COMMUNITY ANIMAL HEALTH TRAINING MANUAL

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Foreword

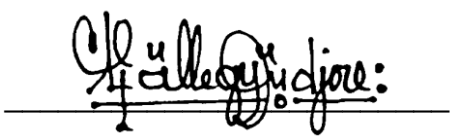
It is with great pride and enthusiasm that I present the Community Animal Health Workers (CAHW) Training Manual, a pivotal resource designed to address the critical gap in veterinary service delivery in rural and underserved communities across Ghana. This manual embodies a comprehensive approach to equipping Community Animal Health Workers with the skills, knowledge, and tools necessary to improve animal healthcare while fostering sustainable livestock management practices.

The CAHW Programme, initiated in the 1990s, was a groundbreaking step towards bridging the divide between professional veterinary services and rural livestock keepers. Over the years, it has evolved into a robust initiative aligned with the globally endorsed "One Health" approach, integrating the interconnected aspects of animal, human, and environmental health.

This manual outlines a structured and participatory training framework that not only enhances accessibility to localized veterinary services but also ensures standardization, builds capacity, and advances disease surveillance at the community level. Key areas such as disease management, livestock and poultry production, feeding practices, and sustainable resource utilization form the cornerstone of the curriculum. Importantly, it emphasizes empowering women in animal healthcare and livestock management, recognizing their vital role in transforming rural livelihoods.

By standardizing the training and certification of CAHWs, the manual ensures the delivery of high-quality services, creating a ripple effect that will improve livestock productivity, reduce public health risks, and contribute to poverty alleviation in rural areas. Moreover, it advocates for the formal recognition of CAHWs, providing them with the legal and institutional support necessary to thrive in their roles.

The manual is more than a guide; it is a call to action for stakeholders, including the Veterinary Services Directorate, non-governmental organizations, and community groups, to unite in fostering an inclusive and sustainable animal healthcare system. I extend my heartfelt gratitude to all those who contributed to the development of this manual.



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BACKGROUND

The Community Animal Health Workers (CAHWs) Programme started in Ghana in the early 1990s as part of measures to ensure a sustainable increase in animal health care delivery to promote the production of livestock in the country. The CAHWs are trained by the staff of the Veterinary Services Directorate (VSD) to be at the front line of disease prevention and surveillance in their communities. In Ghana, apart from the state training these category of service providers many Non-Governmental Organisations (NGOs) also trained these CAHWs to provide a certain level of primary animal health care to livestock in the rural areas.

The CAHWs model seeks to train community-selected members of hard-to-reach and at-risk communities in good animal husbandry practices and basic animal health care. It also focuses on creating awareness on the prevention and control of zoonotic diseases and other neglected tropical and re-emerging diseases whose prevalence constitutes a major disease burden among agro-pastoral communities. The model is built into the One Health approach (animals, people, and environment) that has supported the animal health sector and contributed to disease control within communities.

Supervision: Difficulties in the supervision of the CAHWs presents important consequences for the quality of the services provided and uptake. For instance, without a proper and ongoing supervision, veterinary medicines are misused and badly administered. In parts of the country where CAHWs are active, there is a clear problem of supervision, related to the legal relationship between CAHWs and the other bodies of animal health professionals. In some cases, this leads to competition between CAHWs, VPPs and vets while the goal of CAHWs should precisely be to *fill the gap* resulting from the lack of vets and VPPs and help them to reinforce their activities.

Formalisation or Legal Recognition: There is the key problem of the formalisation or **legal recognition** of CAHWs as they operate and provide animal health services without a harmonised training programme. In Ghana they are recognised and are parts of the workforce under the Veterinary Statutory Body (Galière, 2017). They are therefore issued with a certificate to practice. There is the need for the harmonisation of training programmes for CAHWs, and tying them to the public veterinary services, to recognise them as members of farmers' associations, and offering services bound by formal agreements. This demands the creation of a level playing field for both the frontline VSD staff and the CAHWs during and after training.

EXECUTIVE SUMMARY

The Community Animal Health Training Manual is intended to provide a comprehensive guide for the training of Community Animal Health Workers (CAHWs) with the aim to contribute to improving animal healthcare delivery in rural and underserved communities across Ghana. The Community Animal Health Workers (CAHWs) Programme initiated in the early 1990s, is a strategic effort to address the gaps in veterinary service provision. This manual provides the framework for training CAHWs to deliver essential animal health services and promote better livestock management practices in alignment with the "One Health" approach, which integrates animal, human, and environmental health. The key objectives of the Manual include:

- **Enhancing Accessibility**: Improve access to affordable and localised veterinary services, particularly in hard-to-reach communities.
- **Promoting Standardisation**: Ensure uniformity in training content, duration, and evaluation to maintain service quality.
- **Building Capacity**: Equip CAHWs with essential knowledge and skills to diagnose, prevent, and manage common livestock diseases and zoonotic conditions.
- **Advancing Surveillance**: Strengthen disease monitoring and reporting mechanisms at the community level.
- **Integrating Gender Perspectives**: Empower women in livestock management and encourage their active participation in animal healthcare delivery.

The training framework of this manual provides a structured training programme that emphasises:

- **Community Participation in Trainee Selection**: A participatory process ensures community involvement in nominating suitable candidates.
- **Theoretical and Practical Training**: A combination of classroom-based learning, field referrals, and supervised coaching over six months.
- **Refresher Courses**: Regular training updates to address knowledge gaps and introduce emerging issues.
- **Certification and Licensing**: Post-training certification subject to compliance with performance standards and ethical practices.

The main topic areas covered include:

- **Livestock and Poultry Production**: Fundamentals of animal husbandry, management systems, and crop-livestock integration.
- **Disease Management**: Identification, prevention, and control of diseases, including zoonotic and endemic conditions like Anthrax, Rabies, and Newcastle Disease.
- **Feeding Practices**: Guidance on balanced diets, supplementary feeding, and feed conservation.
- **Housing and Welfare**: Recommendations for proper housing to reduce mortality and improve productivity.
- **Sustainability**: Promoting environmental stewardship through controlled grazing, fodder bank establishment, and rangeland management.

The manual further provides some recommendations for enhancing the effectiveness of the CAHWs training Programme to include:

- **Supervision**: Strengthening oversight mechanisms to prevent misuse of veterinary medicines and maintain service quality.
- **Formal Recognition**: Legal recognition and standardization of CAHW roles to ensure integration within the broader veterinary framework.
- **Resource Allocation**: Provision of basic tools, medications, and equipment to support CAHW operations.

It is strongly believed that by empowering Community Animal Health Workers (CAHWs), livestock productivity would greatly be enhanced while public health risks would see a reduction, and ultimately poverty would be alleviated to a larger degree in rural communities. The manual serves as a pivotal resource for stakeholders, including the Veterinary Services Directorate (VSD), NGOs, and community groups, to foster a robust animal healthcare system that aligns with national and international standards.

This document underscores the critical role of CAHWs in bridging the gap between veterinary professionals and rural livestock keepers, advocating for an inclusive and sustainable approach to animal healthcare delivery in Ghana.

LIST OF ACRONYMS

ABBREVIATION	MEANING
ASF	African Swine Fever
CAHW	Community Animal Health Worker
CBPP	Contagious Bovine Pleuro-pneumonia
CDC	Centers for Disease Control and Prevention
CLW	Community Livestock Worker
CSO	Civil Society Organisation
EMA-i	Event Mobile Application
GoG	Government of Ghana
MoFA	Ministry of Food and Agriculture
ND	Newcastle Disease
NGO	Non-governmental Organisations
PAHC	Primary Animal Health Care
PPR	Peste des Petit Ruminants
VPP	Private Veterinary Service Providers
VSD	Veterinary Services Directorate
BSE	Bovine Spongiform Encephalopathy

CHAPTER 1

INTRODUCTION

- Access to adequate and affordable animal health care services has been a big challenge across the country, especially in northern Ghana where almost every rural household keeps a local breed of poultry, small ruminants (sheep, goats), and others. These deficiencies in animal health services provision increases vulnerability to poverty, public health risks, and food and nutrition insecurity.
- The Veterinary Services Department (VSD) of the Ministry of Food and Agriculture provides technical veterinary services to livestock keepers in communities through their field officers (MOFA, n.d.). Whereas the numbers of veterinary officers are inadequate due to factors such as government's cut back on recruitment due to budgetary constraints, those at post are under-resourced. To fill in the gap, the government introduced the concept of private veterinary practice. This idea did not favour the rural livestock farmers who could not afford the services of a private veterinary professional.
- To fill the void created by the (failed) privatisation and to provide services to livestock farmers in rural areas, a new concept of veterinary care was introduced. This idea builds upon the knowledge, participation, and needs of livestock-owning communities to deliver localised animal health services.
- At the core of these systems are the community-based animal health workers (CAHW). These CAHWs are members of the community and often livestock keepers themselves. They generally receive training in basic animal health care and provide a limited range of veterinary tasks to the members of their community, often in association with or supervised by an official veterinary staff.
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1.2 JUSTIFICATION FOR THE REVISION OF THE CAHW MANUAL

- In the early days of the Community Livestock Workers (CLWs) training, the Veterinary Services Department oversaw the training and manual development. Later when other institutions such as NGOs joined the training under the livestock development projects, there was no strict adherence to training protocols, no standardised trainings and training manuals even though these trainings were carried out by VSD staff. Observations showed that there are no standardised trainings (content, duration, objectives, and pedagogical requirements, persons qualified to train, evaluation) for CAHWs, resulting in important variations in terms of training content and duration. As a result, significant differences exist in terms of CAHWs' capacities in the country.
- There is therefore the need to invest in the revision and standardisation of the CAHWs' training manuals to be in line with the official VSD objectives.
- This revision took into consideration the training manual developed by the veterinary services as well as other CSOs and NGOs in the animal health service provision over the years bringing onboard new concepts of community surveillance and basic ideas of prudent use of medicaments.

CHAPTER 2

2.0 THE MANUAL AS A GUIDE TO THE CAHW TRAINING

2.1 Selection of Trainees

- Each project community was required to nominate two (2) trainees selected through a participatory process involving the community members (farmers). The successfully selected candidates were then interviewed vigorously by a team and the final candidate is selected for the training.

2.2 Field Referral Training

- The subjects and concepts in the manual cover a wide range of topics, as such, the period allocated for the training of the CAHWs was not enough to prepare them effectively to practice the animal health delivery activities as envisaged. To address this, it is proposed that there should be mandatory technical backstopping under the tutelage of state animal health staff for a period of six months before certification and commencement of practice. At the end of the referral period a recommendation is to be made to the state veterinary authorities to certify and license these trainees. They are required to renew their licenses after a year, upon recommendation of good stewardship, following from which they can now practice without hindrances.

- The trainings are to be carried out by recognised VSD and APD staff of MoFA for a period of 10 days for theory including two days of practical training by the frontline staff of VSD.

2.3 Coaching of Newly Trained CAHWs

- Newly trained CAHWs shall be attached to the state veterinary staff in the district responsible for his or her community for daily coaching and supervision. The VSD is supposed to call the CAHW anytime he/she is around for field work or any outreach programme for a period of six (6) months after which the supervising officer will recommend the CAHW for certification.

2.4 Refresher Training

- The training programme for the CAHWs is designed to include residential refresher training courses to be carried out twelve months after the completion of tutelage under their respective technical advisors. Monitoring the activities of the trainees to the end of that period would have identified certain areas of practical work and concepts they have not grasped very well thereby necessitating their re-call to the classroom for a revision. The number of hours for this will be determined by the extent of the knowledge gap as well as the inclusion of other emerging issues.

- Furthermore, to ensure quality training, quality control, and effective skills development of CAHWs, an evaluation team, recognised by the National Veterinary Council – should evaluate CAHWs trainings and grant them certificates of achievement. This means that Veterinary Statutory Bodies should set minimal standards to evaluate the competencies of the CAHWs.

2.5 Drug and Equipment Supply

- At the end of the training session successful trainees will be provided with a CAHWs' Kit Bag containing the basic drugs, medications, equipment and instruments they are permitted to use.

2.6 CAHWs Kit / Other Equipment and Supplies

Item
Albendazole 10%
Methylated Spirit 70%
Acaricide/Pour on
Potassium permanganate Crystals
Tincture of Iodine
Coliprajet/Sulphadimidin for oral dispensation
Hydrogen peroxide
Wound/sore powder
Kidney Bowl
Thumb forceps
Syringe without needle 10ml, 20ml.
Burdizzo
Scissors
Kit bag
Cotton wool
Rain coats
Wellington boots
Note book
Overall
Bicycle
Mobile Handsets
Water proof folders

CHAPTER THREE

3.1 Background to the Concept of Community Livestock Workers

Duration: 1 Hour

Objectives

At the end of the session, the trainee would have appreciated and understood:

- The roles, functions, and limitation of the CAHWs.
- Materials – general and specific (questions & answers, experience sharing and lectures).
- General Discussions

3.1.1 Objectives

- The overall objective of the CAHWs training and activities is to improve the economic and social well-being of the poorest, most marginalised people, particularly women and girls, through support to animal, human and environmental health (One Health) initiatives.

- The core part of the programme is the selection and training of Community Animal Health Workers (CAHWs) to provide basic animal health care services in the project targeted communities using Telehealth innovation. Telehealth innovation is the use of digital technology to deliver animal health care in rural communities. The initiative is to close the gap of inadequate veterinary officers and to provide adequate animal health care information, education, or care and services to clients in the project area.

- Currently the concept and use of veterinary telehealth in animal health service delivery has been very relevant and being used. It is therefore apparent that the presence of Community Animal Health Workers using telehealth facilities and strategies will greatly improve animal health services delivery.

3.2 Primary Animal Health Care

- Primary Animal Health Care (PAHC) is the good management practices, undertaken on an ongoing daily basis by the livestock handler, that are required to maintain health and production. The rural communities lack access to this, and coupled with the failure of private veterinary services in northern parts of the country a big void was created.

