

ORGANIC

POULTRY

B. WAINAINA

REPORT ON: ORGANIC POULTRY PRODUCTION

FOR: GITARE ORGANIC FARMERS GROUP- GILGIL

**REQUESTED AND SPONSORED BY: KENYA ORGANIC AGRICULTURE
NETWORK**

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Abstract: over the years, organic and sustainable agriculture has laid more emphasis on training and adoption of organic methods of production on crop based enterprises at the expense of incorporating organic livestock production on the holistic approach to organic agriculture.

It is important to note and congratulate KOAN for realizing and acting on this inadvertent omission in designing its training programmes to include organic livestock production which forms an important part and parcel of organic agriculture.

PROFARMS has the suitable resource personnel to undertake this kind of training on organic livestock production now and in future to KOAN and other stake holders in the sector.

Organic livestock production as a component of organic systems of agriculture has its own pertinent challenges both at training and practical implementation but should never be left behind in organic systems of production.

Most farms in Africa operate on mixed systems of production that incorporate crop and animal production into organic systems of production and would never be complete without including livestock as a component of organic agriculture. This training on

organic poultry production was designed to capture that important aspect and highlight it to both KOAN and the target group of training.

Introduction: in designing the training programme and training materials, PROFARMS considered the terms of reference on its contract with KOAN which included:-

1. training of Gilgil Organic Producers on
 - disease management in poultry for organic system
 - hygiene and sanitation in production
 - Nutrition, rearing and feeding within the allowed practices of organic agriculture.

2. Slotting in the Gilgil organic producers expectations on what they aimed to achieve at the end of training on organic poultry production based on their peculiar needs tailored for their environment and aspirations.

A lot of effort was put to marry the above two points in order to achieve the aims of both KOAN as the sponsoring organization as well as farmers aspirations and expectations.

Many improvisations were made outside the prepared training notes to cater for diverse needs and the attached notes only acted as a point of reference on training and interactive discussions between facilitators and the group.

Practical demonstrations were incorporated to emphasize certain important aspects of training.

Objectives of training

1. To train Gilgil organic producers on all important aspects of organic poultry production in the areas of:
 - Housing and equipments
 - Feeding and rearing
 - Disease control, prevention and treatment
 - Egg collection, handling, storage, transportation and marketing.
 - Record keeping and basic financial analysis of the poultry enterprise

2. To expose the target group to other wider issues of organic poultry production that may affect the wider environment like use of pesticides and chemicals for disease control and use of G.M.O,s in feed and other.
3. To introduce the important of aspect of interrelationship of organic livestock production and crop production that is complimentary to each other e.g poultry manure and soil fertility maintenance in the farm, using chicken as beneficial biological pest control in ticks, cutworms etc.
4. To expose the target group to important aspects of production that will lead to conversion and certification of their farm and products to organic standards.
5. To emphasize the low external input sustainable agriculture ó LEISA in production and procurement of inputs required for organic poultry production.
6. To fulfill the stated terms of reference in the contract.

Scope of training: this was restricted within the important practices of organic poultry production in areas of

- brooding
- feeding
- vaccinations and disease control
- hygiene and sanitation
- disease treatment with allowed organic substances
- egg handling and marketing
- certification and record keeping

This training can only form the foundation of organic poultry production that can be enhanced by widening the above areas of coverage to create better understanding and implementation of concepts in follow-up training and evaluation sessions in future. Organic poultry production is a wide and continuous engagement that may require professional intervention at various stages of rearing and production to meet specific needs under given circumstances.

It is important to provide for on-spot follow-up or intervention as required within the time frame of the implementation period.

Topics and subtopics covered in training

1. **Housing:** site, design and equipments to facilitate proper lighting, ventilation, hygiene, stocking density and disease control.
2. **Feeding and rearing:** a checklist oriented form of training was done for each stage of growth and production to capture the priorities of each stage as follows:-
 - Chick stage ó 0-8 weeks of age ó brooding, feeding, vaccinations and hygiene.
 - Growersø stage: 9-22 weeks of age; control of maturing rate through restricted feeding regime to produce bigger healthy hens and quality eggs was emphasized among other things.
 - Layers stage: feeding for quality eggs and high laying percentage was emphasized. Use of on farm feed formulation to improve egg quality e.g. lucern, grass, amaranthus was emphasized. Earthwormsø breeding to feed hens was taught as well as composting of poultry manure to kill disease germs and control spread of diseases both in the poultry house and wider environment.
3. **Disease control, prevention and treatment:** emphasis was laid on disease prevention through routine vaccinations, sanitation and hygiene maintenance and proper nutrition for success in organic system of production.

Most farmers fear that disease treatment through organic herbal based preparation is not as effective as convention antibiotic treatment and this fear was addressed through highlighting importance of disease prevention and herbal extraction and preparation in treatment of specific poultry diseases common in tropics.

Alternative veterinary medicine based on common medicinal plants useful in treatment of poultry disease was emphasized and a demonstration carried out on extraction of aloe juice as an example.

Other points taught are laid out in training notes.

4. **Handling of eggs:** importance aspects of egg handling, storage and transportation to comply with organic standards were emphasized. Emphasis was laid on the living aspect of egg on fertilized or unfertilized stage to prevent contamination and deterioration through timely marketing.

5. **Record keeping and analysis:** emphasis was laid on record keeping and treatment of the organic poultry production project as a farm business. Keeping of proper records will help the farmer to monitor performance and make important decisions on expansion, marketing of products as well as help in conversion and certification of the farm as an organic production unit.
6. **Practical demonstrations:** these were done on:
 - Brooder construction using two halves of plywood and wooden pegs.
 - Extraction of aloe juice as medicinal herbal extract for treatment of common digestive and would problems in chicken using mortar, pestle, Kasuku tin and clean cloth as a sieve ó all materials available within the farm.
 - Improvised automatic water drinker using a common household food tray and a plastic container.

