Training Manual:
The Basics of Financing Agriculture

Module 4.5 | Livestock Analysis: Poultry

Acknowledgement

The Agriculture Finance Training Manual is part of AgriFin's Agriculture Finance Training Tools. The Manual was developed by IPC - Internationale Projekt Consult GmbH as part of AgriFin's technical advisory project for Cameroon Cooperative Credit Union League (CamCCUL).

Terms of Use

Session Overview

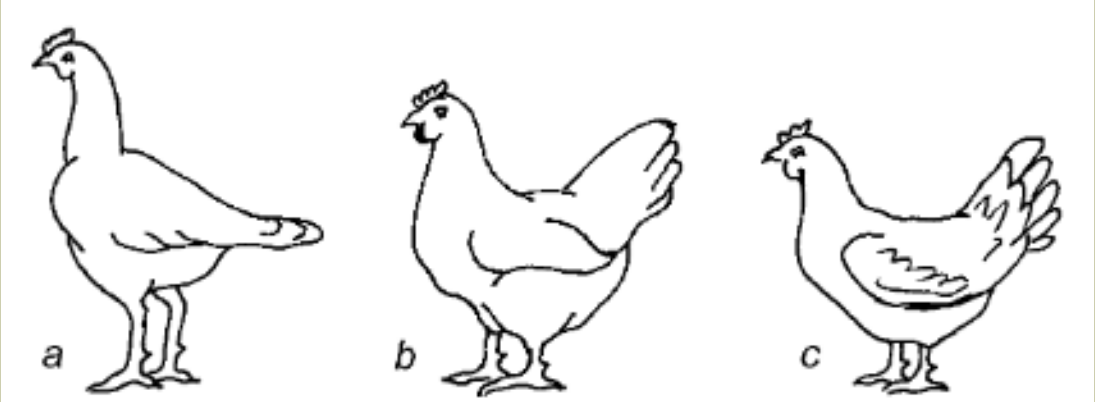
LEARNING OBJECTIVE	**An overview of the production process for poultry will help ALOs analyze and advise a farmer's loan application more effectively. Based on the principles discussed in 'Analyzing Livestock Production', this session provides a basic understanding of the agronomics and management techniques for Poultry.**
SCOPE	By the end of this presentation, the trainee have a basic understanding of the following areas: • Understanding poultry in the context of poultry farming • The different varieties of poultry and how each breed should be managed • The needs of poultry in terms of feed, housing, and safety against diseases • Assessing poultry farmers for loan sanctions
TARGET	Agriculture loan officers, trainers, agriculture experts with limited financial analysis training, and other professionals interested in agriculture financing
DURATION	3 hour

Contents

1. Poultry: Breeds

Scientific poultry name: Gallus domesticus

- egg laying, mainly with lightweight laying breeds or layers
- meat production, mainly by heavyweight breeds or broilers
- both egg-laying and meat production by so-called dual-purpose breeds



1a. Poultry: Breeds

Typical Breeds

1. Layer
2. Broiler
3. Dual Purpose

Other divisions

1. Leghorn: white feathers & white eggs: good potential genetics, low need for feed. Small size but nervous. Resist to heat but poor value after retirement
2. Red feathers & brown eggs: bigger and calmer. Consumption (feed) more important. Better value when retired
3. Black feathers & brown eggs: hardier (more resistant), bigger, production capacity ok. Good species, but difficulties reproducing

NB: Most are hybrids (interbreeding)

2. Poultry: Performance – Layer (Red feather)

Layers	Optimal performance	Typical performance	Remarks
Layer peak	25-35 weeks	24-40 weeks	Consistent
Weight to start laying	1550g @18 weeks	1400g/16w – 1550/18w	Avoid earlier laying
Adult weight	1900g	1750-1900g	
Consumption 0-18 w	6.3 – 6.8kg	5.6 – 6.2kg	
Laying consumption	110g/d to 120g/d 20°C	100g/d to 114g/d (from 35°C to 25°C)	Energy needs decrease by about 3.1 kcal/°C/d
Water consumption	20°C: ≈1.7 x feed; 25°C: ≈2.4 x feed 30°C: ≈3.1 x feed; 35°C: ≈4.2 x feed;		
No. of eggs @ 72 w	310 (19.4 kg)	280 – 300 (17 – 18kg)	
Average egg weight	62 g	58 – 60g	