- To address the inadequacy of the animal healthcare delivery, in 1992, the government of Ghana as part of the public sector reform introduced the concept of ***primary animal health care and production*** to support livestock keepers through the introduction of **the Community Animal Health Workers (CAHWs)** concept and model. This involves training selected farmer representatives who will provide services to livestock owners in the communities they stay in. They are trained in basic livestock health and production management principles by veterinary and animal husbandry professionals drawn from the Ministry of Food and Agriculture. This was to support communities to improve access to basic drugs, vaccines, and equipment needed to undertake those basic animal health tasks.

3.3 Historical Development of the Primary Animal Health Care Concept

- Empowerment of the people with knowledge has been agreed as the key to development of local communities. In 1992 as part of public sector reform program to reduce the size and financial burden of the public service, the Government of Ghana (GoG) introduced the concept of the Primary Animal Health Care and Production. This was to involve the traditional actors of animal health and further introduce a new concept into the system whereby farmers and representatives will be given basic training. Thus, appointed representatives of Livestock Farmers were to be trained in Basic Animal Health Care, strengthening of their capabilities through improved access to basic drugs, vaccines (thermo-stable I-$_2$) and equipment needed to undertake those basic Animal Health tasks.

- Furthermore, livestock farmers were to be mobilised to enhance the dissemination of information and knowledge in animal health delivery and animal production practices. The broad objective of CAHW training is to emphasise the need for the participation of livestock owners/keepers in taking charge of organising and delivering simple and effective animal health and production techniques in their communities. It is also to improve communities' access to inputs, credit, and other support services. Since the government could not do this alone due to financial constraints, NGOs and other service providers have been allowed to assist in training of CAHWs in the country. As a strategy this concept is based on self-help and the services of trained community livestock workers purely in the spirit of volunteerism.

3.4 Who is a Community Animal Health Worker (CAHW)?

Objectives

At the end of the session, the trainee would have appreciated and understood:

- Who a CAHW is (their roles, functions, and limitations).
- Materials (general and specific, questions & answers, experience sharing and lectures).
- General Discussions

3.4.1 Definition

- Community Animal Health Worker (CAHW) is a person selected by livestock farmers from his/her own community and has met the selection criteria, trained, licensed to carry out basic animal health and production activities in his/her community and its catchment area.

- Community Animal Health Workers are mainly livestock keepers who are trained (by government officials, NGOs, or farmer organisations) in basic animal health techniques (such as vaccination and deworming for instance) and who deliver a limited range of veterinary services to their communities in return of some form of payment (either in cash or in kind).

- In most parts of Asia and Africa, they play a substantial role in providing animal health services at the local level due to the critical absence of veterinarians and VPPs. Thanks to CAHWs' interventions, millions of livestock keepers benefit from curative and prophylactic treatments for their animals at a reduced cost. Moreover, CAHWs are also important for overall public health since they play a crucial role in **disease surveillance**, whether detecting highly contagious diseases in livestock or zoonotic diseases affecting humans. To do this, CAHWs report vaccination activities and animal sanitary situations (phone or physically) to the responsible Veterinary Public Health authority in their area.

- CAHWs are also key actors in governmental vaccination campaigns. In Ghana for instance, CAHWs play very important roles in the fight against the Peste des Petit Ruminants (PPR) and Newcastle Disease.

3.4.2 Roles/Functions of Community Animal Health Workers

- Treatment of wounds
- Trimming of overgrown hooves
- Treatment of livestock/poultry against endoparasites
- Treatment of livestock/poultry against ectoparasites (ticks, mange mites, fleas etc.)
- Vaccination of rural poultry against Newcastle disease using the i_2-thermo stable Newcastle vaccine.
- Disease surveillance and reporting of outbreaks.
- Assist in the mobilisation of communities for production and veterinary related activities e.g. vaccinations Livestock/poultry census.
- Closed castration of small ruminants using the burdizzo
- Act as a liaison between the community and staff of MoFA/Other agencies.
- Formation of livestock farmers' associations/groups
- Undertake veterinary public health education with emphasis on zoonotic diseases (Anthrax, Rabies etc.)
- Submit monthly reports on his/her activities to MoFA (supervising VEAS of his/her catchment area) and facilitating Agency.

3.5 Roles of CAHWs in Gender Mainstreaming

- Women make up almost half of the world's farmers and livestock keepers (World Bank, 2017). They are often responsible for small livestock or poultry (as well as milk), while men are mainly engaged in the care and sale of the bigger species. In Northern Ghana women play many roles in livestock production especially local poultry and small ruminant production in the areas of feeding and keeping their pens clean and often the men leave for farm or other errands, the onus falls on the women and children to feed, tether these animals if it is the farming season, and clean up their housing.

- **Gender aspects** should therefore be integrated in the training and the activities of CAHWs.
- Involving women in animal healthcare will therefore be a benefit to the recognition of women's role in livestock management and will add to their overall empowerment. By being more involved, women can support other women thereby increasing knowledge and potentially income.

- Ensures that the interests and priorities of both male and female livestock farmers are considered in livestock and poultry production. Serve as gender equality mentors/models.
- Be able to reach out to male and female livestock farmers in the community.
- Female CAHWs can also be the preferred choice for women to work with and should motivate women to express/share women's specific concerns that they would normally fear to voice out in the presence of men in certain cultures.

3.6 Remuneration of CAHWs

- The CAHW will not be remunerated by any agency.
- However, he/she could be remunerated by beneficiaries in their own way.
- The service charges could be part of his remuneration.

3.7 Rules, Regulations & Sanctions

- The CAHW shall not provide any parenteral treatment or injections.
- They should not carry out any surgical interventions except wound management and close castration.
- They should not move to provide services in non-designated communities.
- They should not conduct inspection and movement of livestock and livestock products.
- They should not conduct any meat inspection.

3.8 National Policy on the Training and Activities of the CAHWs

- Should not conduct meat inspection.
- The CAHWs' activities shall be supervised, monitored, and evaluated by the supervising officers (Veterinary Frontline Staff, Regional Veterinary Officers, and Project staff)
- The trained CLWs start operating only after he/she has been issued with a license.
- License is **NOT** transferable.
- The license is renewable every year by the Regional Veterinary Officers (RVO).
- Renewal shall be based on satisfactory performance and reports from the supervising officers.
- Any CAHW found performing functions outside what is specified for him/her shall be sanctioned (license could be withdrawn)
- Any CAHW whose performance is unsatisfactory may be replaced by another trained CAHW.

3.9 Selection of Trainees

- It has been designed that each project community submits four (4) trainees if two trainees are to be trained per community. The selection is participatory with the farmers selecting their choice of candidates at the community level. The selected candidates are then interviewed vigorously by a team of the partner organization facilitating the training activity and Ministry of Food and Agriculture (MoFA). The final candidates are selected for the training by this team and presented to the community for approval by consent.

3.10 Relationship Between the VSD Frontline Staff and the CAHWs

Creation of Livestock Production and Health Management Value Chain Linkages for farmers**.** The need for effective collaboration between Vets and the CAHWs should be based on the following points:

- The training of the CAHWs should be done by dedicated professionals who will impart not only the knowledge of animal health but the need to obey regulations, need to respect borders or boundaries.
- Vet Technicians should be greatly involved in the training of CAHWs.
- Accepting each other as partners in the animal healthcare delivery system.
- Knowing each other's level and skills.
- Formal introduction of the CAHWs to the Vet Technologist & his Department.
- Formal introduction of CAHW and the Vet Technologist to the communities as partners in animal healthcare delivery system.
- Assigning relevant and defined duties to the CAHWs by the Vet Technician which to help keep them in their lane.
- Private entities training CAHWs who are going to be coached by Vet Technicians should make sure the playing field is even around materials or equipment for both the trainer and the trainee.
- The CAHW should consider herself as a perpetual apprentice before the Vet Technician.
- The Vet Technician should factor the activities of the CAHW into his monthly activity plan and collect report from him/her as inputs into his/her monthly report to the superior.
- Invitation of the Vet Technician to local development functions and vice versa the CAHW also being invited to certain key activities of MoFA-Vet at the district level.
- Acknowledging the roles of the CAHWs during Farmers Day activities.

CHAPTER FOUR

4.0 LIVESTOCK AND POULTRY PRODUCTION

Objectives

At the end of the training, participants should get deeper appreciation on the benefits of keeping animals. Each participant should be able to:

- Understand and explain the reasons animals are kept by smallholders.
- Discuss the economic, social, and cultural benefit of raising animals.
- Explain in broad terms the principal requirements for raising livestock.
- Understand and explain the uses of livestock in the home.
- Understand and explain the commercial uses of livestock and poultry.

Tools Q&A, Pictures, Transect Walks, Farm visits.

4.1 Importance of Livestock Rearing

- Source of protein
- Source of employment
- Source of income
- Farmyard manure for crop production
- Socio-cultural uses; Sacrifices, dowry, gifts, etc.)
- Provide farm power e.g. Ploughing, carting.
- Source of raw material for industries; leather, brisk

4.1.1 Module 2: Livestock Management Systems

Definition: The various ways by which animals are kept and managed is known as the livestock management system.

Objectives

At the end of the training, participants should get deeper appreciation of livestock and poultry management systems and the benefits of keeping animals.

Tools Q&A, Pictures, Transect Walks, Farm visits.

4.2 Types of Management Systems

There are 3 types of management systems namely:

- Intensive System
- Extensive System
- Semi-intensive System

4.3 Intensive System

- Animals are confined and consciously catered e.g. zero grazing of ruminants.

4.3.1 Advantages

- Animals are protected from intensive heat and cold.
- Animals are well protected against diseases and pests.
- Prevents feed wastage.
- Reduces losses due to theft or straying.
- Allows good record keeping.
- Manure can be easily collected for crop farming.
- Easy to detect sick animals.
- Confined animals are easier to handle and manage.
- Allows controlled breeding.

4.3.2 Disadvantages

- High cost of inputs.
- It is also labour intensive.
- Skilled/labour management is required.
- Minimum access to exercise by animals.

4.4 Extensive System/Free Range

Animals are not confined, and little or no attention is given. E.g. free range.

4.4.1 Advantages

- Less capital intensive.
- Less labour intensive.
- No skilled labour is required.

4.4.2 Disadvantages

- Animals exposed to harsh weather conditions.
- Animals exposed to theft, injuries, and accidents.
- Lower feed conversion as more energy is spent walking long distances.
- Animals exposed to disease and pests.
- Difficulty in keeping proper records.
- Higher mortalities and consequently lower profit margins.
- Difficult to practice controlled breeding.
- Selectivity during grazing could cause land degradation.
- Disease spreads fast during outbreaks.

4.5 Semi-Intensive System

Animals are provided shelter but allowed to roam during the day.

4.5.1 Advantages

- Moderate to low capital required to invest.
- Animals have enough exercise.
- Some level of record keeping is possible.
- Level of theft is reduced.

4.5.2 Disadvantages

- Animals are prone to accident.
- Conscious breed improvement cannot be done.

4.6 Crop/Livestock Integration

- This system of farming falls under mixed farming. Crop-livestock systems/integration therefore is the system of farming whereby both the crops and animals of the farmer complement each other. Integration is done to recycle resources efficiently. The droppings from the animals are used as organic manure for the crops. The crop residue is also used as feed for the livestock. Compost could also be made from both the crop residue and animal dropping for manure.

- There could also be tree crop-livestock system where the animals graze under the trees for them to grow well and the animal droppings also serves as manure after decomposing in the field. A major point is that it tends to be more important to look for high yield of the combination of the components rather than for the (high) yield of one component.

- It is a system where crops and livestock are produced within a coordinated framework. The feed for the livestock is crop residues. The manure from the livestock droppings is applied to the crops as sole or as a supplemental fertilizer.

4.6.1 Advantages

- Increase in crop and livestock production.
- Increase in incomes.
- Land degradation is reduced.
- Soils fertility is improved.

4.7 Housing

4.7.1 Introduction

It is estimated that about 50% of newborn lambs, kids, calves, and piglets die because of inadequate protection from direct effects of the weather. It is therefore important to provide shelter and shade for animals.

Objectives
At the end of this module training participants would have known the importance and the attributes of a good housing and how to maintain such structures.

Tools: Lectures, Question &Answers, Pictures, Transect Walks

4.7.2 Importance of Housing

- Protection from the harsh effects of climate i.e. rain, wind, sun etc.
- Protection against theft, accident, and predators.
- Prevent straying and easy identification of sick animals.
- Makes supplementary feeding and watering easier.

- Ensures effective disposal and proper use of manure.
- Easy handling, isolation, treatment of sick animals and reduce infant mortality after birth.
- Facilitates record keeping.
- Facilitate the practice of controlled breeding.
- Facilitates caregiving and support to pregnant females during pregnancy and delivery.

4.7.3 Attributes of Good Livestock Housing

4.7.4 Site Selection

- Avoid waterlogged areas.
- A little bit at the outskirts of the community so that will not disturb or be a nuisance to your neighbours.

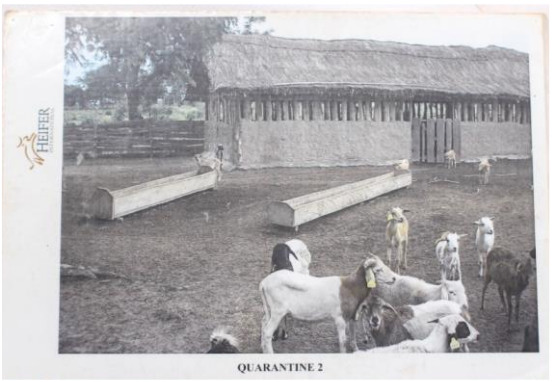
Orientation of building should be East-West direction.
Floor space: Ensure adequate floor space.

4.7.5 Table1. Floor spacing for common domestic animals.

- Generally, the pen must be bigger than the number of animals.