The demonstration was aimed at enhancing the LEISA concept in input procurement and use.

Onsite evaluation:

Strengths: target group participants were already aware of the benefits of training and were ready to carry out implementation based on information passed on during training. A survey of views of those in attendance confirmed that they formed a committed section of the entire group interested in implementing the teachings of the training in their project.

Weaknesses: a section of the participants had no functional literacy skills and although the training was carried out in their vernacular language, they seemed left out in grasping, scientific concepts of training. They took no notes and may not have any revision materials from the training.

Opportunities: the geographical location of the participants characterized by large farm sizes and low chemical usage on the farms favors the implementation of the practices taught on organic poultry on organic poultry production to make them true beneficiaries of such training. Other enterprises like rabbit keeping

and organic horticultural production can be incorporated to use poultry manure and rabbits to use excess greens intended for poultry.

Threats: group cohesion should be emphasized to exploit synergy in working towards common practices and methods of production for sustainability and meeting of market demands. Most farmers were under impression that the project requires a large financial outlay until LEISA concept was introduced and emphasized. This fallacy may have kept some members of the group from attending training for fear that they may not be able to go into implementation stage based on their financial ability.

Strategy on sustainability through continuous training

- The training was condensed to cover on all important aspects of organic poultry production without addressing the specific needs of individual participants on practical implementation of the project. Provision should be made to address this need in form of follow-up training on specific areas of production.

Constraints observed: poultry production requires access to clean, good quality water for success. Lack of piped water in the implementation area can form a major constraint towards successful implementation of the project.

However, the group can create dynamics and advocacy to incorporate on initiation of a water project in the area to address this problem as they are aware of its impact on their project.

Conclusion: on the whole, the training would have been more successful if all of the hundred targeted members of the group attended the training without having to bar themselves on basis of their financial ability to implement the poultry project and make informed decisions only after considering the information passed on during the training session.

Appendices

1. Daily programme

9.00am ó arrival and starting of the programme by group chairman, KOAN training officer.

9.15am ó 11.00 am ó first training session

11.00am ó 1.00pm ó 2nd training session

2.00pm ó 5.00pm ó 3rd training session

5.00pm ó group disperses

2. Language of training: kikuyu ó all participants were able to understand the language.

3. Group discussions were conducted after each training session to thrash out important issues based on farmers' expectation

4. Time table.

Date	9.00am – 11.00am	11.00am – 1.00pm	2.00pm – 5.00pm
31/10/2007 Wednesday	<ul style="list-style-type: none"> - Introduction to organic poultry production - Housing requirements • B. Wainaina 	Housing Design: <ul style="list-style-type: none"> - brooder/stocking density - growers/stocking density - layers/ stocking density • B Wainaina 	<ul style="list-style-type: none"> - Hygiene & sanitation - Disinfection - Composting of poultry manure - Earth worm rearing • J. Wambui
Thursday 1/11/2007	Feeding and rearing <ul style="list-style-type: none"> - Chicks - Growers - Layers • B. Wainaina 	Egg handling <ul style="list-style-type: none"> • B. Wainaina 	Practicals <ol style="list-style-type: none"> 1. aloe juice 2. automatic drinker 3. brooder construction <ul style="list-style-type: none"> • J. Wambui • B. Wainaina
Friday 2/11/2007	Disease control & management <ul style="list-style-type: none"> • B. Wainaina 	Record keeping and analysis <ul style="list-style-type: none"> • B. Wainaina 	Group discussion and environment <ul style="list-style-type: none"> • Teresia Ndirangu

5. Farmers expectations

(Requested language of use: kikuyu)

- I. To be trained on housing requirements and design
- II. Hygiene and sanitation
- III. External parasites
- IV. Proper equipments on poultry production
- V. Feeding and nutrition
- VI. What affects egg quality? How can you tell an organic egg?. How are eggs certified organic?.
- VII. Organic disease control in poultry production and treatment
- VIII. What outlets are there for organic eggs and at what prices?

6. Training notes;

PROFARMS ENTERPRISE

Agricultural products marketing and consultancy.

TRAINING NOTES ON ORGANIC POULTRY PRODUCTION FOR GITARE ORGANIC FARMERS GROUP AT GILGIL ON 31/10/2007 TO 2/11/2007

Introduction; Organic poultry production involves raising of domestic birds for egg and meat production without use of synthetic inputs both in feeds and disease control.

Care is taken to consider the aspects of birds welfare in terms of providing adequate space in housing and allowing them to practice their natural behavior like perching and scratching for food and grit.

Use of antibiotics in disease control is very restricted. Vaccinations against common poultry disease is however allowed and encouraged in disease control.

Additives like growth hormones and synthetic feed additives are not allowed in organic poultry production.

Objectives of organic poultry production

1. To protect the environment against environmental pollution and destruction that may result from activities of poultry production e.g. Use of non-biodegradable

- pesticides for parasites and disease control that may leave residues in the environment.
2. To raise the birds in as close natural environment as possible in both housing and feeding.
 3. To integrate poultry production with other sustainable and environmental friendly practices in the farm e.g. maintenance of soil fertility through composted poultry manure, tick reduction for cattle by using the birds as a biological parasite control, utilization of kitchen waste as a complimentary feed to birds e.t.c.
 4. To provide healthy food from poultry products free from synthetic and non-biodegradable residues for human consumption.
 5. To provide income for the farm through selling of premium price products marketed as certified organic products.
 6. Encourage use of low cost sustainable inputs in poultry farming.[Low External Input Sustainable Agriculture-LEISA]

PILLARS OF SUCCESSFUL ORGANIC POULTY FARMING

1. Reduction of stress by providing for natural behaviour in the birds like dust bathing (use of DEEP LITTER system), perching (by providing perching poles in the housing) adequate space that provides for foraging and sunning.
2. Proper sanitation and hygiene/cleanliness is emphasized in equipments, housing and handling of birds by attendants.
3. Disease control and prevention: it is especially important to prevent occurrence and outbreak of disease through vaccinations and proper hygiene. Mixing of different categories of birds in terms of age and origin is highly discouraged as it leads to spread of diseases.
4. Proper nutrition: Adequate and proper balanced food is important in growth, health and production in poultry. It is important to note that birds require complete rations in their feed formulations i.e. every essential nutrient must be provided for in the recommended quantities in a single ration.
5. Proper housing that provides for hygiene maintenance and sanitation as well as security and practising of natural behavior.

