

One Health & Development Initiative



Implementing Hen Welfare and Cage-Free Practices on Poultry Farms in Nigeria

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Funding Support

Our work is in part funded by a grant from the Open Wing Alliance ("OWA"). Read more on their website: <u>https://openwingalliance.org/</u>.

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Suggested citation: Oluwarore K.O., Lawal T.S., Ezeocha A. B., Ogah S. I., Hen Welfare and Cage-free Farming Training Guide; One Health and Development Initiative (OHDI), March 2024.

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ABBREVIATIONS AND ACRONYMS

AMR	Antimicrobial Resistance
ANAW	Africa Network for Animal Welfare
AU-IBAR	African Union – Inter-African Bureau for Animal Resources
CEA	Centre for Effective Altruism
CVON	Chief Veterinary Officer of Nigeria
DVPCS	Department of Veterinary and Pest Control Services
DVS	Department of Veterinary Services
EA	Effective Altruism
EU	European Union
FAO	Food and Agriculture Organization
FMAFS	Federal Ministry of Agriculture and Food Security
HW	Hen Welfare
GAWS	Global Animal Welfare Strategy
MDAs	Ministries, Department and Agencies
NAFDAC	National Agency for Food and Drug Administration and Control
NGO	Non-Governmental Organization
OHDI	One Health and Development Initiative
OWA	Open Wing Alliance
Q&A	Questions and Answers
SDGs	Sustainable Development Goals
THL	The Humane League
TWGs	Technical Working Groups
VCN	Veterinary Council of Nigeria
WOAH	World Organization for Animal Health
WTO	World Trade Organization

PREFACE

HEN WELFARE AND CAGE-FREE ADVOCACY IN NIGERIA: OUR JOURNEY

One Health and Development Initiative (OHDI) is a nonprofit organization based in Nigeria that works to address correlated issues of human, animal, and ecosystem health using the One Health approach. Farmed animal welfare is one of the key contributors to One Health and in this work area, we promote knowledge and build the capacity of farmers and other relevant stakeholders on implementing and integrating good animal welfare practices into existing animal agriculture and production settings.

As in most countries, hens are the highest farmed land animals in Nigeria. Nigeria has a thriving poultry industry which produces an estimated 180 million chickens annually, the second largest in Africa (Awojulugbe, 2019; Shittu, 2022); an estimated 650 million tons of eggs annually, the highest in Africa, and an estimated 450 million tons of meat, the fourth highest in Africa (Punch Newspapers, 2022; LiveGAPS, 2021). The poultry industry is regarded as the most commercialized and well-established of the country's agricultural sub-sectors (Mengesha, 2012). Over 95 million (over 40%) of Nigeria's population are engaged in poultry farming and 13 million households earn their livelihood and income from the industry (Punch Newspapers, 2022). With a net worth of about \$4.2 billion, the poultry industry contributes about 25% of agricultural GDP to the Nigerian economy.

Despite the considerable growth and achievements, there is minimal discussion, awareness, or implementation regarding hen welfare among farmers and other stakeholders. The prevalence and preference for caged farming systems persist, with little discourse or action taken to address this issue (Oluwarore, 2023). The focus tends to only be on enhancing productivity to maximize returns on investment with little priority given to the well-being of the hens. This perpetuates factory farming systems, where numerous welfare issues persist, leading to significant stress, pain, and suffering for millions of hens. This gap fueled our determination to launch an intervention in this high-impact cause area by promoting knowledge, training, and advocacy on global best practices of hen welfare and cage-free farming among poultry farmers and stakeholders.

Our journey began by conducting an extensive baseline research to understand the knowledge, attitude, and practices of poultry farmers and stakeholders on hen welfare and the prevalence of battery cage use in Nigeria. This survey, made possible through a consultancy mandate by Africa Network for Animal Welfare (ANAW), engaged over 1300 poultry farmers, consumers, researchers, and administrators across the six geopolitical zones of the country. While the full research report is currently being prepared for journal publication, the research results was presented at the 2023 West Africa Cage-free Conference organized by ANAW. This informed a series of subsequent discourses, engagement and planning towards high-impact interventions on improving hen welfare practices and advancing cage-free poultry farming in Nigeria.