BASIC SPACE REQUIREMENT FOR DIFFERENT ANIMAL SPECIES

Animal Type	Space Requirement per Head	
	Length X Breadth x Height (Feet)	Length X Breadth x Height (Metres)
Cattle	6 x 4 x 10	1.8 x 1.2 x 3
Swine	5 x 4 x 10	1.5 x 1.2 x 3
Sheep/Goat	3 x 2 x 10	0.9 x 0.6 x 3
Rabbit	2 x 2 x 10	0.6 x 0.6 x 3
Chicken	1 x 1 x 10	0.3 x 0.3 x 3



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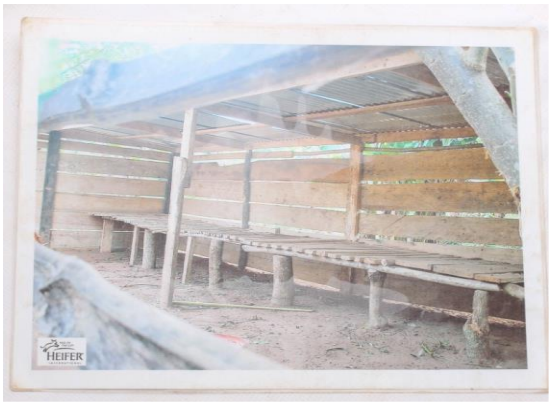
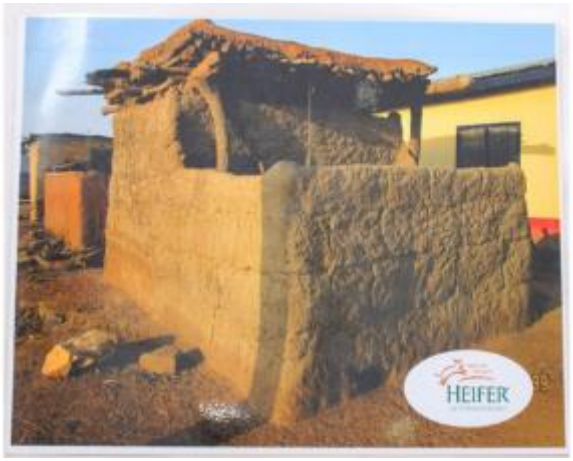


SMALL RUM. HOUSING



4.7.6 Floor Quality for Village Poultry Production

- The floor of the pen must be easy to keep clean and should stay dry.
- A damp and dirty floor stimulates the development of all kinds of germs and worms. The goats also get wet and dirty and are susceptible to disease.
- A hard clay or loam floor has the advantage that it is easily cleaned.
- By making the floor slope slightly, urine will flow to one side into a drain. This can lead to another drain going around the pen which prevents rainwater from flowing into the pen.
- Use durable, locally available materials.
- Walls should be at least 5 feet high.
- Ensure adequate ventilation.

- In warm climates the aluminum will heat up due to sunshine. Also, animals radiate heat when digesting their feed.
- If the animals cannot get rid of that heat because the surrounding temperature is too high, they eat less and therefore produce less.
- Good ventilation is therefore necessary.
- Make the shed sufficiently high and make sure there are openings for ventilation in the roof or walls.
- Ventilation also provides fresh air and carries away damp air.
- However, please note that ventilation is good, but draughts are bad! The ventilation openings must therefore be placed high enough so that air does not blow directly past the animals (draught).
- In warmer climates, where the pens are open, a low wall (of about 1 meter) on the side the wind comes from is sufficient.
- Provide a yard or an enclosed space.
- Provide store from supplementary feed and farm equipment.
- Provide feeding and watering troughs.

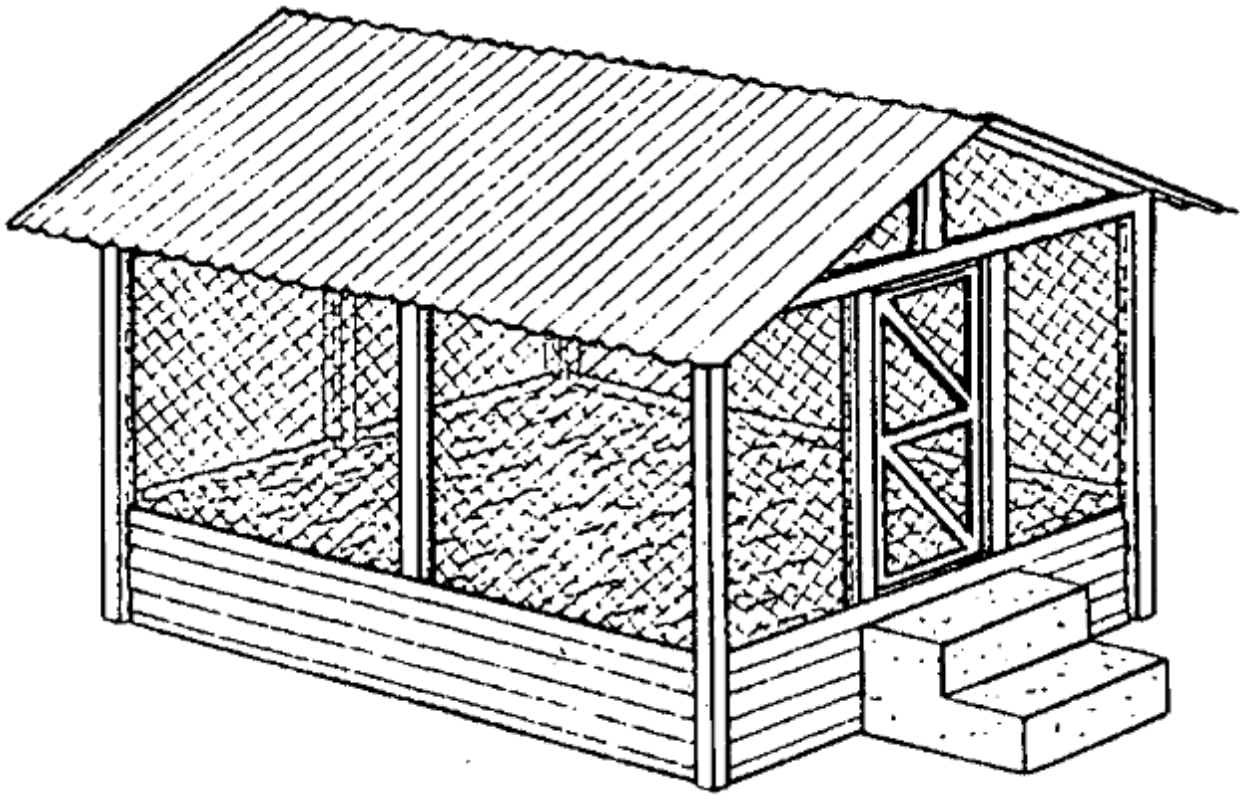
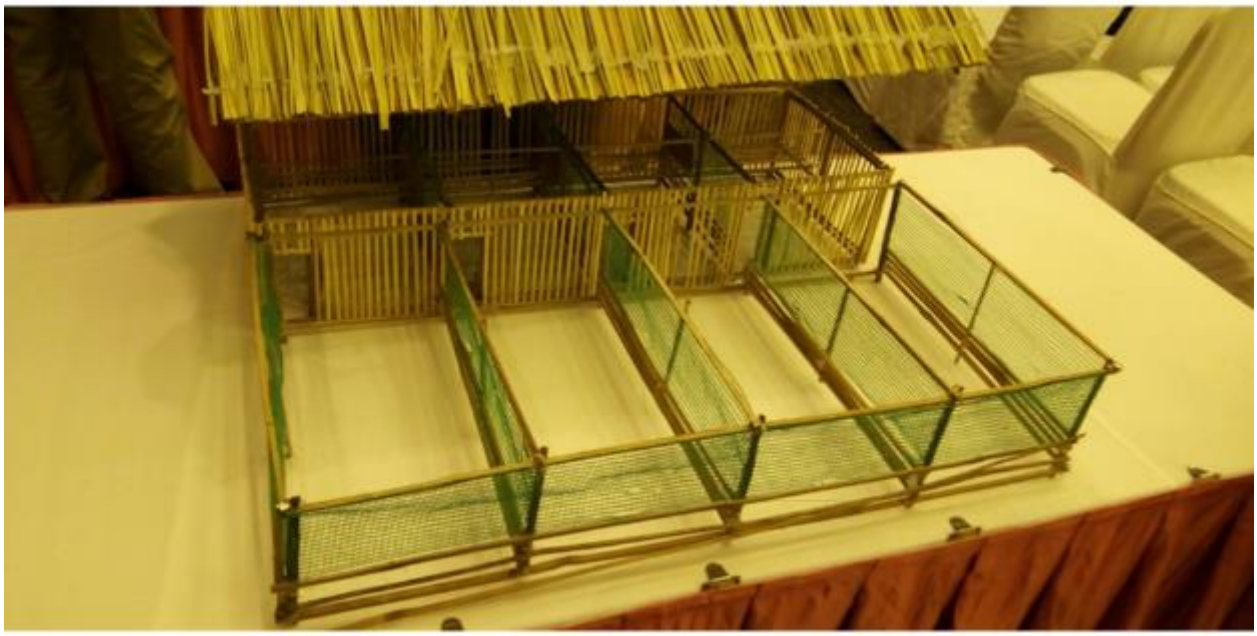


Figure 1 Improved house with good ventilation for poultry.



4.7.7 Additional Features Where Applicable.

- Foot baths
- Crush pen for easy handling during treatment and vaccination.
- Runway
- Fence/Yard attached to pen.
- Feed store.
- Provide a raised platform for goat.

4.7.8 Construction Materials for Livestock Housing.

- When constructing house for livestock efforts should be made to use locally available and less expensive materials

The following materials when available could be used:

- Clay/mud blocks, burnt bricks, cement block, mud(swish), stone, cow dung, bitumen.
- Wood, bamboo, thatch, palm fronds /leaves, roofing sheets.

4.7.9 Housing Management Practices

- The livestock keeper must ensure that the following management practices are carried to maintain the housing of livestock.

Issues to be addressed:

- Ensure adequate ventilation to avoid damp conditions, ammonia build-up.
- Regularly check and seal up all wall and floor crevices to avoid hide outs for ectoparasites.
- Routine disinfection of pen to minimize pathogen build-up.
- Regularly check and seal roof leakages
- Daily collection of droppings
- Provision of bedding to facilitate manure collection.

4.8 FEEDS AND FEEDING

- **Definition:** Feed is any substance either solid or liquid that provides nourishment for maintenance, growth, and reproduction for livestock.

Objectives
At the end of this module trainees would have understood the importance of feeding, the locally available feedstuff, the way to conserve some of the types of feed for livestock.

Tools: Discussions, transect walk,

Materials: Feed samples, supplementary feed, salt lick

4.8.1 Qualities of a Good Animal Feed

- A good animal feed should be nutritious to provide the basic nutrient requirements of the animal.
- It should provide Protein, carbohydrates, vitamins, minerals, water, etc.
- The feed of livestock o ruminants is mostly from grasses which are abundant in nature in the three northern regions, particularly in the rainy season.
- These grasses as they grow become fibrous with lower nutrients for animals.

Every good diet must contain the following nutrients in their right proportions. Such is said to be a **balanced diet.**

- Carbohydrates
- Protein
- Minerals
- Vitamins
- Fat and Oil
- Water

4.8.2 Principal Nutrients and Their Sources

Carbohydrate
Source: Cassava peels, Cassava, Corn, Corn chaff, Yam peels, Palm kernel cake, various grasses, Pito mash, rice straw

Protein
Source: Pito mash, Palm kernel cake, keta schoolboys, leguminous shrubs, groundnut haulms, Termite

Minerals and Vitamins
Source: Salt lick, Green vegetable, Mango leaves and pawpaw leaves

NB. We must feed animals with right proportions of these nutrients if we want to increase productivity.

4.8.3 Feeding Practices for Ruminants

- Feeding practices depend on local conditions, the season, the types of foodstuffs available, the possibilities for growing and storing fodder, and the resources available for buying in feed. There are four broad strategies possible:

Free range (Roaming):

- The animals find their own food, they are browsing, grazing, or on a tether. If the rangeland is fresh and green they should normally find enough for their needs by browsing and grazing.

Paddocking:

- This is where a pasture is established, fenced, and divided into paddocks. The animals are then allowed to feed on a paddock at a time. In paddocking, we can introduce any fodder species of our choice e.g. *Stylosanthes, Leucena, Gliricida* etc.

Zero grazing:

- The animals can be kept enclosed and are fed a complete ration in the enclosure. This means cutting or collecting food and carrying it to the animals, possibly supplemented with concentrates.

Free Range and Supplementation:
The animals can be left to forage free-range for part of the day but are brought in to be fed the main part of their ration. The browsing provides part of the animals' needs, but manual feeding provides the greater part.

4.8.4 Supplementary Feeding

Definition

- Supplementary Feeding is a feeding practice whereby feed is provided to animals in addition to their regular feeding regime to make up for the nutritional requirement of the animals.
- Supplementary feeding can be done all year round, but it is more essentially provided in the dry season when feed is very scarce.
- Varieties of feedstuffs that can be used in supplementary feeding include:

Agro-industrial by-products

- These consist of the residues left over at the end of food processing. They include pito mash, rice bran, wheat bran, cottonseed meal, linseed cake, groundnut cake, coconut cake, baobab seed cake, and soyabean cake (from Late Dr. Banka's Factory in Nadowli) etc. They can be important protein- and energy-rich foods.

Leguminous Trees or Shrubs

- When the dry season sets in, trees and shrubs can provide forage long after the grass has dried. Trees in general and leguminous trees in particular (planted especially for this reason) can function as excellent 'fodder banks. The leaves can be cut and carried to the animals, or the animals can be left to feed among the trees for a while. Eg. *Faidherbia albida* fruits (animal biscuits) Dagaare name: gozana). Animals also eat the fleshy part of the shea fruit.

Grasses *are Panicum maximum, Andropogon gayanus Heteropogon contortus , Cenchrus ciliaris etc.*

Herbaceous legumes such as *Stylosanthes hamata, stylosanthes guianensis , Mucuna Pruriens , Puereria phaseoloides, Cajanus cajans etc*

Concentrates

Treated Crop Residues e.g. rice straw etc.

4.8.5 Importance of Practicing Supplementary Feeding

- Increase in live weight of animals.
- Ensures good health of animals.
- It prevents straying of animals e.g. Salt lick.
- Allow farmers to observe the flock for numbers, health status etc.
- Productivity of animals is enhanced.
- Enhances reproductive performance of animals e.g. flushing.