6. Proper record keeping and data analysis for production and financial viability of the enterprise.
7. Knowledge and skills in organic poultry production
8. Market linkages to enable the project realize its market and financial potential.
9. Regular evaluation of production methods to correct mistakes made during various stages of production.
10. Procurement of Day old chicks and other inputs from reputable outlets to ensure prevention of disease outbreaks and avoid use of non compliant organic inputs.
11. Organic conversion and certification of poultry farm in order to enjoy full benefits of organic market for the products.

Organic poultry production for eggs is divided into the following sections;

1. Housing and equipments
2. Feeding and rearing
3. Disease control, prevention and treatment
4. Egg collection, handling, storage transportation and marketing.
5. Records keeping and financial analysis.

1) Housing and equipment; *the important point to consider in housing are*

- Providing adequate space for the birds and equipments
- Provide a sunning and restricted range foraging area
- Allow adequate ventilation and light in poultry housing. Light is known to influence pattern of lay in birds ventilation influences outbreak of various diseases in birds Provide for right materials in feeding and watering equipments to allow cleaning and sterilization.
- Provide adequate and properly designed laying nests for the reared number of birds.
- Organic poultry production allows the deep litter system of production and adequate dry and clean litter with maximum moisture absorption and biodegradable properties must be provided for beddings in a poultry house.

- Secure and proper equipments for brooding
- A site with adequate drainage
- Provide space for manure collection and composting at a reasonable distance from poultry house to control spread of diseases.
- Provide perching poles
- House proofing the unit against predators rodents and wild birds
- Housing unit must be sited at a reasonable distance from home compound to allow for regular monitoring of what is going on in the poultry house especially at night and during brooding periods
- Sitting of poultry unit in relation to home compound should be in the windward side away from the dwelling house.
- Poultry units should be sited away from roads, schools, factories e.t.c to avoid unnecessary disturbance.
- Insulate the roof to protect the birds from extremes of colds and heat.
- Secure locking to keep away visitors from wandering unnecessarily into the poultry house where they may spread diseases or cause disturbance to birds
- Provide a foot bath at the entrance of every poultry unit filled with a appropriate disinfectant allowed in organic system of production.