Following this, we received valuable support and resources from The Humane League (THL) through the Open Wing Alliance (OWA) to pilot our proposed intervention. This Hen Welfare and Cage-Free Training Guide is an output of this support and is a document that establishes systematic and holistic guidance to educate poultry farmers on the need for hen welfare, cage-free farming and transitioning, and other important welfare guidelines. To pilot the guide, we conducted on-site training for 47 poultry farmers, veterinarians in the government, private and research sectors - using the train-the-trainer approach. These 47 trainees were drawn from across six states in Nigeria, and they currently serve as the pilot set of trainers to disseminate awareness and training of hen welfare and cage-free farming to other poultry farm clusters.

We appreciate the support and contribution of global poultry specialists and welfare advocates who have carefully reviewed this training guide, provided their feedback, and validated the modules and content for deployment. We also value the feedback of poultry farmers and veterinarians who engaged in our pilot training using the training guide and provided us with very useful feedback in refining and adapting the content and delivery of the training guide to fit Nigeria's complex and unique local contexts.

WHO IS THIS TRAINING GUIDE FOR?

This training guide is for poultry farmers and all who work with, contribute to, or support the work that poultry farmers do. These include veterinarians, animal health and production practitioners, government administrators, policy makers and researchers in poultry, hen welfare groups, advocates and affiliated organizations, certification bodies and export institutions, international organizations that support poultry farmers, and private sector companies that purchase poultry products (such as eggs and chicken meat). This inclusion of stakeholders is important to improve their knowledge of expected hen welfare standards and ensure that demand for hen welfare practices from poultry farmers is sustained in their engagements. While this training guide focuses on the Nigerian local context; subsequent versions will be developed and published for other countries in Africa and their respective hen species (where relevant). This would be done in collaboration with the animal and hen welfare stakeholders based in the country of interest.

WHAT NEXT?

Following the development of this training guide and the pilot training conducted, our organization will scale-up interventions in hen welfare and cage-free advocacy within and outside Nigeria. This would include targeted media and community awareness, the deployment of in-person training of poultry farmers and stakeholders using a train-the-trainer approach, and engagement of suppliers on corporate campaigns.

To support the stakeholder training and education, we have developed an <u>online course</u> that will achieve the following:

- Expand and scale-up the in-person training process and reach more farmers and stakeholders via digital platforms.
- Enhance follow-up and continuous educational development and support for poultry farmers and advocates that have been trained via in-person train-the-trainer programs.
- Provide a medium for continuous peer support of farmers in integrating hen welfare practices and cage-free transitioning on their farms and gaining the accompanying benefits.
- Showcase trained farmers and cage-free farms and connect them to existing markets that demand the value of welfare-driven cage-free poultry farm systems.

Poultry farmers and stakeholders are highly encouraged to undertake the online course vis-à-vis utilizing the training guide.

In this regard, we look forward to mutually beneficial collaborations, technical and financial support of relevant organizations who are willing to join us to alleviate the pain and suffering of hens, contribute to the achievement of the grand goal of cage-free status in poultry on the continent, and improve hen health, welfare, and productivity. We are dedicated to the actualization of the cost-effective impact that can be achieved with your partnership and collaboration.

From the team at One Health and Development Initiative (OHDI)

MODULE 1: OVERVIEW OF POULTRY FARMING IN NIGERIA

This module explains poultry farming, the socioeconomic importance and summarises the common types of poultry farming systems that are present in Nigeria

WHAT IS POULTRY FARMING?