2a. Poultry: Performance – Broiler

Broilers	Optimal performance	Typical performance	Remarks
Average DOC weight	40-45g	38-45g	
Average weight @35d Average weight @42d Average weight @49d	1.6 kg 2.1 kg 2.5kg	1.3-1.5kg 1.6-1.9kg 2.0-2.3kg	A delay growth more than 300-400g @ 42 d is not normal
Mortality rate	3.5%	5-8%	Apart from exceptional mortality (heat peak…)
Cumulated consumption	3.7kg	3,1-3,4kg	
Daily consumption	60g@14d 115g@28d 160g@42d	55g@14d 100-105g@28d 130-150@42d	
Water consumption	20°C: ≈1.8 x feed; 25°C: ≈2.1 x feed 30°C: ≈2.8 x feed; 35°C: ≈4.5 x feed		

2b. Poultry: Performance

The information applies to both broilers and layers:

1. Water: Crucial: in quantity and of quality. It is undesirable to restrict any bird's water intake, particularly in the tropics. Even a 10% restriction in the amount of water available can impede the growth rate and feed conversion efficiency (amount of feed needed per kg growth) of broilers. With layers, the effect is even more devastating. Short periods of deprivation can result in moulting and the cessation of egg production
2. Energy requirements: birds eat to satisfy their energy requirements. Thus, increasing the concentration of energy in the diet will result in a decrease in intake, and vice versa, as long as intake is not limited by problems of bulk, texture, inaccessibility or palatability. Levels of nutrients in a diet are therefore often stated in terms of energy content. Recommended energy levels in poultry diets are about 2,800 kcal/kg for layers and about 3,000 kcal/kg for broilers

2b. Poultry: Performance (contd.)

1. Protein requirement: 10 amino acids are essential. A shortage of those amino acids (especially lysine and methionine for eggs production) will limit production. It can be useful to add crude protein to the chickens' diet.
2. Vitamin requirements: Vitamins play a role in the enzyme systems and natural resistance of poultry
3. Mineral requirements: especially calcium and phosphorus (for bones)
4. Other ingredients: coccidiostat can be added to broiler diet as a prophylactic measure.

2c. Poultry: Performance – Case

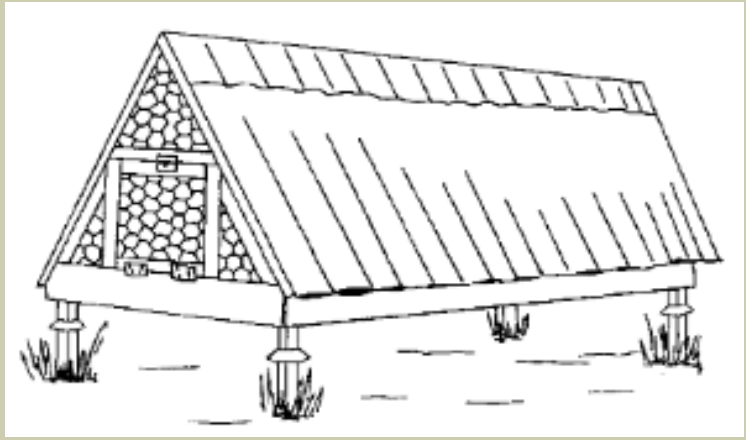
- **Exercise:**
- If a farmer has 200 broilers, sells them at 45 days, a 50kg bag of feed costs XFA 17,000, how much will he spend on feed?
- What if he wanted to keep his broilers 3 weeks?