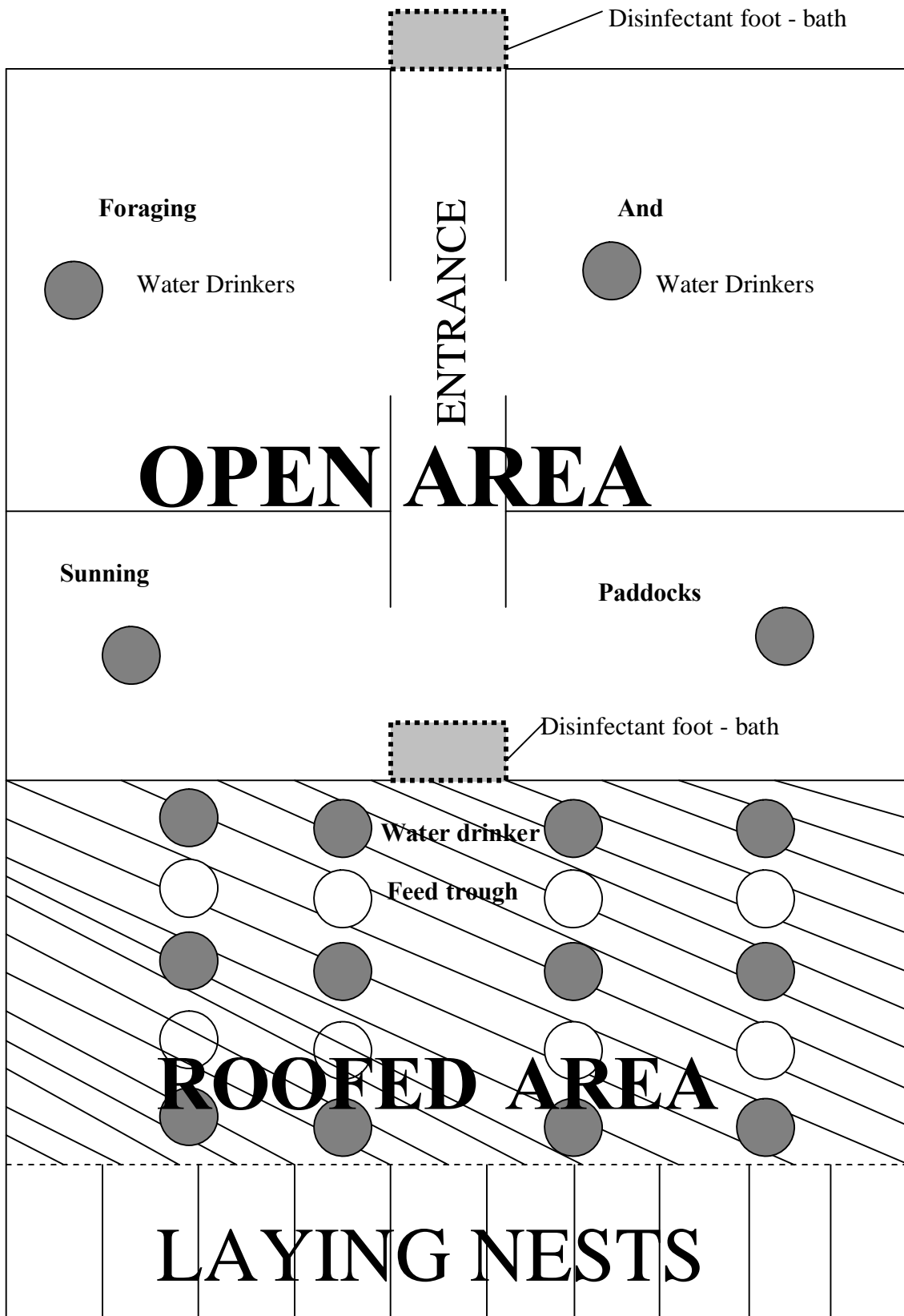
Basic requirements of a poultry house

- Adults laying birds in organic system of production should be provided a space of minimum 2ft per bird in the confined area and 3ft in the sunning /foraging area i.e. 5 sq ft/bird.
- The beddings must be kept dry at all times by removing the wet caked parts and turning the litter often to keep it loose, dry and well aerated. Poultry droppings are high in uric acid which generates poisonous ammonia gas on decomposition which leads to respiratory disorders in birds.
- The poultry house should be well ventilated. Solid walls are only raised 3ft high from GROUND and chicken wire fitted up to the roofing base to avoid direct wind draughts into the poultry house

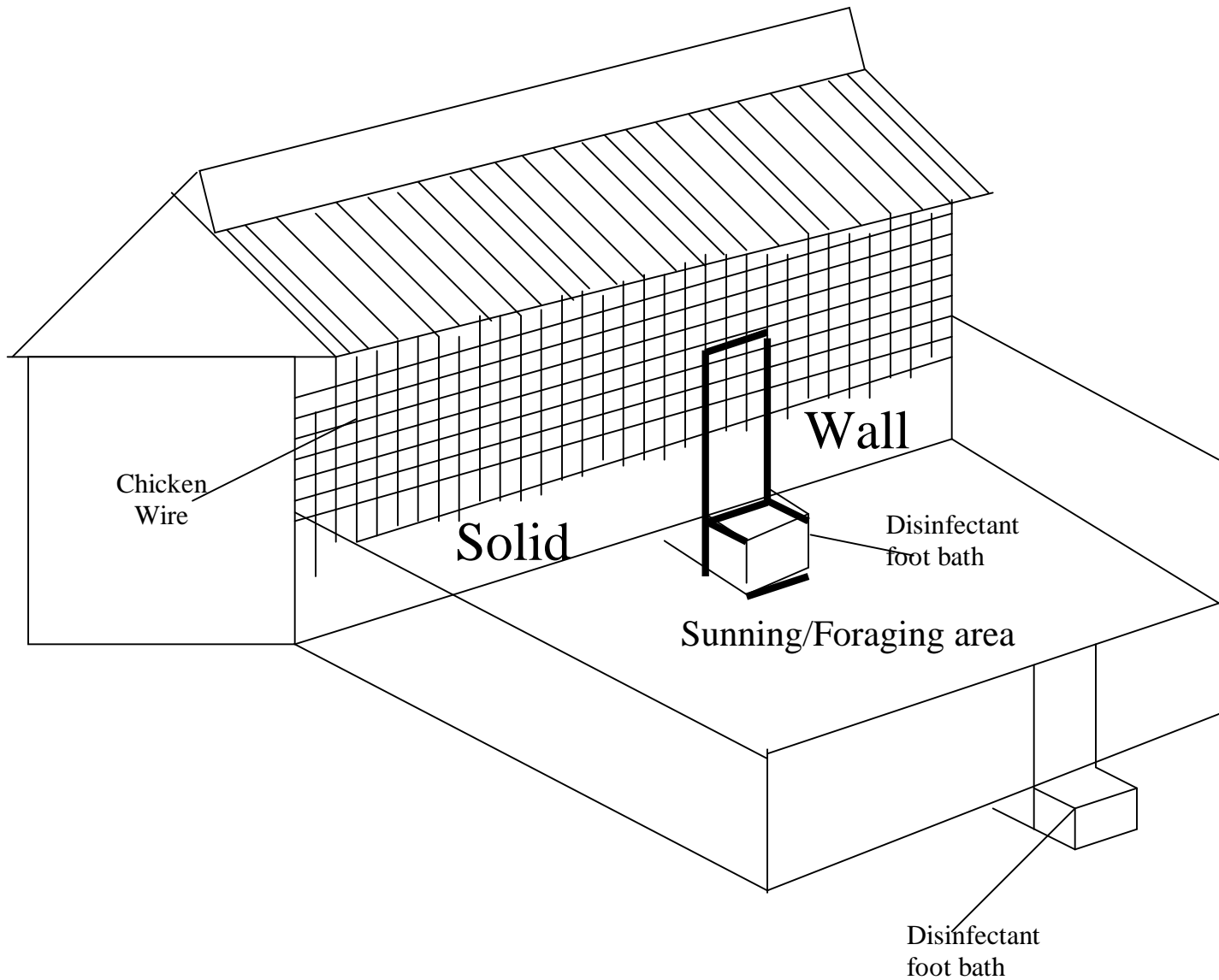
- Walls should be constructed to allow maximum natural light penetration which is important in regulating the laying pattern.
- Hessian cloth should be fitted on the parts of wall fitted with wire to allow for regulation of temperature in the poultry house during very hot or cold weather when they can be rolled down or up to maintain optimum temperature.
- The foraging area can be constructed entirely of poles and chicken wire on walls and roof.
- It is recommended that the open area be planted with lawn grass to provide green forage to the birds which improves the yellow egg yolk quality.
- Sunning of birds in this area helps in control of external parasites in birds as well as acting as natural disinfectant for pathogens/germs. Birds are also able to synthesis vitamin D in their bodies from direct sunlight which necessary in deposition of calcium/phosphorous on egg shell and bones of the birds.
- The roof especially where it is constructed of iron sheets should have an under lying layer of insulating material like Makuti or grass thatch to protect the birds from extremes of very cold or hot weather.
- The poultry house should be fitted with laying nest ft 18 inches from the ground. Each nest should measure 2ft x 2ft x 2ft and provide with dry litter and slightly covered with a gunny bag sheeting for partial darkness that birds prefer during laying time. One such laying nest is adequate for 10 laying birds.
- The nest can be fitted to project from outside the wall to maximize the internal available space for other equipments.
- A lockable hatch door can be fitted from outside so that the collection of eggs does not involve the attendant entering the house for this exercise which might involve several poultry units therefore increasing the risk of disease spread.
- This is also suitable for security reasons since when the poultry unit is locked, only the attendant will have access to the nests therefore minimizing pilferage of eggs.
- A provision for flexible brooding area should be made in the poultry unit. This should be designed in such a way that the brooder can be pulled down to maximize space for growing birds getting out the brooding age.