Poultry farming refers to the process of raising domesticated birds, such as chickens, ducks, turkeys, and geese, for the purpose of producing meat or eggs. It involves the breeding, rearing, and management of these birds in controlled environments, usually in specialized facilities known as poultry farms. Poultry farming can be done on a small scale, such as backyard farming, or on a large scale in commercial operations. The primary goal of poultry farming is to efficiently produce high-quality poultry products for consumption (FAO, 2013).

BRIEF OVERVIEW OF POULTRY FARMING IN NIGERIA

Poultry farming in Nigeria is a significant agricultural activity that contributes to the country's economy and provides employment opportunities for many Nigerians. It involves the rearing of various domesticated birds for meat (broilers) and egg production (layers). According to statistics from the Poultry Association of Nigeria (PAN), the poultry industry accounts for about 25% of the agricultural Gross Domestic Product (GDP) in Nigeria and contributes approximately 4% to the overall GDP of the country (PAN, 2021). Nigeria has recently experienced rapid growth for poultry meat and eggs due to a growing population, urbanization, and the change of dietary preferences. Due to this demand, the Nigerian poultry sector has responded by expanding production capacity and improving productivity.

Nigeria is the largest producer of eggs in Africa and the 20th biggest in the world, with an estimated annual production of over 1.5 billion eggs (FAO, 2019). The country also produces a significant amount of chicken meat, with an estimated annual production of over 300,000 metric tons (NBS,2019). Poultry farming in Nigeria is predominantly carried out by small-scale farmers, with an estimated 80% of the poultry farms classified as small-scale or backyard farms (Adebayo and Akanbi, 2019). However, there are also many large-scale

commercial poultry farms that have invested in modern production facilities and technologies.

COMMON POULTRY FARMING SYSTEMS IN NIGERIA

Poultry farming is a significant agricultural practice in Nigeria, contributing to the nation's food security and economic growth. Common poultry farming systems in Nigeria include the extensive, semi-intensive, and intensive systems (<u>Sime,2022</u>).

EXTENSIVE SYSTEMS

The extensive system of poultry farming is a traditional method where birds are raised in a free-range or semi-free-range environment. This type of system allows birds to have access to the outdoors to promote and encourage natural foraging behaviour and exercise. Because extensive systems in Nigeria are often conducted in small-scale subsistence manner, this system is considered cost-effective as it requires minimal investment in housing and equipment and allows birds to roam freely, reducing the need for expensive infrastructure (Ayojimi et al., 2020). The main extensive systems of poultry farming in Nigeria include:

Free-range system: In this system, birds are allowed to roam freely during the day and are confined to an (open-spaced) shelter at night. They have access to open spaces for foraging, perching, scratching, and dust bathing. Free-range system can be practiced for both subsistence and commercial purposes. However, in Nigeria, it is mostly subsistence, characterised by minimal infrastructure and relying on natural resources for feed and forage <u>(Ayojimi et al., 2020)</u>.



Picture 1.1- Free range system. Source (Bnethub)

Village system: The village system is prevalent in rural communities, where birds are allowed to roam freely within the village or community area. This system often involves communal ownership and management, where the responsibility for the birds is shared among community members. Birds scavenge for food and are supplemented with locally available feed resources (Ayojimi et al., 2020). It is also often practised for subsistence purposes and on a small scale.



Picture 1.2: Village System of Poultry Farming. Source (Livestocking.net)

Generally, birds in the extensive system have the freedom to engage in natural behaviours such as foraging, scratching, and dust bathing. This promotes their overall welfare and reduces stress-related issues (Zhao *et al.*, 2014). Poultry raised extensively have access to a diverse range of forage, insects, and greens, leading to a varied diet. This contributes to the nutritional value of their meat and eggs, which are known to be rich in omega-3 fatty acids and other essential nutrients (Wijedasa *et al.*, 2020).