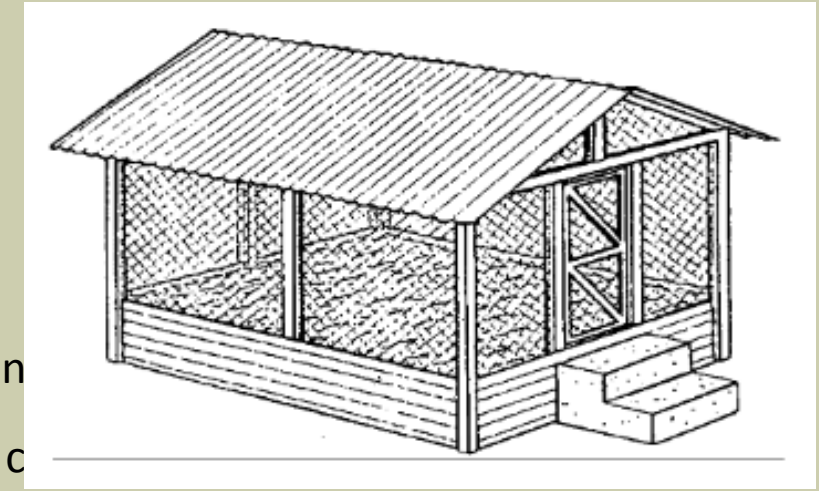
3. Poultry: Feeding

1. Production depends completely on quality and available feed
2. 70-80% of production costs
3. Chicken needs:
    - Energy (need related to climate) and protein
    - Minerals: Ca, P and also trace elements (Na, K, Cl, etc.)
    - Vitamins, choline, etc.
    - The minimum law (especially for layers!)
    - Depend on the temperature
    - Before laying period, diet can be enriched with Ca & P to achieve requirements for laying
    - Additives: can be used as preventive drugs. But should be withdrawn from feed some days before human consumption (and this is why they are not advisable for layer production)
    - Water: quality and quantity (clean & fresh water always available)

4. Poultry: Housing

1. Extensive farming
2. Intensive farming
3. Semi-extensive farming
4. Free-range chickens
5. Small scale housing
6. Some housing options





•Upper figure: a simple (mobile) chicken

•Lower figure: a deep litter house with c

4a. Poultry: Housing

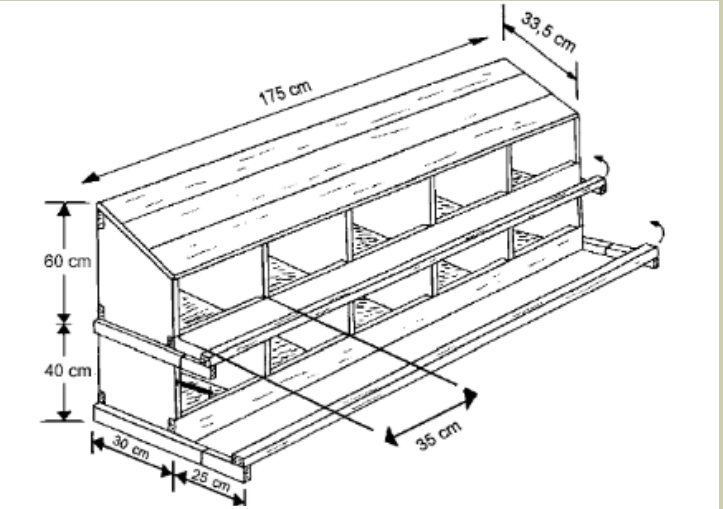
- When chickens are free to roam and scavenge, we talk about **extensive**, free-range chicken farms. The level of capital and labor investment is low. Housing is less important.
- **Intensive** systems, developed for specialized breeds, are estimated to be in use for about 30% of the poultry population in Africa. These are mainly found in and around urban areas with good markets for eggs and chicken meat. Intensive chicken farms require more investment in both capital and labor, e.g. special poultry houses with runs or roaming space. Flock sizes in intensive production are normally in the thousands. This has been made possible by research developments in artificial incubation, nutritional requirements and disease control.
- In the **semi-intensive** production system, also known as backyard production, flocks range from 50 to 200 birds. A lot of techniques and expertise developed in intensive systems can be applied in semi intensive poultry raising systems, adapted to be adequate for the scale.
- In both semi-intensive and intensive production systems, housing is very important for optimal production levels.