- Fire hazard risk should be minimized in the brooder by adopting proper design and materials to be used in the brooder.
- Although temperature maintenance is crucial in the brooder, ventilation should not be compromised by completely sealing off the brooding area to allow escape of poisonous gases from the burning fuel.
- Adequate provision of feeding and watering equipments at the optimum ratio per number of birds should be considered in design and space of the poultry housing unit.

A TYPICAL FLOOR DESIGN OF A POULTRY HOUSE



POULTRY UNIT



- Three dimension perspective of poultry unit and sunning area/foraging.

FEEDING AND WATERING EQUIPMENTS

The round free flow feeders are recommended for feed troughs to maximize on eating space per bird and check feed wastage.

One medium size round feeder serves 25 adult birds. 100 birds require 4 such feeders but more feeders can be added to cater for feeding on the sunning area.

Improvised round drinkers made from 10 litre bucket and metal trays are useful in providing adequate water. One such drinker is enough to serve 25 birds. More can be added to serve in sunning area.

REARING AND FEEDING

Rearing of layers is divided into three main stages which are dependent on developmental age of the birds namely;

1. **Chick stage:** Which is a period of between one day of age to 8 weeks. This stage has several specialized management practices i.e.
 - Brooding: control of environmental temperature
 - Vaccinations which take place mostly at these stage of growth.
 - Specialized feeding which requires a minimum protein content of 20% in the ration.
2. **Growers stage:** This period of between 8 weeks to 22 weeks of age. It is a period of relatively high growth and transition into adult laying birds. It involves average management practices in areas of feeding and disease control.
3. **Layers stage:** this is a period starting from about 23 weeks of age and marks the commencement of laying period which lasts for about 52 weeks. It involves specialized management practices feeding and disease control which are all aimed at maximum lay percentage in the birds for maximum production and revenue.

Rearing of day old chicks to growers stage; this involves the following management practices in the prioritized order.

- Construction of brooder: this is done by using two halves of longitudinally cut ply wood which are joined and supported by wooden pegs to form a circular confinement about 2 weeks before chick placement.
- Put wood shavings to form bedding layer of minimum 4 inches deep.
- Disinfect the brooder by spraying with 5 % Magadi soda solution.
- Sterilize the chick drinkers and feed troughs with the same solution 2 days before placing the chicks.
- Full the drinkers with water on the morning before placement.

- Light the charcoal jiko or infrared bulbs 6 hrs before placement to allow for uniform brooding temperature of 35.c at 18 inches height within the brooder. (The brooding thermometer should be suspended at this height within the confines of brooder).
- Putting on the heat source early allows the water in drinkers to be tepid by the time the chicks arrive.
- A little glucose may be added to water (100gms for every 5 litres of drinking water) to start of chicks.
- Don't allow chicks to eat before ensuring that all of them have taken water to stimulate their digestive systems.
- Don't use charcoal that produces a lot of smoke.
- The ratio of drinkers and feeders to chicks is 1:25 chicks.
- On arrival of chicks, count and place them into the brooder. Uniform spread shows optimum temperature is attained. Huddling near heat source shows that the brooder is cold. When chicks are spread away from heat source around the ring of brooder, it shows that the brooder temperature is very hot!

VISUAL APPRAISAL OF OPTIMUM BROODING TEMPERATURE

Fig. 1 This figure shows a cold brooder.

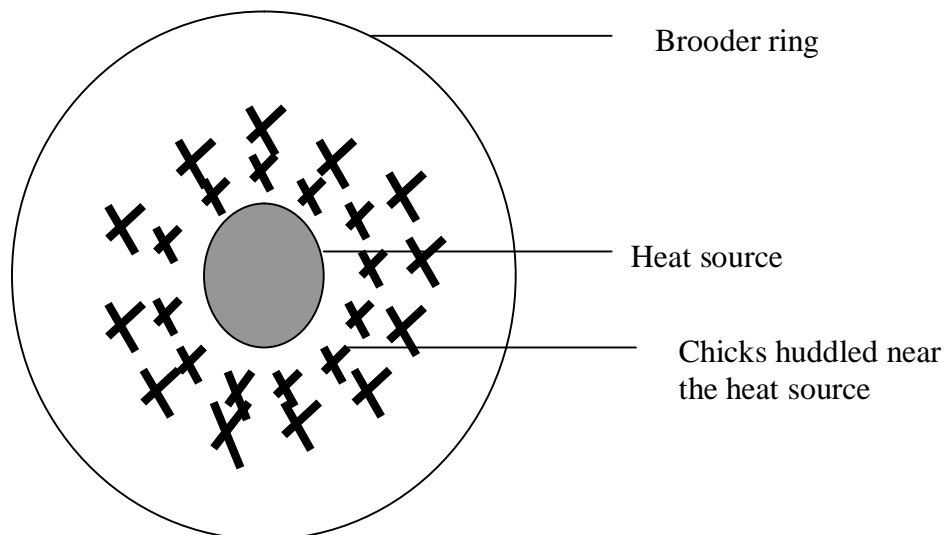


Fig. 2 This figure shows a very hot brooder.