Due to the subsistence nature in which extensive systems are practised in Nigeria where people hardly pay close attention to the nutrition and health of birds like in other commercially-driven systems, the birds are more vulnerable to predation by wild animals (such as snakes, foxes, and birds of prey), and disease risks which can result in significant losses (mortality) if proper preventive measures are not in place (Ovwigbo et al., 2009). Therefore, having good biosecurity measures, including a vaccination programme, regular health monitoring, and appropriate fencing can mitigate these risks (Paul et al., 2022).

SEMI-INTENSIVE SYSTEM

The semi-intensive system of poultry farming in Nigeria is a popular farming method that incorporates characteristics from both the extensive and intensive systems. In this system, poultry birds are reared in a controlled environment but are allowed some level of freedom of movement, and in some cases, they have access to outdoor areas. One of the key characteristics of the semi-intensive system is the provision of spacious housing for the birds. The housing structure is designed to provide adequate ventilation, natural light, and protection from predators and adverse weather conditions. The birds are given enough space to move around, perch, and exhibit natural behaviours such as scratching and dust bathing (FAO, 2010). Poultry farmers provide a balanced diet to the birds, consisting of a combination of commercial feed and locally sourced feed ingredients. The feed is formulated to meet the nutritional requirements of the birds at different life stages. Additionally, farmers may allow the birds to forage in open areas, where they can consume insects, worms, and vegetation, supplementing their diet with natural sources of nutrition (Osuagwu et al., 2020). The system also adopts good biosecurity practices to prevent the spread of diseases. Farmers implement measures such as the regular cleaning and disinfection of housing facilities, proper waste management, and the control of pests and parasites. Periodic health checks and vaccinations are also carried out to maintain the health and well-being of the birds (Oluyemi and Roberts, 2000). It requires a moderate level of investment and can be suitable for both small and large-scale farmers. The sale of eggs and meat from the poultry birds can provide food for the family as well as a steady source of income for the farmers, and contribute to the local economy (Chiekieze et al., 2022).

The common types of semi-intensive poultry farming systems in Nigeria include:

Deep Litter System: In this system, birds are housed in a shed with a deep layer of litter material, such as wood shavings, or rice husks. The litter absorbs moisture, provides insulation, and helps control odour (<u>Justagric., 2023</u>).



Picture 1.3: Deep litter system of poultry farming. Source (Justagric., 2023)

Backyard system: The backyard system is commonly practised in rural areas and involves raising a small number of birds in the backyards households. Birds are allowed to roam freely within the compound and are provided with simple shelter and feeding facilities. This system is usually subsistence-oriented and provides a source of income and nutrition for the household <u>(Zhao et al., 2014)</u>.



Picture 1.4- Backyard system of poultry farming. Source (Poultrysite)

INTENSIVE SYSTEM

Intensive poultry farming is a popular method of raising poultry in Nigeria. This system involves housing many birds – up to hundreds of thousands - in a controlled environment, where every aspect of their care and management is closely monitored and regulated. The goal of intensive farming is to maximise productivity and profitability by optimising resource utilisation, such as feed, water, and space (Zhao *et al.*, 2014). However, several studies have highlighted the welfare challenges of intensive poultry farming globally and in Nigeria. A research paper by (Ugo *et al.*, 2020) found that intensive systems often result in higher incidences of leg problems, feather pecking, and cannibalism among birds. These issues can be attributed to factors like high stocking density and overcrowding, inadequate or lack of environmental enrichment, and poor management practices. The common type of intensive system of poultry farming in Nigeria includes the caged system.

Battery Cage System: The Cage system includes the different types of restrictive cage housing available such as the **barren battery cages** (sometimes simply called a 'battery cage'), **enriched battery cages** (also known as the 'furnished' or 'colony' cage) and the **combi system** (and its variations). However, the barren battery cage system is the most widely used in Nigeria among the cage systems, and the most utilized for commercial poultry farms in the country. According to a <u>research presentation</u> on the status and prevalence of battery cages in Nigeria, battery cages constitute over 65% of poultry farms in Nigeria. The system involves housing birds in cages, typically made of wire mesh. For farmers, it allows for easy management, feeding, and monitoring of birds, as well as efficient waste management. On the other hand, it is rife with poor welfare issues, which will be well discussed in subsequent modules of this training guide.