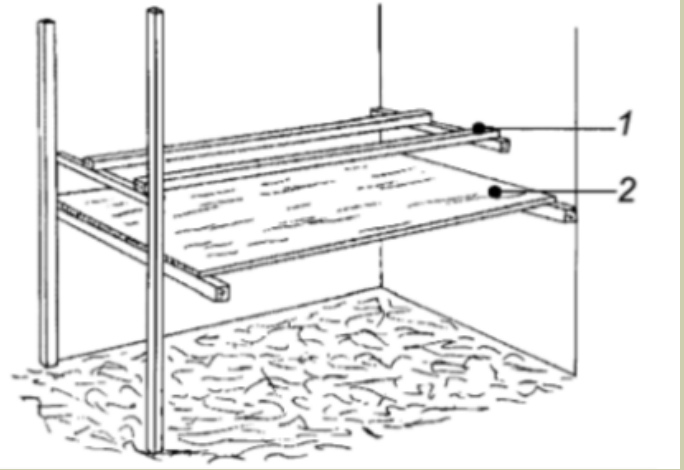
4b. Poultry: Housing

1. Field
   - Flat, non-floodable, no nuisance (e.g. noise)
   - Clean location and if possible vegetation
   - Away from other animals (500m)
2. Location
   - Isolated (from thieves, predators, other animals)
   - Quality water
   - Easy access
   - If possible: electricity (night light, electric ventilation, etc.)
3. Orientation
   - Perpendicular to main wind to benefit from maximum aeration
   - Minimize sun intensity
4. Organization
   - Manure storage away from poultry buildings

4c. Poultry: Housing Equipment

1. Feeders
   - Long feeder
   - Round feeder
2. Drinkers
   - Long drinker
   - Round drinker
3. Perches
4. Laying nests
   - Communal laying nests
   - Individual laying nests
   - Floor eggs
   - Lighting





4d. Poultry: Housing Equipment

1. **Feeders**: feed lost if scattered on the floor: this is why feeders are necessary. Each layer needs at least 12 cm of space along one site of a dish of a long feeder, broilers 5 cm. If a round feeder: layers need 5 cm and broilers 2 cm. To avoid waste: feeder should not be filled more than 1/3. To reduce the amount of feed wasted, only put small amounts at a time in each feeder, and feed several times a day. This can also increase feed intake, which is often not optimal in warm climates. Place a rotating stick above the feeder to prevent the birds from sitting in the feeder and dirtying the feed (if a farmer does not have such equipment, it is possible that he is less experienced than he claims).
2. **Drinkers**: long drinker: broilers and layers need: 2 cm; round drinkers: broilers and layers need: 1 cm. Water must always be available. Drinkers need to be placed at several places in the poultry house but should not be further apart than 3 to 5 m.
3. **Perches**: see downer figure (perch (1) with dropping board (2). Usually made of wood. Chickens like to spend the night on high perches. Perches are small

4e. Poultry: Housing Equipment

sats 5 cm wide and 35 cm long, usually made of wood. It is best to place them about5-7 cm apart. Each chicken needs approximately 15 cm (or more) of sitting space, depending on its size. In cages with wooden slats, perches are not necessary. However, they should be installed if the floor is made of chicken wire, to enable the chickens to spread out evenly over the wire floor.

4. **Laying nests**: hens usually prefer to lay eggs in protected nests, rather than simply on the floor of the house. See upper figure for grouped individual laying nests. Floor eggs are often a big problem in litter housing and housing with slatted or wire floors. Those eggs are usually dirty and require extra work. During the first weeks of the laying period, the percentage of floor eggs will reach a maximum of 5-10%, after which it should quickly decrease to 1 or 2% at the most. There are measures to limit floor eggs (at least one laying nest for 5 layers, keep nests dark, etc.).
5. **Lighting**: There are two ways to try to raise the production of chickens by using artificial lighting. 1/ If the housing is lit in the cooler hours before sunrise or after sunset, the chickens are able to eat more. 2/ If the day length is increased by using artificial lighting, laying hens are encouraged to lay eggs.

4f. Poultry: Housing

4g. Poultry: Housing

5. Poultry: Material Norms

	Chicken start (DOC)	Chicken growth	Chicken end	Chicken female	Laying chicken
Density (birds/m²)	30	25 to 10 (no more than 20–25 kg/m²)	10	8-10 (@1month)	5-8
Water trough Automatic water trough	1/50 DOC 1/70	1/50 1/70	1/50 1/70	1/50 1/70	1/30 1/50
Feeding trough	2 plates / 100 DOC	5cm access/bird	5cm access/bird	5cm access/bird	10cm access/bird
Light duration	Maximal (light at night if possible to facilitate feeding)			Day light then 13h @18w then +30/w up to 16h @ 24w	16h
Min temperature (with brooder)	0-3d: 36°C 4-7d: 34°C	8-14d: 32°C 15-21d: 28°C		Same as DOC	
Min temperature (living area)	0-3d: 29°C 4-7d: 27°C	8-14d: 26°C 15-21d: 25°C 22-28d: 25-21°C	17-19°C	Same as DOC	