4.8.6 Recommended Feeding Practices for Ruminants

- Ensure a minimum of 8hrs grazing time daily.
- Provide supplementary feeds.
- Establish personal fodder bank e.g. Pigeon pea, Stylosanthes.
- Develop communal grazing grounds.
- Provide fresh and clean water daily.
- Provide mineral support always.

4.8.7 Recommended Feeding Practices for Monogastrics

- Provide a balanced diet.
- Feed at least twice daily.
- Provide fresh and clean water daily.
- Provide vitamin and mineral supplementation.

4.9 Feed Conservation and Preservation

4.9.1 Ways to Improving Animal Feeding and Feed Resources

Issues to be addressed by Farmers:

- Farmers to know that animals must not look for their own feed and water.
- Prevent indiscriminate bush burning, grass and crop residues.
- Gathering of agro by-products for feeding purposes e.g. rice straw, groundnut haulms, soybean, beans, etc.
- Improve pastures with better grasses, legumes, browsing trees etc.
- Selecting and producing the seeds of local fodder and legumes as well as introducing foreign grasses and legumes
- Making hay – cutting, drying, and storing grass in times of plenty for future use, particularly in the dry season.
- Legumes and grass- legumes hay is better than grass hay alone because they are richer in proteins.
- The following are suitable: soybean, mucuna, cowpea, groundnuts, and pigeon pea.
- Three (3) days of continuous drying is required to produce good quality hay.
- Use of browse/fodder tree leaves and fruits.
- Cultivation of forage crops like stylosanthes spp, Cajanus cajan, velvet beans and using them for livestock feeding
- By making Silage by cutting and storing fresh crops like green grass, maize, sorghum etc. in large trenches in the ground where it is made airtight.
- Cereal/legume mixtures produce high-quality silage.
- Use of UREA – chemical nitrogen to treat straw. The nitrogen will be converted into proteins in the rumen of the animal.

Conservation Methods

- Sun/Shade drying.
- Bailing.
- Haymaking
- Silage
- Prevent bush burning.
- Fodder bank establishment.

Preservation of Feed

Feedstuff collected should be stored in well well-ventilated structures free from moisture and direct sunshine e.g. in barns, raised platforms, rooftops, etc. These dry-season feedstuffs should be used as supplementary feed specifically for ruminants.

Feed marketing

Tools: Pictures, Visits to Feed markets,

Watering of Livestock and Poultry

Importance of Water

- Water is so abundant and may be very cheap, hence it is most of the time taken for granted. Water in the form of body fluids makes up approximately 60-70% of the live weight of an animal. Blood is 90% water and urine is 97% water.

Objectives

- At the end of the training CAHWs should know the important role water plays in livestock nutrition. Water is essential for all livestock; it makes up 80% of the livestock's body.
- Sources of water are fresh plants, wells, boreholes, dams, dugouts, streams, rivers etc.
- Regulation of body temperature.
- Aids in excretion of urine and dropping. Inadequate water in especially cattle causes dryer dung (constipation).
- Aids in the absorption of nutrients after digestion.
- All chemical reactions in the body take place in the presence of water.
- It also acts as a lubricant for moving parts to minimize friction.

- In all situations, animals should be provided with clean and cool drinking water. Where water supply is a problem, steps could be taken to as much as possible harvest rainwater into reservoirs such as dugouts.

- Water should be provided in clean containers. Local materials such as open earthenware pots cut lorry tyres, etc. could be used. In all situations, animals should be provided with clean and cool drinking water. Where water supply is a problem, steps could be taken to as much as possible harvest rainwater into reservoirs such as dugouts.

4.9.2 Rangelands- Management, Utilization & Enrichment

Introduction

- Rangeland refers to the wide stretch of natural vegetation mostly marginal lands consisting of grasses, shrubs, and few trees where livestock graze.

- In Ghana ruminant's livestock depends mostly on the rangeland for their nutrient intake. However, the forage from rangeland is inadequate due to the following:
    - Overgrazing
    - Indiscriminate bush burning
    - Insufficient leguminous species.
    - Crop farming activities.
    - Mining activities

Consequently, the need to manage the rangelands to ensure sustainable livestock production cannot be overemphasized.

4.9.3 Rangeland Management

- It is caring and managing the rangeland in such a way as to give the most desired results. This involves making available.
    - Adequate **quantity** of forage
    - Adequate **quality** of forage

Management Practices

- Over sowing e.g. with stylosanthes
- Controlled bush burning
- Rotational Grazing
- Controlled herd size/Controlled Grazing
- Provision and even distribution of watering points.
- Provision of shade (sheds, trees etc.)

Caution: Avoid overgrazing

4.9.4 Breeds and Breeding

Definition of Breed

- Animals that, through selection and breeding, have come to resemble one another and pass those traits uniformly to their offspring. Some of these traits include color, size, horn, mild yield, egg laying percent, mothering ability, etc.

Objectives
At the end of the session, farmers should be able to identify and select good breeds with desirable characteristics. Farmers should be able to practice improved breeding.

Tools: Lectures, Demonstration, Pictures, Q&A, farm visits, discussion, training materials

The impressive performance of livestock is based on two distinct factors:

- The animal's genetic potential
- The environment

Animal Breeding is the application of the principles of animal genetics to improve the performance characteristics of farm animal.

4.9.5 Types of Breeds

Sheep Breeds

- Djallonke (West African Dwarf)
- Sahelian Sheep
- Djallonke x Sahelian (Crossbreed) High Heterosis
- Nungua Black Head (Crossbreed)

Breeds of Goat

- West African Dwarf Goat
- Sahelian Goat
- Crosses between West African Dwarf Goat and Sahelian Goat

4.9.6 Methods of Livestock and Poultry Improvement

There are 3 main ways of improving livestock and poultry genetically:

- **Selection**
  - You can select animals with desirable characteristics and allow them to reproduce.

- **Crossbreeding**
  - You can introduce a different breed with superior characteristics to cross your flock. An example is the introduction of Sahelian breed of sheep or goat to cross indigenous Djallonke breeds. Crossbreeding is highly preferred because offspring have high hybrid vigor.

- **Importation of New Breeds**

4.9.7 Selection of Breeding Animals

- Select animals that have reached puberty; **5 months for goat**, **8-9 months for sheep,** and 15-18 months for cattle. However, its recommended to delay mating until 12 months for both goat and sheep.
- Purchase breeding animals from well-established farms with good records.
- Assess the health status of animals.
- If possible, assess the performance of ancestors of animals.
- In purchasing breeding males, care must be taken not to buy them from the same farm unless sure that males are not related to the females (to minimize inbreeding).
- At times it is advantageous to buy animals which have delivered before to know whether they are good mothers or not.

4.9.8 Things to consider in selecting breeding animals.

Males

- Check size of testes, palpate the scrotal content and testes to rule out any inflammations.
- A good male should have well developed testis with a functional penis.
- Check feet conformation and any possible feet abnormalities especially in breeding males.
- The hind legs should be sturdy and strong.

Females

- Check body conformation.
- Check for well-developed udder and functional teats.
- Check the udder of females and palpate to detect any abnormalities.
- Owner's preference for coat color etc.
- The reproductive performance of a breeding male can be assessed by the performance of their offspring. It all the offspring of a particular breeding male do poorly, then that sire should be culled and replaced.

4.9.9 Inbreeding

This refers to mating of close relations:

- Inbreeding adversely affects the reproductive performance of the flock.
- Hence young males which will not be used for breeding should either be castrated or separated from the main flock.
- Some negative effects of inbreeding are stunted growth, congenital or genetic abnormalities of offspring and delay in the onset of puberty.

Castration

- This is a practice of rendering male animals sterile.
- It prevents animals with undesirable characteristics from reproducing.
- It also inhibits undesirable sex characteristics such as bad odor.
- It also reduces aggressiveness to make the animal docile.
- Open castration which involves the incision of the scrotal sac and removal of testes is one type of castration.
- Another type is Closed castration which involves the application of external pressure to cut off blood supply to the testes.

POULTRY-LOCAL CHICKEN & COMMERCIAL BIRDS

White leghorn: White in colour and of small size. It is an egg laying type.

Rhode Island Red: Layers and good carcass after slaughter

Light Sussex: Good for egg production

Black Australop: Dual purpose birds; good laying and good carcass
Hybrids: Mixtures of light and heavy breeds

- What is a Broiler? Discuss
- What is a Cockerel? Discuss
- What is a layer? Discuss

Village or Rural poultry

- Peri-urban Rural poultry
- Rural poultry –Range from the typical mongrel domestic chickens to purely exotic hybrids and their crosses which have resulted from random mating and their names are derived from where/habitat and management system under which they are kept and managed.
- They are mainly non-commercial and kept on small scale basis.

Constraints of Rural Poultry Production

- Unexploited genetic potentials
- Management and husbandry deficiencies
- Disease and other associated losses- Diseases, Predation, environmental and weather stress

Poultry Production Systems

- Traditional free- range
- Improved free-range.
- Small- scale confined rearing
- Intensive Commercial production

Free Range Production in Local Poultry

CHAPTER 4

5.0 LIVESTOCK AND POULTRY HEALTH MANAGEMENT

Disease recognition, prevention, and control

Objectives
CAHWs would be able identify:

- Signs of disease situations, control and manage basic animal health delivery.
- Participants should be able to identify sick animals and healthy ones.

Tools: Demonstration questions and answers, Video, Pictures, experience sharing Lectures, discussions.

5.1 Definition and Causes of Diseases

Causes

- Biological (infections)
- Parasitic (noninfectious)
- Mechanical (trauma)
- Chemicals (poisoning)
- Congenital (hereditary)
- Environmental (heat stroke/ cold conditions)

Mode of transmission

- Direct contact
- Aerosol
- Through Contamination of Feed and water
- Personal protective clothing

5.1.1 Signs of Good health and ill health (General)

Signs of Good Health

- Alertness and brightness – active, responds quickly to sound, touch, light, and to other objects.
- Healthy animals show body movements i.e. walking, running, trotting, and jumping.
- Good body condition –well fleshed (well fed and full).
- A healthy animal has bright smooth and shiny hair coat.
- In a healthy animal, breathing is smooth, regular, and quiet.
- A healthy animal has good appetite; rumination will normally be seen (chewing the cud, re-chewing, and re-swallowing)
- Healthy cow or cattle has it muzzle always moist.
- A healthy animal in heat should show libido.
- A healthy animal should have a clean peri-anal region Posture/Gait - in a standing position, a healthy animal stands evenly on all four feet in a relaxed manner with the back straight and level.
- When moving it walks with regular steps.
- A healthy animal should move in a group.
- All natural orifices should be devoid of discharges.

Signs of Ill-Health

A sick animal exhibits the following.

- Dullness, non-alertness
- Discharges from natural openings
- Limping or in a staggering gait
- Soiled perianal region (diarrhea)
- Loss of appetite
- Isolates itself.
- Rough coat
- Loss of hair
- No libido
- Emaciation
- No rumination
- High temperature
- Difficulty in breathing etc.

Normal Temperature of Animals (°C)

Animal	Normal Temperature
Cattle	38.5
Calf	39.5
Goat	39.5
Sheep	39
Donkey	38.2
Pig	39
Piglet	39.8
Chicken	42

The normal temperature may be up to 1 °C above or below these temperatures.

5.1.2 General Methods of Disease Prevention

- Prevention by Sanitation
- Prevention by Isolation
- Prevention by Medication
- Prevention by Vaccination

5.1.3 Sanitation

- Sanitation reduces the number of disease organisms, which the chicken contacts to the level where they will no longer cause disease.
- Sanitation provides a clean and healthy environment.
- This is achieved by ventilation to reduce the number organisms (pathogens) in the air.
- Reduction of contact with other chickens by keeping them in cages.
- Sanitation affects all levels of the bird's environment.

5.1.4 Prevention by Isolation

- This is achieved by stopping the micro-organisms that cause diseases from contacting the chickens.
- This practice is only applicable to diseases which are spread through contact or by mechanical transfer by carrier objects such as feed, water, trucks personnel, rats, wild birds, insects.
- Some disease agents are already widespread in the environment and are difficult to prevent by isolating the birds e.g. enteritis, staphylococcosis, coccidiosis etc. E. coli.

5.1.5 Prevention by Medication (Preventive Medication)

a. Some disease situations such as coccidiosis can be prevented by medication.
b. Preventive medication is most useful when protection is only required for limited time.
c. Low level antibiotic in the feed or water can prevent some diseases also.

5.1.6 Prevention by Vaccination

What is Vaccine?

- A vaccine is a type of medicine that trains the body's immune system so that it can fight a disease it has not come into contact with before. Vaccines are designed to prevent disease, rather than treat a disease once you have caught it.

Vaccination

- The act of introducing a vaccine into the body to produce protection from a specific disease.
- Poultry have a good immune response to many diseases and to vaccination.
- Poultry pass immunity to offspring through the egg.

Definition of Vaccination*:* Application of biologicals (antigens) into the body to build up immunity or resistance to a particular disease.

Importance of Vaccination

- Better to prevent than to cure.
- Cheaper to vaccinate than to treat.
- Protects animal against disease for a period Most often one year.
- Animal builds immunity against disease.
- In case of disease outbreak, vaccinated animal will not be infected.
- Vaccines must be kept under cold chain.
- Cold chain should not be broken.
- Vaccination should be repeated annually or according to the manufacturer’s instructions.
- A booster dose can be administered as directed.

Vaccination and the role of CAHWs

- Sensitize catchment area of importance of vaccination.
- Organize catchment area for vaccinations.
- Demonstrate by having your animals vaccinated always for them to see the difference.

Differences between Treatment and Vaccination

- Treatment is either curative or preventive:

  Curative: disease has occurred in the animal, and you are now using drugs to get the disease out of its system.
  - Sick animals and birds should not be vaccinated.

  Preventive: disease has not occurred, but you are treating so that it does not occur
  - Most viral diseases are not curable.

