 11–13%. Pond water also helps to reduce heat stress which enables the ducks to keep up their feed intake.

For semi-intensive duck farming systems, the following mixed feed for grower and layer ducks are found suitable.

Ingredients	Grower feed (%)	Layer feed (%)
Crushed wheat	35.0	25.0
Wheat bran	25.0	25.0
Rice polish	13.75	25.0
Oil cake	16.0	12.0
Fish meal	8.0	8.0
Oyster shell	2.0	4.75
Feed/day/duck		125–130 g

However, in fish-cum-duck rearing system where the ducks gather some of their food from the pond, simpler and cheaper duck feed can be used, as follows

Wheat bran	60 %
Rice polish (not rice bran)	30 %
Oil cake	10 %

Giving 50–100 g crushed fresh snail daily is highly recommended. Duck weed (*Lemna minor*) is also preferred by ducks. Daily 125–130 g supplementary feed per duck seems sufficient for the adult layers when they have enough natural feed in the pond.

Ducks prefer wet mash due to the difficulties in swallowing dry mash. Initially the duckling should be fed 4–5 times a day. Later it can be decreased until twice a day. For adults 10cm feeder length can be used for each duck. If feeding on the pond is not possible then drinkers should be placed next to the feeders. Feeders and drinkers should be cleaned every day and dried to prevent from contamination. In daily feeding, it is better to feed the ducks by the same person.

## ■ How diseases occur?

Diseases occur through:

1. Wet litter.
2. Feed and water.
3. Close contact.
4. Contaminated equipment.
5. Attendants and visitors.
6. Air.
7. External parasites.
8. Free moving birds
9. Rodents and flies

## ■ What are the General Principles for Prevention of Diseases of Duck?

1. Procure day old ducklings from disease free flock.
2. Maintain proper hygienic conditions.
3. Provide adequate feed, water and floor space etc.
4. Rodents and wild birds etc should be prevented to enter the houses.
5. Follow regular vaccination schedule.
6. Proper disposal of dead birds.
7. Footbaths should be provided at the entrance of each shed.
8. Reduce stress effect.
9. Ensure clean and adequate water supply.
10. Use of suitable litter material and periodical turning is essential to keep it dry.

## ■ What can be done at the time of an outbreak?

1. Restrict the movement of ducks ( selling and buying)
2. Follow strict hygienic measures
3. Take help of veterinarians

How vaccination schedule can be made?

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<b>Vaccine</b>	<b>Route</b>	<b>Dose</b>	<b>Age Of Ducks</b>
1. Duck Cholera (Pasteurellosis)		1 ml.	3-4 weeks
		2 ml.	After 1 month of last Vaccination
2. Duck Plague		1 ml.	8-12 weeks.

## ■ What to do and what not in vaccination?

1. Obtain the vaccine only from the reputed manufacturer.
2. Store the vaccine in refrigeration till use.

3. Administer only proper dose as recommended by the manufacturer.
4. Vaccine should be used within 3-4 hours after dilution.
5. Don't use the vaccine after expiry date.
6. At the time of vaccination, use only sterilized syringes and needles.
7. Vaccinate the birds during cooler parts of the day.

## ■ What are the important diseases of duck?

### **DUCK PLAGUE:**

Adult birds are mostly affected by virus disease. It is characterized by vascular damage with tissue haemorrhages and free blood in body cavities. The lumina of intestine and gizzard are filled with blood. There is no treatment for the disease. The birds can be protected by Duck Plague Vaccine, which is given at the age of 8-12 weeks.

**Prevention:** By Vaccination.

**Treatment:** No treatment for viral diseases, prevent secondary infection.

### **DUCK VIRAL HEPATITIS**

It mainly affects ducklings of 2 to 3 weeks of age. It is characterized by an acute course and primarily hepatitis. There is no treatment for the disease. The breeding stock can be immunized. The day old ducklings can be protected with attenuated virus vaccine.

### **DUCK CHOLERA**

It is an infectious disease, caused by bacterial organism *Pasteurella multocoda* in ducks over four weeks of age. There is loss of appetite, high body temperature, thirst, diarrhea and sudden death. Most common lesions are pericarditis, arthritis and hemorrhages under the skin (Pink skin), in visceral organs, over the serous surface and intestine (Haemorrhagic enteritis). Liver and spleen are enlarged. The diseases can be controlled by sulpha drugs. Vaccinate the birds with duck cholera vaccine, first at the age of 4 weeks and again at 18 weeks.

**Prevention:** By Vaccination.

### **BOTULISM**

Food poison is a serious problem in both young and adult ducks. It is caused by ingestion of bacterium that grows on decaying plants.

**Prevention:** Avoid ducks scavenging on decaying plant material.

**Treatment:** Epsom salt in drinking water which acts as purgative

### **PARASITES**

Ducks are resistant to internal parasites. The infestation is prevalent only among those ducks which have access to stagnant water, over-crowded ponds and small streams. The parasites include flukes, tape worms and round worms. These causes decrease of nutrient assimilation by the bird and anaemia due to toxic material excreted by them, destroying the red cells.

The external parasites are an infliction rather than an ailment. These include lice mites, fleas and ticks. These cause irritation and annoyance leading to loss in egg production. They also transmit many diseases producing organisms. However, these are not commonly found on water-fowls as in chicken.

### **AFLATOXICOSIS**

Ducks are very susceptible to aflatoxin content in the feed. Aflatoxin produces liver lesions and results in death when present in high concentration.

There is no specific treatment for aflatoxicosis. When the source of aflatoxin is removed from the feed, birds make rapid recovery.