5a. Poultry: Material Norms

5b. Poultry: Material Norms

6. Poultry: Diseases and Prevention

1. Infectious diseases: many possible causes:
   - worms (*heterakis, ascaris*, taenia, coccidiose),
   - bacteria (salmonellose, colibacillose),
   - viruses (newcastle, gumboro, marek…)
   - Fungi (*aspergillosis*…)
2. Keep chicken houses dry and clean (clean drinkers as well, etc.)
3. Do not let chickens have contact with their droppings
4. Footbath (renew at least once a week)
5. Clean everything after each batch (disinfect)
6. Crawlspace + allow time to dry

6a. Poultry: Diseases and Prevention

Health principles:

- For good productivity and profitability, farmers should keep their chickens as healthy as possible. Sick chickens do not produce, and profits will be lost if farmers have to buy medicines or if his chickens die. Prevention is better than cure, so farmers must try to provide good housing, nutrition and health care for their chickens, and inspect them daily for any abnormalities and disease symptoms. Some diseases can spread rapidly through a poultry flock so sick-looking birds should be housed separately and given extra care. Farmer must contact veterinary or extension agent for information about common poultry diseases in his area and the availability of chicken vaccines.
- A healthy chicken is active, has bright eyes and scavenges for food. Unhealthy or sick birds are often less active, with dull eyes and ruffled feathers. Sometimes you may observe abnormal breathing (coughing, swollen eyes), abnormal digestion (watery or bloody diarrhea, dirty feathers) or locomotion disorders (paralysis/limping)… ALO must pay attention to the poultry farm he visits and when seeing (what he think are) abnormal signs he must discuss them with the farmer.
- Apart from some worms, most causes are not visible to the naked eye.

6b. Poultry: Diseases and Prevention

Disease prevention

Diseases in chicken can often be prevented by:

- providing clean water, good food, housing and care
- applying hygiene and biosecurity measures
- vaccinating against viral diseases present in the area

Disease treatment

Farmers must be in regular contact with a vet that can help them to get the right diagnosis on time. Viral diseases cannot be cured with any medicines. For bacterial and parasitic diseases, there are medicines such as antibiotics, coccidiostats, deworming drugs, herbs etc. Ectoparasites can be treated by applying oil, kerosene or pesticides. The right diagnosis is important, so farmer can choose the right treatment. When chickens are treated with medicines, residues of the drugs can be present in meat and/or eggs for some time. These products must not be consumed!

6c. Poultry: Diseases and Prevention

Age	Disease	Product or vaccine	Administration
1 day	Newcastle Newcastle	Inactivated oily vaccine Hitchner B1	Injection Beak soak
2 to 4 d	Infection prevention	Colistine + vitamins	In drinking water
Between 10 & 12 d	Gumboro	Living vaccine	Eye drops or in drinking water
2 days after		Vitamin complex	In drinking water
Between 18 & 21 d	Gumboro	Living vaccine	In drinking water
2 days after		Vitamins complex	In drinking water

6d. Poultry: Diseases and Prevention

Age	Disease	Product or vaccine	Administration
1 day	Newcastle Newcastle	Inactivated oily vaccine Hitchner B1	Injection Beak soak
2 to 4 d	Infection prevention	Colistine + vitamins	Beverage (water)
7 d	Rappel Marek (if risky area)	Vaccine	Injection
Between 10 & 12 d	Gumboro	Living vaccine	Injection
2 to 3 days after		Vitamin complex	In drinking water
14 days	Gumboro	Living vaccine	Eye drops or in water
Between 22 & 25 d	Gumboro	Living vaccine	In the water
2 to 3 days after		Vitamin complex	In the water
35 d	Newcastle	La sota or Clone 30	Eye drops or in water
2 to 3 days after		Vitamin complex	
Between 5 & 7 w	Feather eating	Beak trimming	
42 d	Round Worm	Piperazine or Levamisole	

6e. Poultry: Diseases and Prevention

Age	Disease	Product or vaccine	Administration
8 weeks	Newcastle Smallpox	Inactivated oily vaccine Living vaccine	Injection Wing transfixion
2 to 3 d		Complex vitamin	In drinking water
70 d	Round Worm	Piperazine or Levamisole	In drinking water
2 to 3 days after		Vitamin complex	In drinking water
18 w	Round Worm Newcastle	Piperazine or Levamisole Inactivated oily vaccine	In drinking water Injection
2 to 3 days after		Vitamin complex	In drinking water