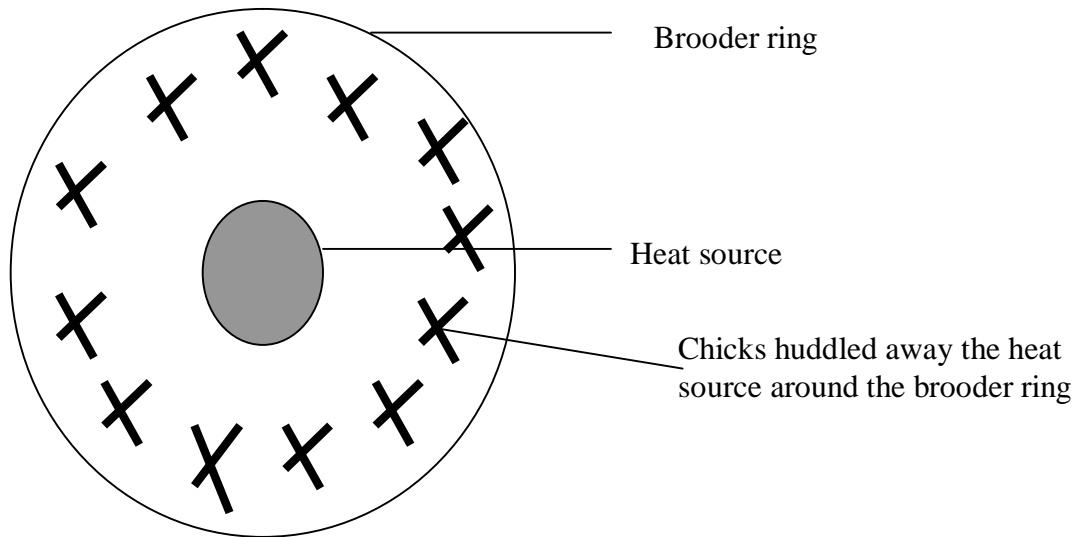
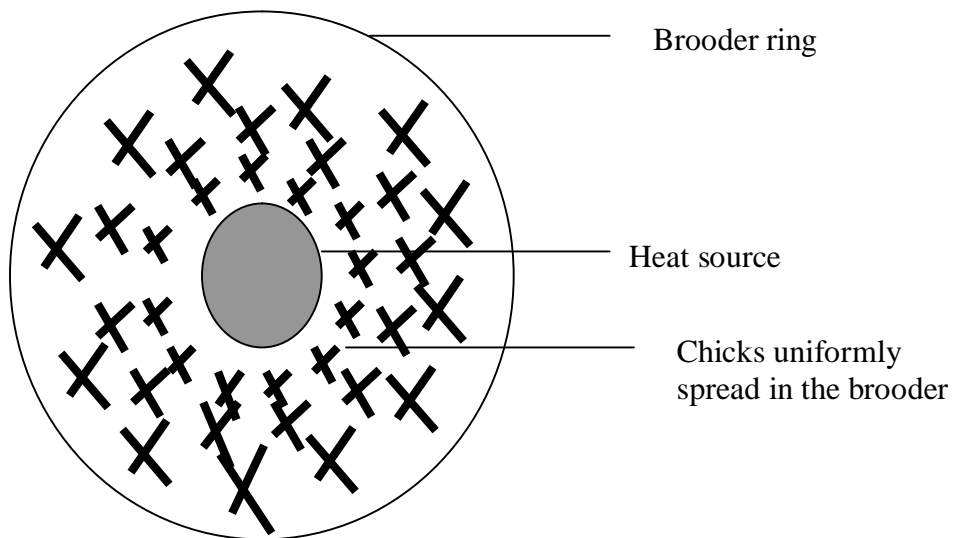


Fig.3 This figure shows a brooder at the right brooding temperature.



- After the chicks have drunk water, fill the feeders with chick mash which is the recommended feed at this stage of rearing. Clean newspaper spread and plates may be used to introduced the chicks to the feed
- Stop their use as soon as chicks are able to feed from trough to avoid feed wastage.

- Provide source of light to avoid huddling and suffocation
- Spread the chicks that are huddled together as you adjust the heat for right temperature to avoid suffocation.
- Chicks should be fed at free choice in this stage but care should be taken to avoid wastage by replenishing the troughs regularly with small portions of feed.
- Chicks will eat a total of 2kg / birds of chick mash for the rearing period of 8 weeks at this stage.
- Expand the brooder as chicks grow by monitoring congestion to ensure uniform spread.
- During the 7th week of age, mix chick mash with growers mash to allow for gradual change of diet.
- Brooding temperatures should be maintained as follows:
 - 1st week ó 33-35°C 4th week -25°C
 - 2nd week ó 30°C 5th week 23-25°C
 - 3rd week ó 27°C 6th week ó room temperature
- Maintaining high temperature from 5th week of age discourages good feathering that may result in chilling during growers stage.
- New castle vaccination- 14 days of age
- Infectious Bursal disease (Gumboro) -18 days of age
- Chicks are not allowed into the summing area at this stage
- Maintain the litter in completely dry to discourage onset of coccidiosis by removing caked litter and turning the whole depth of the litter. A little clean litter may be added after turning to maintain cleanliness.
- Hessian cloth around a wider area of the brood helps regulate the right temperature while allowing air circulation.
- Don't use polythene sheeting around the brooder as this traps the poisonous gases inside the brooder
- Don't use saw dust for the litter as chicks may confuse this with feed

Regular monitoring of conditions in the brooder helps correct anything wrong that may result in high death rate of chicks associated with this stage.