Common Diseases

Common diseases of livestock to be covered include the following:

- Common diseases of Small and Large Ruminants **include,** Anthrax, PPR, CBPP (Contagious Bovine Pleuro-pneumonia) Bovine Tuberculosis, Blackleg/Black-quarter, Endo-parasitism, Ecto-parasitism, pustular dermatitis (Orf), Mastitis, Zoonotic Diseases

- **Swine:** African Swine Fever (ASF), Endo-parasitism, Ecto-parasitism
- **Canine**
- Rabies
- **Anthrax**

Definition: Anthrax is a bacterial disease of animals and man caused by *Bacillus anthracis.*

General Information:

- This is a disease of global occurrence and often occurs as outbreaks. Spores survive in soil for many years. The disease is enzootic and endemic in the country and more common in the three northern regions. Outbreaks in the pasture are associated with infected feedstuffs and watering points.
- Clinical findings in ruminants are per-acute disease characterized by fever, septicemia, and sudden death.
- Because of risk of spread and infection, opening of the carcass is not allowed. Exudation of tarry blood from the body orifices of the cadaver, failure of the blood to clot, and absence of rigor mortis are some of the clinical signs.
- The disease occurs in all vertebrates but is most common in cattle sheep goats, pigs, and donkeys.

.**Clinical signs in Animals**

- Sudden death with blood oozing from the natural openings (anus, nostrils etc.).
- Bloat
- Rigor mortis absent.
- Blood does not clot.

Clinical signs in Humans

Human signs involve swellings around inguinal areas, the neck region, and the armpit.

- High temperatures,
- Loss of appetite,
- Difficulty in breathing
- Diffused Boils

Control

- In contact animals will have to be given heavy doses of antibiotics.
- Animals within 8.0km radius from outbreak centre should be vaccinated.
- It is a preventable disease, its best to vaccinate to avoid outbreaks.
- In case of outbreak, ban on slaughter and movement of livestock in and out of affected area should be put in place.
- A combined incident command system (Vet services, health personnel and local government authorities) should be put in place (Vet personnel will be dealing with animals, health personnel with humans and local government will provide the necessary logistics).

5.1.6 Anthrax Outbreak-What is the Role of the CAHWs

- People get anthrax by: Breathing in spores, Eating food, or drinking water that is contaminated with spores, or. Getting spores in a cut or scrape in the skin.
- The only way cutaneous (skin) anthrax can be transmitted is by direct contact with the drainage from an open sore. Anthrax is not spread from person to person by casual contact, sharing office space or by coughing and sneezing.
- Inhalation anthrax develops when anthrax spores enter the lungs through the airways. It is most contracted when workers breathe in airborne anthrax spores during processes such as tanning hides and processing wool. Breathing in spores means a person has been exposed to anthrax.
- concerning the transmission of anthrax by biting flies. blood-sucking insects. through the biting of Stomoxys calcitrans. through the bites of Stomoxys calcitrans and Tabanus striatum.

Humans can get anthrax through:

- exposure to infected domestic or wild grazing animals
- exposure to infected animal products, such as wool or hides
- inhalation of spores, typically during the processing of contaminated animal products (inhalation anthrax)
- consumption of undercooked meat from infected animals (gastrointestinal anthrax)

5.1.7 Biological weapons

Anthrax can be used as a biological weapon, but this is very rare. There hasn't been an anthrax attack in the United States since 2001.

Why is anthrax so dangerous?

- The Centers for Disease Control and Prevention (CDC) Trusted Source suggest that anthrax is one of the most likely agents to be used in a biological attack. This is because it's easy to disseminate (spread) and can cause widespread illness and death.
- Here are some other reasons why anthrax makes an effective agent for a bioterrorist attack:
    - It's easily found in nature.
    - It can be produced in a lab.
    - It can last for a long time without stringent storage conditions.
    - It's been weaponized before.
    - It can be easily released — in powder or spray form — without drawing too much attention.
    - Anthrax spores are microscopic. They might not be noticeable by taste, smell, or sight.

Anthrax illness is more common in farm animals than people. Humans have an increased risk of getting anthrax if they:

- work with anthrax in a laboratory.
- work with livestock as a veterinarian (less likely in the United States)
- handle animal skins from areas with a high risk of anthrax.
- handle grazing game animals.
- are in the military on duty in an area that carries a high risk of anthrax exposure.

While anthrax can be transmitted to humans via contact with animals, it's not spread through human-to-human contact.

What are the symptoms of Anthrax?
The symptoms of anthrax exposure depend on the mode of contact.

Case Definition-Suspected Case
A suspected case is defined as "Sudden death plus one of the following: absence of rigor mortis, bleeding from natural orifices, subcutaneous swellings, rapid bloating, or dark non-clotting blood".

Confirmed is defined as "A suspected case that is laboratory-confirmed".

Cutaneous (skin) Contact
Cutaneous anthrax is anthrax contracted through contact with the skin. If your skin comes into contact with anthrax, you may get a small, raised sore that's itchy. It usually looks like an insect bite. The sore quickly develops into a blister. It then becomes a skin ulcer with a black center. This doesn't usually cause pain. The symptoms typically develop within one to five days after exposure.

Inhalation
People who inhale anthrax usually develop symptoms within a week. But symptoms can develop as quickly as two days after exposure and up to 45 days after exposure.
The symptoms of inhalation anthrax include:

- Cold symptoms
- Sore throat
- Fever
- Achy muscles
- Cough
- Shortness of breath
- Fatigue
- Shaking
- Chills
- Vomiting

Ingestion
The symptoms of gastrointestinal anthrax usually develop within a week of exposure.
Symptoms of anthrax ingestion include:

- Fever
- loss of appetite
- nausea
- Severe stomach pain
- swelling in the neck
- bloody diarrhea

How is anthrax treated in human beings?

Treatment for anthrax depends on whether the symptoms have been developed by the victim or not.

If you're exposed to anthrax but you have no symptoms, your doctor will begin preventive treatment. Preventive treatment consists of antibiotics and the anthrax vaccine. Experimental treatments include an antitoxin therapy that eliminates the toxins caused by *Bacillus anthracis infection as opposed to attacking the bacteria itself.*

Role of CAHWs during suspected anthrax outbreaks

- In case of any sudden deaths, report immediately to MoFA/Vet.
- Carcass should not be tempered with.
- Under no circumstances should the carcass be consumed.
- Help to sensitize and mobilize communities for vaccination should it be confirmed positive.

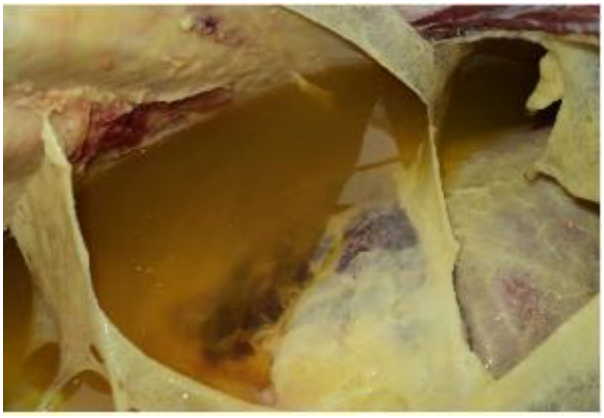
5.1.8 CBPP (Contagious Bovine Pleuro-pneumonia)

Definition. CBPP is an infectious respiratory disease of the lungs caused by *Mycoplasma mycoides* sub sp. *mycoides* in cattle, and occasionally buffaloes.

General information

- It is a major plague of cattle, endemic in Africa. Its spread is because of relaxation of import controls and increase in international trade. Insidious nature of disease also facilitates it's spread.
- Clinical signs include fever, agalactia, anorexia, depression, coughing, thoracic pain, back arched, expiratory grunting, dull areas of lungs, edema of throat, and dewlap.
- Protracted/ Chronic disease.
- It involves coughing with difficult breathing.
- Affected animals move slowly or cautiously.
- Affected animals face wind direction with wide opened nostrils for air.
- There is a gradual emaciation.
- Observable lesions are remarkable pleuritis, marked consolidation and marbling of lung, pleural adhesions. Lesions are confined to the thoracic cavity and lungs, colored fluid containing pieces of fibrin.

NB: In serious cases, death occurs after a marked consolidation and marbling of lung, pleural adhesions. Death occurs after a variable course from several days to 3 weeks. In the hyperacute form, affected cattle may die within one week after the onset of respiratory distress.



Signs:

- Protracted/ Chronic disease.
- It involves coughing with difficult breathing.
- Affected animals move slowly or cautiously.
- Affected animals face wind direction with wide opened nostrils for air.
- There is a gradual emaciation.

Control Measures

- Report to MoFA/Vet immediately.
- Emergency slaughter of sick animals is recommended.
- Vaccination of rest of the animals within 8km radius.

5.1.9 Blackleg/Blackquarter

Definition: It's a bacterial disease of cattle that affects the muscles of the limbs leading to limping with accompanying swellings. The organism produces toxins that poison the animal to death.

General Information

Blackleg, or *clostridial myositis* of skeletal muscles, is caused by the bacteria *Clostridium chauvoei*, a gram-positive, spore-forming, rod-shaped bacterium. The spores are highly resistant to environmental changes and disinfectants and persist in soil for many years. Usually, the disease occurs with several animals getting affected within a few days. The disease is enzootic areas, especially when they are prone to flooding. The case fatality rate in blackleg approaches 100%.

Clinical Findings:

- Before death, there is severe lameness,
- Pronounced swelling of the upper part of the affected leg
- Depression, complete anorexia, and ruminal stasis
- Swelling is hot and painful to touch in the early stages but soon becomes cold and painless and edema and emphysema can be felt.
- The skin becomes discoloured, dry, and cracked.
- The condition develops rapidly, and the animal dies quietly 12-36 hours after the appearance of signs.
- Many animals die without signs having been observed.
- Also called symptomatic anthrax

Postmortem Findings

- Cattle found dead of blackleg are often in a characteristic position, lying on the side with the affected hind limb stuck out stiffly.
- Bloating and putrefaction occur quickly, and bloodstained froth exudes from nostrils and anus.
- Clotting of blood occurs rapidly.
- Incision of the affected muscle mass reveals dark red to black, swollen tissue with a rancid odor and fluid containing bubbles of gas.

Signs

- On palpitation, there is a crepitating sound or noise.

Control

- Vaccination of animals within 8 km radius
- Ban on movement and slaughter.
- Antibiotic coverage in the early stages.

Role of CAHWs

- Report to your supervisor (MoFA/Vet)
- Assist in sensitization and mobilization of communities for vaccination.

5.1.10 Peste de Petite Ruminant (PPR) or Goat Plague

***Common Name*: (**Pseudo rinderpest or diarrhoea- pneumonia complex)

Definition: A viral disease of small ruminants characterized by persistent and profuse diarrhea coupled with pneumonia.

***Common Name*:** (Pseudo rinderpest or diarrhoea- pneumonia complex)

General Information

PPR: Other Name *Kata.* PPR is caused by a morbillivirus closely related to the rinderpest virus as well as measles in humans. The disease occurs mostly in goats and sheep. The disease is endemic in West Africa. Outbreaks invariably occur when new stock is introduced into the farm. Therefore, new stock should be isolated for a week or two before mixing with old stock.

Infection rate in enzootic areas is generally higher (above 50%) and can be up to 90% of the flock during outbreaks. The disease is more severe in goats than in sheep and rapidly fatal in young animals.

Mode of Transmission

- Close contact with infected animals
- Large amounts of virus are present in all body excretions and secretions esp. in diarrheic faeces.
- Infection is mainly by inhalation but could also occur through conjunctiva and oral mucosa.

Clinical Findings

Disease can be acute or sub-acute.

- Acute form seen only in goats.
- Signs generally occur 3-6 days after being in contact with an infected animal.
- A high fever is accompanied by dullness, sneezing and serous discharge from eyes and nostrils.
- A day or two later discrete necrotic lesions develop in the mouth and extend over the entire oral mucosa.

There is profound halitosis and animal is unable to eat because of a sore mouth and swollen lips.

Nasal and ocular discharges. become mucopurulent and exudate dries up, matting the eyelids and partially occluding the external nares. The nostrils are sometimes blocked leading to difficulty in breathing.

- Diarrhoea develops 3-4 days after onset of fever.
- Diarrhea is profuse and faeces may be mucoid, and blood tinged.
- Coughing occurs later and the respiratory signs are aggravated when there are secondary bacteria- infection.
- Death usually occurs within one week of the onset of illness.
- Carcass is severely dehydrated.
- Hind quarters are soiled with fluid faeces and crusts of exudate around the eyes, nose, and lips.
- Extensive areas of erosion, necrosis, and ulcerations are present in oral mucosa and pharynx.
    - Peri-anal region is soiled.
    - Pneumonia
    - Erosions of the gums
    - Foamy mouth
    - Loss of appetite

Clinical signs:

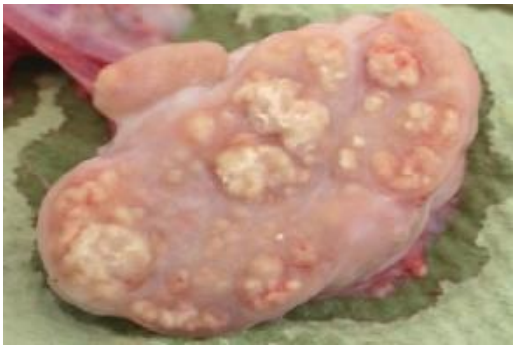
- There is profuse and persistent diarrhoea.
- The peri-anal region is soiled.
- There are muco-purulent nasal discharges.
- The nostrils are sometimes blocked leading to difficult breathing.
- Pneumonia
- Erosions of the gums.
- Foamy mouth.
- There is always loss of appetite.

Prevention and Control Measures of PPR
Role of the CAHWs-

- Report to MOFA/Vet
- Sensitize and mobilize for vaccination.

5.1.11 Tuberculosis

It is a bacterial disease of domestic and wild animals, mainly cattle that can be transmitted to humans.

Clinical Signs:

Cattle: Cough, with the progression of the disease: lymph nodes of the head, neck and front train grow larger, yellowish runny nose, loss of weight
Pigs: Generalization of tuberculosis in pigs leads to symptoms like those observed in cattle (see pictures).
Tuberculosis is mainly diagnosed in slaughtered animals.
Fowls: There is an avian tuberculosis in domestic and wild birds. Avian tuberculosis can be transmitted to domestic livestock (cattle, pigs) but generally no clinical signs are observed. Avian tuberculosis can be dangerous for immunocompromised HIV) humans.