6f. Poultry: Diseases and Prevention

Causal Agent	Example
Infectious	
Virus	Newcastle Disease, Avian Encephalomyelitis,
	Fowl Pox, Marek's Disease, Infectious Bronchitis
	Infectious Laryngotracheitis, Gumboro Disease (Infectious Bursal Disease), Duck Virus Hepatitis
Mycoplasma	Chronic Respiratory Disease
Bacteria	Fowl Cholera, Salmonellosis, Pullorum, Fowl Typhoid, Infectious Sinusitis, Colibacilosis
Parasites	Ectoparasites: lice, mites, ticks
	Endoparasites: nematodes, Histomoniasis, Haemoparasites, round worms, hair worms, Avian Malaria
	Protozoa: Coccidiosis, Blackhead
Fungus	Aspergillosis: A. flavis (toxins), A. fumigatus (airsaculitis)
Non-Infectious	
Deficiencies	rickets, curled toe paralysis, encephalomalacia
Toxicities	salt poisoning, food poisoning (Botulism Clostridium botulinum and C. perfringens), poisonous plants

7. Poultry: Conduct

Broiler Conduct

1. Building preparation
2. Reception, check and sort birds
3. Start in a heated area (DOCs can suffer from cold even in tropical area)
4. Daily check: trough (well working and clean)
5. Keep records (weekly weight on a sample of 100 birds, occurrences)
6. Bird sales
7. Cleaning + disinfection, keep buildings empty

NB: Hatching: essential in the VC (quality & availability) and can be a bottleneck (especially before Christmas)

7a. Poultry: Conduct

Layer Conduct

1. Same as broiler, plus:
2. weekly weight on a sample of 100 birds at a fixed time
3. Sort sick and weak birds
4. Beak trimming
5. Follow lighting programmes
6. Keep records (feed quantity, egg produced → allows quicker recognition of problems and allows birds to be retired at the optimal time)
7. Retire unproductive birds

8. P&L: Layer without amortization

Example of a profit & loss calculation for layer production			
	Quantity	**Cost/unit XFA**	**Cost XFA**
Expenses			
DOC	1,000	550	550,000
Start feed	4kg/DOC, 1,000 DOC	180	720,000
Female chicken feed	6kg/bird, 950 birds	150	855,000
Layer feed	45kg/bird, 900 birds	170	6,885,000
Litter	Fixed price		10,000
Vaccines/drugs	Total		337,000
Alveolus	9,000	50	450,000
Others (water, electricity)	Fixed price		400,000
TOTAL EXPENSES			10,207,500
Sales			
Total eggs	270 eggs/chicken	45	11,542,500
Reform sales	900	1,500	1,350,000
TOTAL SALES			12,892,500
Gross profit	(without amortisation)		2,685,000
	Per bird		2,826
	Per egg		10.5

9. Traditional Chicken Production

1. Characteristics:
    1. Low number of birds (<150)
    2. Extensive production with few inputs
    3. Mixed production (meat + eggs)
    4. Local species
2. Reasons for developing production in villages
    1. Meat and eggs consumption is important, the improvement of these products directly improves the living condition of the population
    2. Most families keep chickens → improved production methods = big impact
    3. The birds are more resistant
    4. Farmers have an interest in short cycle production that can provide regular income
3. Difficulties:
    1. To vaccinate : No electricity = no cold chain, a low number of birds, no vet available
    2. To access new markets

9a. Traditional Chicken Production

	Every day	Every week	Every month	Every quarter	Every half-year	Every year
Get out and feed the birds						
Replenish water	Twice a day					
Clean trough						
Inspect and count birds						
Disinfect nest						
Disinfect poultry house						
Check walls and roof						
Check state of trough						
Change soil litter						
Change nest litter						
Retire and replace reproducers						
Vaccinate one-month chickens						
Vaccinate against chicken pox and pseudo-pest						
Deworm (every month for 0 to 3 month chicks)						

10. Assessment

What questions should we ask?

10a. Assessment: Industry practices

1. Nature of structure
2. Source of DOC
3. Mortality rate below 10%
4. Source of water
5. Number of years in operation
6. Hygiene
7. Schedule of Medication

10b. Assessment: Management Quality

1. Number of years experience
2. Level of experience
3. Does he keep records?
4. To what extent is he willing to learn
5. What are his personal characteristics
6. Relationships with third parties. Friends, social groupings

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www.AgriFin.org

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