- **Rearing of growers:** this is the management of pullets from 8 weeks of age to 22 weeks of age.
- The feeding involves a specially formulated feed known as growers mash.
- Restricted feeding i.e. feeding only a recommended amount of feed per day starts at this stage as follows:

9 ó 11 weeks of age = 60gms per bird per day.

12 ó 13 weeks of age = 65 gms per bird per day.

14 ó 15 weeks of age = 70 gms per bird per day.

16 ó 17 weeks of age = 75 gms per bird per day.

18 ó 19 weeks of age = 80 gms per bird per day.

20-22 weeks of age = 100gms per bird per day.

Oyster shells/grit = 5gm/bird/week.

- Feed restriction is done for the purpose of controlling maturing rate of pullets so that they don't mature very fast.
- Early maturity leads to:-
 1. low egg production and smaller eggs
 2. weak laying bird with high mortality
 3. Prolapsed and egg peritonitis leading to cannibalism.
- Feed restriction also controls feed wastage of up to 5% feed savings.

Guidelines on successful feed restriction regime.

1. Provide enough feed trough to ensure proper feed distribution and access to every bird during feeding time.
 2. Restricted feeding should not be practiced on sick or stressed birds.
 3. provide feed once a day and keep the birds busy by providing grains e.g. broken maize, sorghum, wheat at a rate of 5gms per bird per day. Grain feeding and grit is especially advised in organic poultry rearing.
- New castle vaccination booster dose is given in 18 week, fowl typhoid 16th week.
 - Deworm birds regularly with organic herbal preparation e.g. garlic paste in water.
 - Allow birds into sunning area at 14 weeks of age

- Introduce layers mash at 19 weeks mixed with growers mash for gradual change in diet.
- **Management of layers** ó this is done for a period of economical laying period from 24 weeks of age to 72 weeks of age. Birds still continue laying after 72 weeks of age but at an economical rate.

Birds are considered to have started laying when 5 % of them are laying.

Laying birds require a specialized feed formulation known as layers mash. In organic poultry production the wholesome quality of eggs is considered to be important and supplementation of layers mash with other high quality organic supplements which include Lucerne meal (dried), dried green grass and green grass and green vegetation like amaranthus leaves, (dried), amaranthus grain. Drying prevents spread of diseases like coccidiosis which require moist conditions.

- Whole grains spread (10gms per bird) in the litter and sunning areas helps keep birds busy and allows scratching and dust ó bathing essential allowing the birds practice natural behaviours. Bathing also helps turn the litter keeping it dry.
- Laying birds are fed free choice i.e. without feed restriction but on average, every bird consumes 150gms/day. E.g. 100 birds should be provided with 15 kgs of layers mash per day.
- Clean water is essential in egg production
- Lack of water stops the birds from feeding resulting in low egg production and cannibalism.

Care of eggs

- The egg is a living organism even in unfertilized state and the contents are in an active physiological state with the enzymes actively changing the contents which results in deterioration. It is also capable of absorbing contaminating materials from air, water and general environment.
- Eggs should be stored at 10 ó 16°C to prevent deterioration but must be used within 30 days after lay.

Abnormalities in eggs

- Loose yolk due to breakage of membranes attaching it to the shell.
- Loose air cell on the broad base of egg
- Blood spots due to bursting blood vessels in the ovary during egg formation.
- Double yolk eggs
- Shell less eggs due to deficiency of calcium and vitamin D.
- Rough shell and cracked shells.

Guidelines in care of eggs:

- Collect eggs 2-3 times a day to get cleaner eggs and fewer breakages between 8 am and 12 noon.
- Collect the rest at 3.00pm
- Place them in paper tray or plastic tray the narrow base down to keep the air space free at the broad base top.
- Use clean hands and trays when handling eggs.
- Don't stack more than 10 trays to avoid breakage and allow air circulation in eggs to slow deterioration.
- Paper trays are best during transportation as they are able to absorb shock.
- Scrap off dirt on eggs with a knife. Don't wash them as water may contaminate the eggs through absorption in the shell.
- Don't touch eggs with greasy hands so as not to block air pores in egg shell.

Egg quality: this is determined by

- Firm shells with uniform thickness
- Size 6 55 gms
- Well held egg yolk
- Yellow colour egg yolk.
- Absent of meaty spots
- Clean shells
- Must be fresh i.e. to be sold within 30 days after lay.

Important guidelines on rearing

1. comprehensive guide on poultry feeds and feeding

<i>Category</i>	<i>min % C.P</i>	<i>name of feed</i>	<i>feed per bird for the stage.</i>
Chicks (0-8wks)	20	chick mash	2kg
Growers (9-20wks)	16	growers mash	8kg
Layers (20-72wks)	16	layer mash	55kg
Total feed consumed per bird			65kg

1. Brooding temperature guide

1 st week	- 35°c
2 nd week	- 32°c
3 rd week	- 29°c
4 th week	- 21-26°c
5 th ó 18 th week	- 10-27°c

2. Stocking density guide on free range system

<i>Category of birds</i>	<i>Area recommended per 100 birds</i>
1. Brooding chicks (0-4 weeks old)	4 m ²
2. Pullets (5-22 weeks old)	70 m ²
3. Adult layers	140 m ²

3. Lighting density guide (free range system)

<i>Category of birds</i>	<i>Hours per day</i>
Brooding chicks (0-3 weeks)	18-20hrs/day
4 th week	12hrs
Rearing pullets (5-22 weeks)	12hrs

Adult layers (23 ó 76 weeks)

16hrs

4. Water consumption per 100 birds at 15-25°C

<i>Age</i>	<i>Litres of water per day</i>
0-3 weeks	8litres
4-6 weeks	12 litres
7 ó 10 weeks	16litres
11-22 weeks	20 litres
Adult layers	30 litres

NB. Provide double required water to allow for spillage and evaporation depending on weather.

Don't provide salty water.