Prevention: Health risks for the human population are real because humans are susceptible to pathogens. The danger is particularly present in raw milk. It is, therefore, necessary to screen dairy cows to eliminate affected females but also to boil raw milk before consumption (the commercially available pasteurized or UHT milk has been subjected to a treatment that kills the pathogen of tuberculosis).

Treatment: the treatment is contraindicated, eradication of identified carrier animals

5.1.12 African Swine Fever (ASF)

Definition: African Swine Fever is a contagious viral infection of wild and domestic pigs *(virus is a sole member of the Asfariviridae)*

General Information

- African Swine Fever is a disease of major threat to pig producing countries in Africa transmitted by argacid tick from wild pigs to domestic pigs. The disease is indigenous to the African continent where it affects wild pigs, and which act as reservoir of the virus which circles between the virus and the tick.

- Morbidity rate could be as high as 100% in the early stages of the disease and often over 90%. A decrease in virulence of the virus occurs with time in enzootic areas and the case-fatality rate may now be as low as 2-3%.

In the acute form of ASF, clinical findings may be as follows:

- Animals die in an acute state of shock characterized by a disseminated intravascular coagulation with multiple haemorrhages in all tissues.
- Incubation period after contact or exposure varies from 5-15 days.
- High fever (40.5^{o}C, 105^{o}F) appears abruptly and persist with other apparent signs, for about 4 days.
- Fever subsides and pigs show marked cyanotic blotching of the skin, depression, anorexia, huddling together, disinclination to move, weakness and incoordination.
- Paralysis of the hind quarters with difficulty in walking is an early and characteristic sign.
- Coordination remains in the front legs and affected pigs may walk on them dragging the hind legs
- Nasal and ocular discharges occur.
- Sometimes cough %) may be present in some pigs.
- Diarrhoea sometimes dysentery and vomiting occur in some outbreaks.
- Pregnant sows usually abort in all stages of gestation (5-8 days after infection).
- Purple discolourisation of skin may be present on limbs, snout, abdomen, and ears.

Summary of Signs and Characteristics

- Spreads very fast
- Skin discolouration.
- Incoordination
- Loss of appetite
- Massive deaths
- Paralysis of the hindquarters
- Either there is profuse diarrhoea or constipation

Control

- Confine uninfected pigs.
- Slaughter of affected animals
- Restriction on movement of animals

There is no vaccine or treatment.

Role of CAHW in Control

- Report to MoFA vet.
- Awareness creation of the disease

5.1.13 Rabies or Hydrophobia

This is a viral infection of all animals especially dogs, cats and man sometimes referred to as mad dog disease.

General Information

Rabies is caused by a virus called *Lyssavirus* which belongs to the *Rhabdoviridae* family. The disease occurs in all warm-blooded animals and affects all farm animals worldwide. It is transmitted by bites of infected animals. It is a disease of the brain, which can affect all animals as well as humans. It is caused by a virus, which are transferred through the bites of rabid (sick animals even if not showing clinical signs yet e.g. they are afraid of water) carnivorous animals such as dogs, foxes, wolves, hyenas, and some bloodsucking bats. When the rabid animal bites another animal or human, the virus, which live in its saliva, pass into the body through the wound caused by the bite and travel along the nerves to the brain.

Apart from bites, contamination of skin wounds by fresh infected saliva may result in an infection. Any bitten animal or humans gets infected if no medical attention is sought immediately. Animal and human vectors include the dogs and to some minor extents the cats.

Characteristics

- Affected animals bark on seeing water.
- Disease of dogs and cats but affects other warm-blooded animals.
- Affected dogs bark, run around biting anything on their way.
- Any bitten animal or humans gets infected if no medical attention is sought immediately.
- The disease is fatal.
- There is no known cure.
- There is salivation because of paralysis of the jaw muscles.

Treatment

- Post exposure treatment is available for human beings.
- No treatment should be attempted after clinical signs are evident in humans.

Control

- Animals with strange behavior should be quarantined.
- Vaccinate all pets.
- Destroy affected animals showing strange signs of disease.
- Report all human involvement to the medical authorities.

Caution

- Any case of dog bite should be reported to the health authorities for medical attention.
- Report to Veterinary office for the necessary action.
- Immediately wash wound with warm water and soap and apply iodine after a bite.

5.1.14 Endoparasites and Ectoparasites and their Control

Tools: questions and answers, lectures, demonstration, pictures
Endo parasites infestation and types

Objectives
Participants should be able to identify endoparasite infestation and their control.

Tools: Specimen, Pictures, questions and answers, lectures, practical demonstration

Endo –parasites

Definition: Organisms found living in the body (intestines, liver, lungs, trachea, muscles) of animals and feeding on the animal.

Types of Endo-parasites or worms

- Round worms.
- Tape worms.
- Flat worms.

Locations of some Worms

- Round worms are found in the stomach, muscles, kidneys, lungs, and intestines of animals.
- Tape worms are also found in the intestines of animals.
- Flat worms are in the liver and lungs.

Clinical Signs

- Loss of appetite
- Poor growth rate/stunted growth
- Diarrhoea
- Rough coat
- Drop in egg production.
- Coughing
- Pale eyes
- Pot belly
- Bottle jaw.

Control

- Deworm with appropriate dewormer e.g. broad spectrum dewormer.
- Strategic deworming.
- Routine deworming.
- Do not open animals early in the mornings. Allow the dew to dry before animals are opened.
- Change dewormers periodically every three to six months to avoid building up of resistance by worms.

Types of Dewormers

Dewormers come in various forms

- Boluses
- Suspensions
- Powder
- Injectable

Caution

- Always read manufacturers' instructions carefully
- Use recommended dosage.
- Make sure you don't choke the animal If animal is coughing or struggling during administration, stop and restrain it properly before administering drug.

5.1.15 Ectoparasites Infestation and Control

Definition: These are organisms which live on the body of the animals deriving their nutrient needs from these animals for their survival

Objectives:

Participants should be able to identify endoparasite infestation and their control

Tools: Specimen, Pictures, questions and answers, lectures, practical demonstration, dipping, spaying etc.

Types of ectoparasites

- Ticks
- Lice
- Fleas
- Mites
- Flies

Predilection sites of Ectoparasites

Ticks

- On the ears
- Around the scrotum
- On the udder
- Dewlap
- The inguinal region
- Around the anus
- Interdigital space

Predilection Site for Fleas, Mites And Lice

- On the body
- In the feathers of birds
- On and in the ears
- On the legs

Signs

- Restlessness
- Irritations / robbing against objects
- Anaemia
- Hairlessness in animals (alopecia)

Control of Ticks

- Use acaricides cautiously because they are poisonous and can kill.
- Infested animals can be washed (bathing), dipped or sprayed.
- Topical application is also available (pour-on, tick grease, dusting powder)

Types of Acaricides by carrying media

- Water soluble
- Oil soluble.
- Powder
- Grease

Caution on the use of acaricides

- Acaricides are highly dangerous and can kill if care is not taken.
- Should be used with outmost care.
- Make sure animal does not lick or drink acaricide solution.
- Do not over concentrate the solution (can kill animals)
- Store acaricides out of reach of children and persons who do not know their use.
- Do not bathe or dip animals on a rainy day.
- Do not also dip or bathe in the hot sun.
- Follow manufactures' instructions to the letter.
- Do not eat/drink or smoke when using acaricide.
- Do no pour left – over acaricide into water bodies (stagnant water) – streams and lakes.
- Wash hands and equipment after use of acaricide.
- Wear protective clothing when using acaricide.
- When spraying, take note of wind direction to avoid inhaling spray drift.
- Do not face wind direction.
- In case of accident follow the manufacture instructions.
- Do not use containers of chemicals for household purposes – putting water for drinking.

5.1.16 Coenurus cerebralis (Multiceps multiceps)

Definition: Coenurosis is the infection of the central nervous system of goats and sheep and occasionally cattle with *Coenurus cerebralis*, the intermediate larval stage of Taenia multiceps, a tapeworm of dogs.
Other names are *Gid and Sturdy*.

Clinical Signs:

- Blindness, in coordination, circling, knocking of their heads into objects and eventual recumbency and death.

Control:

- No treatment, the life cycle of the worm can be broken by restricting access by dogs to sheep offals.

5.1.17 Myiasis

Definition: Invasion of tissues by fly larvae.
Signs: Maggots are seen burrowing into the tissues

- Tissue damage observed,
- Irritation to the animals
- Wounds are developed on the animal.

Control:

- Spraying of flies away.
- Good sanitation of animal houses.
- Affected animals can be treated by removal of maggots and dressing of the wounds.

5.1.18 Coccidiosis in Small Ruminants (endo-blood parasite)

Definition: A protozoal infection of the intestines of domestic animals caused by coccidian spp.

Signs:

- Common in young animals with diarrhea sometimes bloody, loss of appetite, weakness and death if not attended to.

Control:

- Avoid overcrowding, clean animal houses regularly, feeding and watering troughs should be raised from ground level, apply coccidiostats to water and feed of young animals.

5.1.19 Mange

Definition Skin disease of sheep and goats and other species like cattle, pigs, dogs, and donkeys caused by skin parasites called mange mites.

Signs

- Loss of hair (alopecia)
- Crusty coat
- Emaciation
- Scratching of body on objects

Control

- Use acaricides to spray, bathe or dip affected animal.
- Use of acaricide (pour on).

Role of CAHWs

- Report to supervisor.
- Bathing of the animal with acaricide.
- Sensitize farmers not to use unorthodox methods e.g. use of engine oil, kerosene.

Poultry Diseases

Poultry Diseases and their Control or Management

- Endoparasites of poultry
- Ectoparasites of poultry and their Control
- Corrhyza **Newcastle, Fowl pox**

Newcastle Disease

Definition

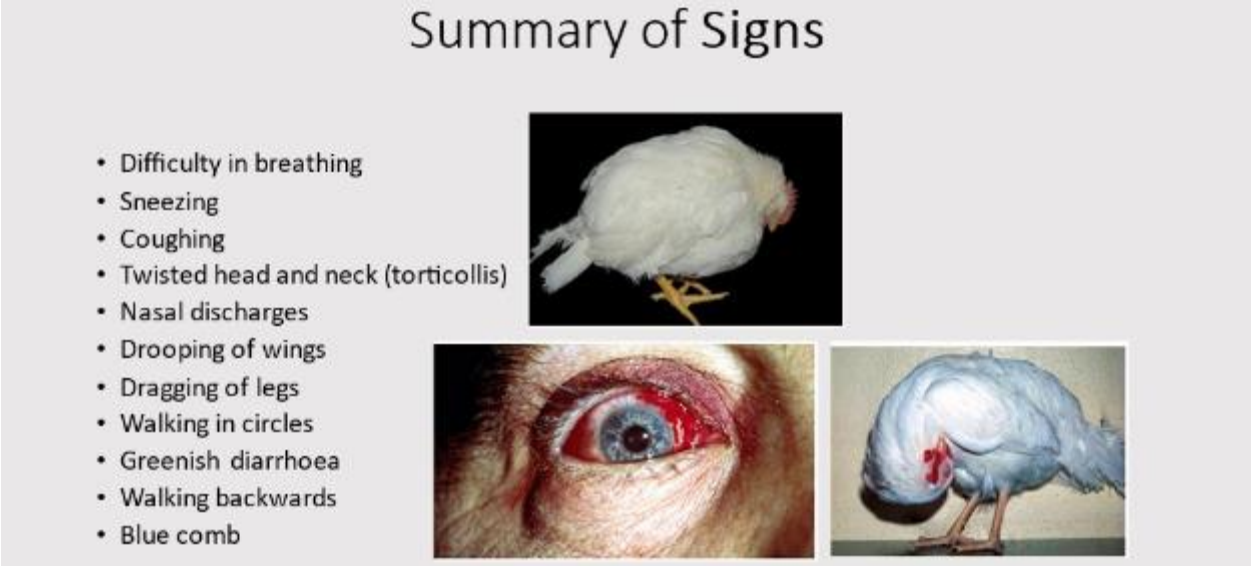
It's a viral disease of many kinds of poultry including wild and caged birds with nervous, respiratory, and digestive signs accompanied by very high mortalities sometimes up to 100%.

General Information

- In chickens Newcastle Disease is caused by slightly pathogenic (lentogenic) strains of virus. May produce few or no signs and a little or no mortality. In chickens the most pathogenic (velogenic) form of ND is usually characterized by a short course marked by respiratory signs, diarrhea and paralysis followed by death of most affected birds.

- In young chicken, ND caused by moderately pathogenic (mesogenic) strains of virus characterized by respiratory signs with concurrent or closely following central nervous system involvement and high mortality. In layers ND causes marked sudden drop in egg production, accompanied by few or no signs and little or no mortality.

- In wild and caged birds, ND is often inapparent. Signs when apparent are variable but often include gasping, respiration, diarrhoea, and later sign of CNS involvement. Sudden deaths are often the first indication of ND.



The disease usually occurs in chickens, less often in turkeys, although most poultry and many wild and caged birds are susceptible. All age groups are susceptible. Human who come in close contact with ND virus for the first time may develop a temporary localized eye infection (conjunctivitis).

Mode of Transmission

- Virus containing excretions from infected birds including aerosols and faeces, can contaminate feed, water, footwear, clothing, tools, equipment, and the environment.
- Exposure of susceptible birds to any of these sources of virus can result in transmission via inhalation/ingestion.
- Also infected poultry may spread the virus if their tissues are used without proper processing in rendered products.
- Eggs laid by infected hens may contain the virus. Such eggs seldom hatch, and few are laid due to cessation of production caused by ND. If eggs accidentally break in the hatcher, the entire hatch of chicks may be infected.
- Live virus vaccines may constitute a reservoir of ND.

Summary of Signs

- Difficulty in breathing
- Sneezing
- Coughing
- Twisted head and neck (torticollis)
- Nasal discharges
- Drooping of wings
- Dragging of legs
- Walking in circles
- Greenish diarrhoea
- Walking backwards
- Blue comb

Control

- No treatment
- Vaccination of healthy birds
- Isolate sick birds and destroy.
- Premises must be disinfected.
- Litter removed and burnt.
- Follow Vaccination regime (Hb1, La Sota and injectable Newcavac) and begins at four weeks.
- Dispose dead birds by burying or total burning.
- Send dead or affected birds for postmortem.