Disease prevention, control and treatment

Guidelines to follow on disease control measures

1. Don't admit strangers into the poultry house. They may be carrying disease germs on their shoes and clothing and spread them to your birds.
2. Poultry house attendants must (!) disinfect their footwear on the footbath at the entrance of each poultry house.
3. Overalls, gumboots intended for use in the poultry houses should not be used for other purposes in the farm e.g. land preparation, harvesting etc.
4. Poultry house must be proofed against wild birds and rats that may spread diseases and cause feed wastage by feeding on the feed intended for birds.
5. Don't bring strange birds bought from market, neighbours into your compound. They may be carrying dangerous diseases.
6. Clean and disinfect the house and equipments before bringing in a new flock of birds.
7. Equipments intended for use in the poultry house must not be removed from the poultry house or used for other purposes outside the poultry house e.g. buckets to fetch water.
8. Isolate any sick birds into sick bay. Remove the dead birds and burn or bury them away from the poultry houses. Don't sell or eat diseased birds.

9. Follow a strict vaccination programme as follows:

Age	Type of vaccination
1 st week	Mareks and New castle disease (normally done at the hatchery)
2 nd week	Gumboro/New castle.
4 th week	New castle disease/deworm
6 th week	Fowl pox
16 th week	Fowl typhoid
18 th week	New castle disease/deworm
42 nd week	New castle disease

Important poultry diseases

1. **Musky chick disease:** the disease is caused by poor healing of navel in day old chicks. Such chicks are normally sorted out in the hatchery but some might be sold to farmers. It is advisable to buy chicks from reputable hatcheries.

The disease is noted through observation of the following symptoms:

- The chicks are dull and don't eat
- When the feathers around navel area are blown apart, navel is seen to be swollen and may be oozing pus.

Prevention: clean surroundings in hatcheries equipment and clean brooding areas in the farm. Isolate the sick chicks from the healthy.

Treatment: treat the area with Aloe juice until it heals completely. Remove the pus first by squeezing gently if necessary before treatment.

2. **New castle disease:** This is a disease of poultry caused by virus and it is especially common in the rainy season. It kills a large number of birds and spreads rapidly in flocks across villages.

Signs common for the disease include:

- watery green diarrhea with foul smell
- birds don't eat
- birds look sleepy
- mucous comes out from nose
- birds cough and sneeze
- there is swelling of head and neck
- the bird keeps the head twisted to one side.
- The wings droop
- The crop is full and distended
- The bird goes into paralysis and death

Prevention: this disease is better prevented by vaccination at the right time since treatment of viral diseases is difficult.

Treatment: crush 4 fruits of red pepper into 4 litres of water. Add ½ litre of Aloe juice and give to the sick birds in the sick bay. Allow birds to drink only this treated water for 5-7 days without giving any other untreated water.

3. **Fowl typhoid:** this is a serious disease of birds that can also affect people who eat the sick birds and eggs that are not cooked properly. It is caused by bacteria.

Signs seen in sick birds include:

- whitish watery diarrhea with foul smell
- chicks huddle near the heat source
- chicks have no appetite and are sleepy
- Whitish diarrhea observed under the tail.

Prevention: the disease is very well prevented through vaccination against fowl typhoid. Hatcheries should avoid using eggs from sick birds for hatching chicks as the disease is passed on to the newly hatched chicks.

Treatment: the disease is treated in the same way as new castle disease but prevention through vaccination is the best way to prevent the occurrence of disease.

4. **Fowl pox:** this disease is caused by a virus and affected birds show black spots on the head and beak area. The birds look dull and don't eat properly.

Prevention: this is done through vaccination for fowl pox.

Treatment: treat the affected areas with Aloe juice ó mix Aloe juice with the drinking water and give to the birds for 5-7 days.

5. **Coccidiosis:** this is a serious disease of birds caused by dirty litter and moist condition in the beddings it is caused by a protozoa.

Signs of Coccidiosis:

- the birds pass chocolate brown diarrhea or droppings
- birds don't eat properly
- birds droop the wings and have ruffled feathers
- bird look sleepy.

Prevention: the litter in the poultry house should be kept dry at all times. Wash the feeding and watering equipments regularly to avoid contamination. This disease cannot be prevented through vaccination.

Treatment: same as in New castle and fowl typhoid. Hygienic condition and composting of poultry manure kills the disease causing germs.

POULTRY KEEPING RECORDS

Record keeping is very important in poultry production to help the farmer follow-up the success in rearing, feeding, egg production and financial returns for the project.

There are two types of records designed for purpose of following up production success namely:

1. Daily weekly record
2. Weekly/monthly record

These records are designed as follows.

Daily weekly record

Week	Day	Date	Amount of feed (kg)	No of deaths	No. of sick birds	Remarks
1	Monday					e.g. total No. of birds
	Tuesday					
	Wednesday					
	Thursday					
	Friday					
	Saturday					
	Sunday					
	Totals	-	?	?	?	

Weekly summary record

Week No.	Amount of feed (kg)	No. of deaths	Total eggs collected	Remarks
1.				
2.				
3.				
4.				
5.				
6.				
7.				

Egg production record

Poultry house No. _____ Week No. _____

No. of birds starting _____ No. of birds closing _____

Date	No. of eggs collected	1 st grade No. of eggs	2 nd grade No. of eggs	No. of broken eggs	Amount of feed	Deaths No.

Monthly cost and revenue analysis records;E.g. **month** Jan 07

Costs

Bags of feed used x cost Kshs _____

Oyster grit kg Kshs _____

Vet / vaccines Kshs _____

Fuel / power Kshs _____

Transport Kshs _____

Labor Kshs _____

Water Kshs _____

Interest on loan Kshs _____

Totals Kshs _____

Revenue

Trays of eggs sold x price Kshs _____

Eggs used by family Kshs _____

Poultry manure tons sold Kshs _____

Culled hens sold Kshs _____

Empty gunny bags sold Kshs _____

Gross profit = Revenue – Costs

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