Avian Influenza

Bird to Human Transmission

Directly

Frequent and intensive, narrow contact with:

- Domestic infected poultry (chicken, ducks) alive.
- Wild birds infected or carriers or dead through respiratory secretions (droplets).
- Discharges from beak, tearing of the eyes.
- Droppings from infected birds (dead or alive).
- Eating of raw/uncooked meat or eggs.
- Accidental ingestion of droppings (dirty hands).

Indirectly
Frequent and intensive contact with:

- Contaminated surfaces, breeding equipment or materials such as: soiled feed, water, droppings, eggs and egg trays, hands, clothing, shoes, boots, and vehicles.

How do **humans** get infected? Through the eyes, nose and mouth and indirectly through soiled hands wiping the face.

Directly
Frequent and narrow contact with:

- Domestic infected poultry (chicken, ducks) alive.
- Wild birds infected or carriers or dead.
- Through Respiratory secretions (droplets).
- Discharges from beak, tearing of the eyes.
- Droppings: Eating of droppings.

Fowl Pox
Definition. This is a viral disease of birds with the formation of visible nodules on the head, wattles, combs, legs and mouth parts.

Characteristics: Has three forms

- ***Dry form:*** Scabs and crusts form on the face wattles and comb
- ***Wet form:*** Lesions are in the mouth, trachea (windpipe), and parts of the intestines.
- ***Mixed form:*** Dry and wet forms can both occur.

Treatment

Dry form

- Scrape scabs and crusts and apply tincture of iodine.

Wet form

- Difficult (lesions are virtually in the bird)

Control

- Vaccinate all bird using wing web method.
- Do not introduce birds from infected or unknown source.

Role of CAHW

- Report the disease outbreak to the veterinary office.
- Sensitize community about disease.
- Organize for fowl pox vaccination.

Wound Treatment

Objectives

Participant would have understood wound treatment methods and their usage.

Tools: questions and answers, Lectures, practical demonstration, Pictures, TMs

Definition of Wound

A break in the continuity of tissue in any part of the body usually produced by an external agent.

Causes

- Physical agent (mechanical) - trauma
- Chemicals – referred to as burns.

Predisposing Factors

- Inappropriate husbandry practice.
- Parasites (endo and ecto).

Classification of Wounds

Wound can be classified in to
Open
Closed

Depending on external communication, wounds can also be classified depending on the degree of damage to tissue as ff:

- **Abrasions** – only surface of skin is damaged.
- **Laceration** – would edges irregular tissue.
- **Puncture**
- **Contusions** – little damage to skin while bruising the soft tissue belong.
- **Contaminated/infected** wounds.
- **Aseptic** –surgical wounds

Wound Treatment

Procedure:

- Stop bleeding.

How?

- Restrain
- Poor clean, cold water over wound
- Press a clean, wet cloth or your hand over the place for a minute.
- Tie a piece of cloth over the wound.
- Medicament e.g. aloe.
- Clamping with forceps.
- Clean with warm water/physiological saline solution.
- Debridement – remove foreign materials, dirt damage tissues.
- Bandaging using wound dressing or antibiotic powder.
- Encourage drainage.
- Stitching of wound.
- After care/tetanus injection.

Reasons for Bandaging Wounds

- To prevent infection i.e. To protect the wound from flies, dust, and particles.
- To prevent animal from licking and mutilating the wound.
- Reduce swelling.
- To prevent bleeding.

Do not over treat wound, it is not necessary. The frequent use of water and strong antiseptics everyday will irritate and delay healing. If the wound is healing do not disturb it. The wound is healing if the surface is red and itchy.

Castration Practical

Definition Rendering a male animal sterile.

Why do we castrate?

- To control breeding and maintain a correct breeding ratio i.e.
    - Cattle 1:25 (R*efer to chapter on production)*
    - Sheep/goats 1: 30
- Male animals not required for breeding are castrated.
- To control transfer of undesirable traits E.g. animal with scrotal hernia.
- To control temperament or to tame the animal e.g. the bullock is easier to handle than the null
- To control certain diseases e.g. disease of the testes and scrotum –orchitis
- To control meat quality and for increase weight gain

Age at which animals can be castrated

- Sheep 5 months, Goat 5 months- Castrate animal only when the testes have descended.

Types of Castration

Open/Bloody

The scrotum and *tunica vaginalis* are incised to expose the testicles and spermatic cord. The testicles are removed. This method is used for pigs, cats, dogs

Closed/Bloodless
An instrument called the Burdizzo is used to crush the spermatic cord and the blood vessels without opening the scrotum. It is the method of choice for cattle, sheep and goats

Elastrator
Applying a band tight elastic band around the neck of the scrotum

Complications of Castration

- Bleeding
- Hernia
- Tetanus
- Other infections
- Death

Bloat

Bloat is simply the build-up of gas in the rumen. This gas is produced as part of the normal process of digestion and is normally lost by belching (eructation). Bloat occurs when this loss of gas is prevented. There are two sorts of bloat. The least common type is gassy bloat, which occurs when the gullet is obstructed (often by foreign objects such as potatoes) or when the animal cannot burp (such as with milk fever or tetanus).

The second type of bloat is frothy bloat, which happens as the result of a stable foam developing on top of the rumen liquid, which blocks the release of the gas. This is by far the most common form of bloat, and unlike gassy bloat, it is highly seasonal with peaks in the spring and autumn. This is because the foam is formed by breakdown products from rapidly growing forages. These increase the viscosity (stickiness) of the rumen fluid and prevent the small bubbles of gas formed by rumen fermentation from coming together to form free gas that can be belched off. (Image: Ali 1994)

CHAPTER 5

GENERAL ANIMAL HEALTH MANAGEMENT PRACTICES

Telehealth Concept

Definition

Telehealth is the blanket term for any health information, care, and/or education provided remotely with the help of technology ***involving the*** use of digital information and communication technologies, such as computers and mobile devices, to access health care services remotely and manage health care.

Relevance of Veterinary Telehealth (Newly Introduced)

With the rapid evolution of digital technologies, veterinary service providers have to adopt telehealth services to stay relevant and better serve patients and their owners. While obtaining the equipment and programs to offer these telehealth services is important, assuring veterinarians' understanding of telehealth, its benefits, and ultimately their practice thereof is vital to its success.

Most livestock value chain analysis in Northern Ghana always points to the fact that there is little or no animal health care in the rural settings which have most of the livestock populations. Even if available these services become very expensive for the "single" farmer as he or she may be the only person who might have requested for the services.

The paravet or the veterinary technical officer may be available in the area but is poorly resourced and has many communities to visit. Apart from that farmers do not often have liquidity to pay for services on the spot unless on market days when they will sell a little farm produce or a fowl to offset the health care services. The service provider is not always comfortable with that mode of payment.

Telehealth facilitates timely information sharing among all stakeholders, from livestock farmers to district and regional veterinary officers. Telehealth will therefore enhance data collection and transmission at the earliest time possible. This is very vital to the surveillance and strengthening of early warning systems of diseases and improving communication between stakeholders.

The CAHWs will serve as an interface between the livestock holders and Veterinary Service directorate of the Ministry of Food and Agriculture. They will be resourced with Mobile phones to communicate digitally in reporting on disease situations and provide prompt feedback (remedies or what to do) to farmers at the earliest time possible.

ANIMAL HEALTH DELIVERY IN GHANA -STAKEHOLDER ANALYSIS					
Value Chain Stakeholder	**Location**	**Infrastructure**	**Educational Background**	**Animal Health Delivery**	**Linkage with other stakeholders**
Stockholder /Farmers	Rural remote communities	Poor roads, bush tracks, cut off during rainy seasons	Very high Illiteracy rate	Very poor	Lowest in the linkage with other actors like vet staff, input supplier, telecos system, often poor transport system
Community Animal Health Workers	Rural remote communities	Poor roads, bush tracks, cut off during rainy seasons	Can read and write	Very poor	Telephone Linkage
Veterinary Technical Officers	District capital, bigger towns	Motorable roads within a few kilometers radius but poor to link up with the stockholders	Well educated	Service Provider	Very low linkage with stockholder. Strong linkage with input supplier, telecos, better means of transportation
District Veterinary Officers	District capital,	Good infrastructure	Well educated	Service Provider	Least linkage with farmers, Good linkage with technical officer and fair linkage with CAHW, good telecommunication at his disposal
Input Suppliers	District capital,	Good infrastructure	Educated	Service Providers	Good linkage with Technical officer but poor or no linkage with farmers

There is a need for a primary animal health care program when the existing animal health delivery system is difficult to access by majority of owners of livestock because of financial, geographic, and technical problems.

Due to the above challenges and situations in animal health delivery the concept of telehealth is handy to effectively support the primary animal health delivery in the rural areas where most of the livestock populations are found. It is hoped that any software to be used in the VETS telehealth system should have a seamless link with the relevant stakeholders at a given level in the value chain.

What is Telehealth

Veterinary telehealth describes all uses of technology geared to remotely deliver healthcare information, education, or care and services to clients and patients (animals). It involves the use of digital information and communication technologies, such as computers and mobile devices, to access health care services remotely and manage health care. Veterinary 'telehealth' describes virtual veterinary services and 'telemedicine' involving the use of digital interactions between the veterinarian and client (text messaging, photo messaging, email, and video calls, right through to the use of apps and wearable devices

Role of CAHWs in Veterinary Telehealth

- Ensure follow-up calls and/or visits to farmers are completed.
- Ensure compliance of medications as will be directed by the vet technician, etc. and answer secondary questions that they may have.
- Ensure the numbers to call are clear to the farmers.
- Teach the farmers how to keep clear records of their herds (even if it's in the most basic format- ex. 3 sheep sick) to facilitate disease diagnosis and surveillance.
- Problems should be solved or attended to as soon as possible to prevent them from building up.
- Ensure you speak to the main caretaker of the animals (ie. *Women and children!)*
- Avoid open ended statements or questions keeping to questions which the farmer can answer quickly else he will start lying.
- When conducting appointments, repeat what the farmer has just told you and/or summarize the conversation to the farmer so they can correct any miscommunication.
- When giving advice, ask the farmer whether he/she has any questions often during the conversation.
- Talk in clear simple language avoiding technical terms.
- Remember that the farmer thinks you know a lot but allow him to talk more and you will realize that you rather know little. Your contribution is value addition.
- Ask the farmer to repeat the advice you just gave to ensure clear communication and no gaps in knowledge.
- Avoid posturing and bring yourself down to the level of the farmer.
- Be punctual when called by the farmer or when you arrange to meet him or her.
- Do not create the impression that you are in a hurry, and you have many farmers to visit.

Maintenance of Equipment

- Cleaning
- Disinfection
- Sterilization

Syringes and needles must be cleaned and sterilized after treatment to kill germs. Afterwards they must be kept in a clean container. Instruments, which cannot be boiled, should be thoroughly scrubbed clean and then wiped with a disinfectant before being stored or used again. Do not use disinfectants to clean syringes and needles used for vaccination this may kill the life vaccine.

Sterilization and Disinfection

- This is done to prevent contamination and transmission of infection.
- Cleaning with antiseptic or disinfectant of syringes, needles and order instruments used in handling animals.
- Sterilization involves boiling, steaming or wet hot air and dry hot air.
- In case of metallic equipment (forceps etc.) avoid rusting by air drying.
- Disposable syringes and needles should always be well disposed.

Transport of vet samples and carcasses of poultry

- Samples are most often used for further test to confirm a case.
- Vet samples should be handled properly during transportation this is to make sure they arrive wholesome for investigations to be carried out.
- Improper handling can destroy material that could have aided in the diagnosis.
- Some of the samples should be put in ice packed containers e.g. organs, tissue and blood.
- Carcasses must be well wrapped without any parts exposed.
- Avoid spilling of discharges along your way to point of delivery.
- Suspected anthrax cases must not be moved from point of death.
- Poultry should be wrapped in polyethylene and immediately dispatched to the nearest vet laboratory.
- Avoid sending decayed samples.
- Samples should be well labeled and legible.
- State history of case concisely and precisely
- Your history can make or unmake the diagnosis.
- History should involve name, time, place/location, number involved, deaths if any as well as signs noticed.
- State name of laboratory for samples to be sent.

Disease Surveillance of Emerging and Transboundary Diseases (Emerging Topic or Issues)

What is surveillance?

Ongoing and systematic data collection, processing analysis, (and interpretation of health data in the process of describing or monitoring a health event (disease) and dissemination of that health event.
It is a system that collates, analysis and interprets data on disease frequency and distribution in animal population to initiate control measures or further investigative action.

Objectives of Surveillance System

- Early detection of livestock diseases.
- Enabling early and rapid reaction to diseases.
- Enabling planning of disease control programs.
- Provision of strategic decision-making support.
- To provide sound animal health advice to farmers and stakeholders.
- Determination of animal health status for trade.

Types of Surveillance systems
Passive and Active

Methods of Disease Surveillance - Role of CAHWs

Use of FAO Software EMA-i for Disease Surveillance
Early detection and timely reporting of animal diseases, including zoonoses, represent a national, regional and global challenge. Good-quality disease information and timely reporting is needed in order to understand the disease situation, support decision-making, prevent potential disease incursion and respond quickly. FAO has therefore developed **EMA-i** (Event Mobile Application) for data collection and to facilitate real-time disease reporting to support veterinary services capacities in disease surveillance. EMA-i is supported by **EMPRES-i** – Global Animal Disease Information System.
Training on this software should be carried out by the Epidemiology Unit of the Veterinary Services Department in conjunction with FAO Epidemiology Unit.

Advantages of the EMA-i

- Enhance **timely reporting** of disease information from local to central level (access to Internet).
- Enhance **quality** of information transmitted from local to central level.
- Improve **communication** between actors (veterinary services, animal health workers, laboratory experts).
- Effective and **early response** to disease threats.
- Enhance **feedback** on guidance, advice, services, access to veterinary drugs to support disease management.
- **Cost/effective** compared to traditional systems.
- Easy to maintain and sustain in the **long term** with limited resources.

EMA-i is a supportive tool for the veterinary services -Summary

- Reporting diseases events (real time).
- Information sharing (real time / short term) for decision-makers, public health partners, laboratories (real-time / short-term).
- Early warning, field investigation (short term).
- Risk management and disease strategies (medium/long term).
- Reduces the risk of occurrence of animal diseases.

Notifiable Schedule Diseases in Ghana			
1	Rinderpest	14	Black Quarters
2	Newcastle disease	15	African Horse Sickness
3	Highly pathogenic avian influenza	16	Lumpy Skin Disease
4	Fowl Typhoid	17	Bovine Spongiform Encephalopathy (BSE)
5	Pullorum	18	Dermatophilosis
6	Contagious Bovine Pleuropneumonia	19	Tuberculosis (Bovine TB)
7	Anthrax	20	Fowl Pox
8	Rabies	21	Haemorrhagic Septicaemia
9	Trypanosomiasis	22	Gumboro
10	Mange	23	Peste des Petits Ruminants (PPR)
11	African Swine Fever	24	Brucellosis
12	Swine Erysipelas	25	Contagious Pustular Dermatitis (Orf)
13	Foot and Mouth Disease		

Types of Case Definition

- Suspected (symptoms)
- Probable (epidemiological link)
- Confirmed (lab)
- Include person/animal, place, and time.

***For example**:*
The suspected case of Peste des Petits Ruminants is established in the presence of two of the symptoms hereafter: eye, nasal and oral discharges, oral lesion, diarrhoea, mortality.

Biosecurity In Smallholder Poultry Farms (New Topic)

What is Biosecurity?

Biosecurity is Protecting Life, Protecting the poultry from disease outbreak on the farm.

- Biosecurity is a set of practices designed to prevent the spread of disease into poultry farm or live bird market.
- It is accomplished by minimizing traffic of disease-causing agents crossing its borders. In its simplest meaning,
- It is the process of keeping germs away from poultry and keeping poultry away from germs.
- Biosecurity is the cheapest, most effective means of disease control available. Preventing diseases is always cheaper than treating or suffering the effects of disease.
- Small investments in improved housing and equipment and creating and training staff on proper biosecurity procedures will lead to healthier and more productive birds.

Components of Biosecurity

- Isolation – Keeping your poultry protected from sources of infection – including unauthorized access and carriers of disease – and separating groups of animals to minimize the spread of infection across the population.
- Traffic control – Limiting incoming traffic and traffic within your farm or market, and controlling the movement of equipment, vehicles, people, feed, birds, and eggs to prevent exposure to disease.
- Sanitation – Regularly cleaning and disinfecting housing, equipment, vehicles, and people to destroy disease agents.

Biosecurity-The Spread of Infectious Diseases

- Introduction of diseased birds
- Introduction of birds that are carriers of disease.
- Shoes and clothing of people
- Contact with objects that are contaminated with disease agents.
- Carcasses of dead birds
- Impure water, such as surface drainage water
- Pests: rodents, wild animals, and birds
- Insects
- Contaminated materials: feed, feed bags, egg flats, crates, coops, etc.
- Contaminated vehicles: delivery trucks, motorcycles, wheelbarrows, etc.
- Contaminated premises through soil and old litter
- Egg transmission (for HPAI, this is limited to egg surfaces).

Biosecurity in Small-Holder Poultry Farms and Rural Communities

- **Record** Maintain clear and complete **records** for each flock, including number of animals, species, age, where/when they were acquired, any vaccinations/medications given, any diseases present.
- **Isolation**: Use housing and PPE to prevent contamination. Try to separate poultry by age or species; separating by age is preferred to facilitate the all in-all out method:
    - Remove manure and used litter.
    - Dry clean (blow down dust if possible)
    - Wet clean using water and detergent to remove organic material and decrease pathogen load.
    - Disinfect barn surfaces and equipment to kill remaining pathogens.
    - Disinfect water lines/dishes.
    - Prepare barn for new chickens.
    - Construct a fence to prevent free-ranging birds and separate flocks by age to limit spread of disease.
    - Try keeping the birds indoors as much as possible (especially at night)
    - Other incentives to establish fencing and/or keep poultry indoors: prevents robbery of birds, prevents losing birds, prevents dirt from entering the house.

Ideal housing:

- Easy to clean.
- Reduces wind chill.
- Provides adequate ventilation and sunlight.
- Laying boxes provided

Traffic control

- Limit contact of the flock with visitors
- Do not visit live bird markets.
- Only purchase new birds from known disease-free sources
- If taking birds to a live bird market, do not return them to the flock if they don't sell.
- Remove attractants that can draw in wild birds (ex. spilled feed, open water, dead birds, trees where wild birds will nest)
- Maintain a *closed flock*: no exposure to birds from outside the flock.
- Quarantine new birds before adding them to the flock.
- Quarantine sick birds when you notice them.
- Good air quality is important to establish good litter quality and feed quality.
    - Too dry = respiratory issues
    - Too wet = ammonia buildup (toxic) and respiratory issues
- Use *disinfectant foot bath* at the door of the chicken house to prevent entry of diseases.
- Use dedicated clothes, head wear, and gum boots when working with poultry; only wear these clothes in the chicken houses and change before going anywhere else in the home.
- Keep feed protected from wild birds and mammal/insect pests.
- Do clean work first (collecting eggs, feeding, watering) followed by dirty work (disposing of carcasses, cleaning out chicken houses and dirty drinking dishes)

CHAPTER 6
CROSS-CUTTING ISSUES

Climate Change and Climate Smart Livestock Production & the Environment

- Use of CAHWs as agents of change
- Education of CAHWs on climate change and Environment
- Farmers education on climate change and agronomic practices

Issues

- Environmental degradation
- Pollution
- Indiscriminate use of agrochemicals
- Plastic waste menace-
    - Bloat in ruminants.
    - Plastic occupying the lower layers of the soil impending fibrous roots dev.
    - Choking of gutters and waterways
- Indiscriminate bush burning
- Indiscriminate logging
- Farming practices and their effects on the environment and climate
- Effect of chemical use on livestock and fish
- Farming along stream and riverbanks
- Dumping of refuse into valleys which are potential waterways.

Topic: Gender Issues in Livestock/Poultry Production Role of women and children in livestock production

Objectives

To enhance the knowledge and skills of CAHWs to effectively integrate gender equality into their work and enhance their commitments to gender mainstreaming.

Tools

Lectures, questions, and answers, Roles Plays, Pictures and Video Clips, Discussions, Activity Calendar.

- Gender is a net of social and cultural attributes in which men and women have different roles, needs and priorities. Gender roles are socially defined and are determined by social and economic activities, reflecting biological differences between women and men, and varying according to the region's cultures and activities. Gender roles are a major variable in participatory development. Under the VETS project, gender equity issues are to be tracked and monitored and forms one of the deliverables of the CAHWs. These will be done using suitable indicators, which they will periodically report on.
- Gender-sensitive indicators are indicators of gender-related differences and/or changes within society over time, reflecting the experiences of both women and men. Ideally, gender-sensitive indicators should be based on data where differences between women and men are considered at all stages of data definition, collection, tabulation, analysis, and dissemination.

- Normally, gender-sensitive indicators are derived from gender-disaggregated data. Gender-disaggregated data provide an impression of the situation, roles, and levels of participation of men and women in society. Such data are essential for mainstreaming gender issues in development policy, strategies, and programs and budgets so that gender disparities may be addressed, and gender equality and women's empowerment promoted. Gender equity implies fairness for both men and women by giving them equal opportunities to access and own resources (productive/economic, social, etc.), to participate in decision-making, and to have access to basic services.
- Gender equality means that one's rights and opportunities derive from being a human being, not from being male or female. Gender equality also means addressing issues of class or socio-economic status, age, racial and ethnic differences, which may also reinforce unequal gender relations.

Ultimate Objective

To enhance the knowledge and skills of CAHWs to effectively integrate gender equality into their work and enhance their commitments to gender mainstreaming.

Specific Objectives of Gender Equity in Community Animal Health Activities under VETS

- Participants should be able to explain to livestock farmers the concepts of gender equality and gender analysis and assess gender inequality in the livestock sector interventions.
- To make sure that there is equitable access to interventions and project resources and related benefits are distributed evenly among men and women in livestock development.
- To make a deliberate attempt to include women to participate in decisions in the communities especially among livestock holders.
- To provide even field for men and women to access knowledge and new techniques in the livestock sub-sector (Number of men and women trained to be CAHWs. *Considerations of venues, periods for training avoiding market days and farming periods. Venues should be near trainees' homes).*

Gender Roles in Livestock Production-Discussion topic.

- Male-headed families.
- Female-headed families
- Participation of Women in **Livestock Development** Project Activities -Construction of Housing, Training, Demonstrations, Vaccinations

Constraints -Discussion

- Cultural Norms hindering women from participation in livestock development issues.
- Family responsibilities
- Absence of husbands
- Illiteracy
- Time for socialization
- Confidence/forcefulness in networking.
- Poor access to information
- Access to and control of productive resources (land, labour, housing, fodder etc.)

Gender Analysis (who has more/less access?) What are the reasons? Who has less or more control? What are the reasons? What are the implications for men and women? What can be done to improve the situation?). DISCUSSION TOPICS

Role of CAHWs in Gender Mainstreaming to make sure on the following:

- Women are educated on Gender issues in livestock and poultry production.
- Women acquire knowledge and skills in livestock and poultry production.
- Women have access and control of agricultural productive assets especially.
- Women have access to information/technology.
- Women are linked up to Market opportunities.

Issues to be Discussed

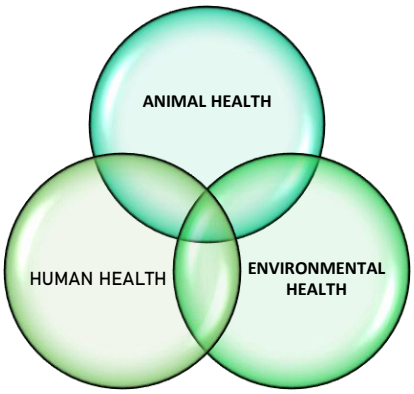
- Roles played by men and women at the household and community level (Triple Roles) and their implications, e.g. family and household responsibility, task time for men/women and related challenges and the implications on women's participation in planned activities.
- Social and cultural roles of men/women that work against women having full control over assets in livestock production/management (construction of pens, cleaning of pens, feeding/watering, tendering animals). The questions to ask are: Who does what? Who has the skills, time, and resource (including labour) to do what?
- Mobility constraints-location of meetings/trainings, time, security.
- Identify knowledge/skills set (traditional, conservative, and adaptable).
- Learning and skills applications (different abilities-who has knowledge/skills; Are men/women learning and adopting/adapting technologies at the same pace with men? What are the reasons? What can be done to address the gaps identified?).
- Risk levels of technological inputs- exposures to medications/ technologies introduced by the project.
- Vulnerability– persons with disability, living with AIDs, minority groups should not be marginalized in our activities.

Strategies to Address Gaps

- Create spaces for men and women to access and benefit from project resources.
- Consider the gender division of labour, responsibilities and coping strategies within the household.
- Consult with women to identify obstacles to their participation and benefit from project activities.
- Lobbying/dialoguing/advocating on gender issues.
- Coach/accompany women to build their skills and confidence to perform traditionally male roles and overcome fears in areas involving risks.
- Facilitate community and solutions to problems.
- Identify risks/obstacles and opportunities for minimizing their impacts should be fed into the planning, implementation and monitoring of activities and the changes reported.

One Health

What is One Health?



"....When animals are healthy human beings are also healthy…." -Ayomalie William from Jeninsa-Kanjarga Builsa South UER

One Health and its Objectives

One health is inextricably linked with animal and environmental health and seeks to increase communication and collaboration between human, animal, environmental health professionals.

Issues or Events which have brought out the Concept of One Health to Prominence

- Expansion and Growth of Human Populations into new geographic areas.
- More people live in close contact with wild and domestic animals.
- Close contact with animals and their environments provides more opportunities for diseases to pass between animals and people.
- Animals play an important role in our lives, whether for food, fiber, livelihoods, travel, sport, education, or companionship.
- Climate changes, global warming etc.
- Land use, Intensive logging (deforestation and intensive farming practices lead to disruptions in environmental conditions and habitats can provide new opportunities for diseases to pass to animals.
- Movement of people, animals, and animal products has increased from international travel and trade. As a result, diseases can spread quickly across borders and around the globe.
- Rural communities are high-risk areas for spread of zoonotic diseases (One Health) because community members harvest forest products and wildlife for food and for their livelihoods (other uses)
- In the game reserve locations of Ghana some rural communities share boundaries at the fringes of these reserved locations national parks, wetlands, protected areas, where people and animals have constant animal-wildlife-environment interface which are all high-risk locations for disease transfer.
- Rural communities are home to migratory birds, bats, monkeys and other wild animal species known to be reservoirs of zoonotic pathogens
- Currently about 60% of human pathogens are of animal origin responsible for the emerging and re-emerging zoonotic diseases (OIE,2015) originate from rural communities where the communities share the same water sources from rivers, ponds, streams, and boreholes with domestic and wildlife >some of these animals live with people as sacred animals, which is One Health concept.

All the scenarios mentioned above involving the environment (trees, rivers) human beings and animals have roles to play in the drive towards sustainable development with special reference to the rural communities and influence food security.

Some Impacts of the Changes

These changes have led to the spread of existing or known (endemic) and new or emerging **zoonotic diseases**

- Anthrax,
- Brucellosis,
- TB,
- The multiple global outbreaks of Avian Influenza
- Ebola in Africa
- Coronavirus

One Health Concept is premised to ensure the following:

1. Animal sourced food for livelihoods,
2. Provide healthy animals to improve community public health,
3. Provide enough healthy animals for socio-cultural purposes,
4. Provide animal manure for food crop production,
5. Strengthen rural households' resilience to climate change shocks,
6. Create rural employment and increased family incomes.

Keys to Sustainable Change in One Health

- Awareness
- Education
- Communication
- Collaboration
- Action
- Surveillance
- Reflection
- Re-evaluation