Picture 1.5: Battery Cage System of Poultry Farming Source (Agro4africa)

INTEGRATED SYSTEM

The integrated system of poultry farming in Nigeria is a comprehensive approach that combines various aspects of poultry production to maximise efficiency and profitability. This system encompasses both the production of broilers and layers as well as the utilisation of their by-products for additional revenue streams (Makinta et al., 2019). One key characteristic of the integrated system is the use of modern housing facilities. These facilities are designed to provide optimal living conditions for the poultry, including controlled temperature, good ventilation, and adequate space, while providing efficient oppprtunities to perform other integrated functions of the farm (which may range from feed production to waste management (Ugo et al., 2020).

For example, to integrate feed production, an efficient feeding system is implemented. This involves the use of balanced and nutrition-rich diet that are formulated to meet the specific requirements of the birds at different stages and growth. The feeding system has automatic feeders and drinkers, reducing labour and ensuring the birds have consistent access to food and water (Anosike et al., 2021). To integrate waste management functions, the manure from farms is collected and processed into organic fertiliser, which in turn can be sold or used to enhance crop production. These practices not only provide an additional source of income but aids sustainable agricultural practices (Makinta et al., 2019).

The system also practices high biosecurity measures to prevent the spread of diseases and follows strict biosecurity protocols for example, restricted access to the farm, regular disinfection of facilities, and proper removal of waste management. There are several types of integrated systems of poultry farming in Nigeria. Here are a few examples:

- **Broiler and Hatchery Integration**: This system involves the integration of broiler production with hatchery operations. It ensures a continuous supply of day-old chicks for broiler production (Gafaru et al., 2015).
- Layer and Feed Mill Integration: This system integrates layer production with the establishment of a feed mill. It allows for the production of highquality feed for the layers, ensuring optimal nutrition and productivity <u>(Ayojimi et al., 2020)</u>.
- **Poultry and Crop Farming Integration**: This system involves integrating poultry farming with crop farming. Poultry waste is utilised as fertiliser for crop production, while crops such as maize and soybeans are grown for feed production (Sanmi et al., 2004).

QUESTIONS AND ANSWERS SESSION

DISCUSSIONS POINTS

- Introduce yourselves. Farmers should describe their poultry farm (type of system used, species(s) of birds, number of birds, location, successes, and challenges etc.).
- Others (non-farmers) should discuss their motivation for taking the course/training and what they seek to benefit.
- What are the most common poultry farming systems practised in your area? Why is this system common?
- Tell us which poultry farming system you prefer the most and why. Share your personal experiences (if any) with your preferred poultry farming system, including pros and cons.
- Have you practised integrated poultry farming before? If yes, share details of the integrated poultry farm system, your experience with it, and what you consider as pros and cons.

MODULE 2: INTRODUCTION TO ANIMAL WELFARE

This module provides a basic introduction and overview of animal welfare, providing information on general animal welfare principles and rationale. It also introduces the 5 freedoms and domains of animal welfare and gives insights into general animal/hen welfare violations and practices. Lastly, it provides insights to provisional country-level legal frameworks in Nigeria on Animal Welfare

OVERVIEW, HISTORY AND TRENDS OF ANIMAL WELFARE

Though previously marginalised, the field of animal welfare has continued to grow and advance over the last three decades due to the increasing recognition and appreciation of the link between animal sentience and animal health and well-being. Animal welfare used to focus mostly on health disposition, improved ways of detecting health issues, and animal management (Pinillos *et al.*, 2015). However, it has evolved to now include a better understanding of animals' social behaviours, cognitive abilities, and ability to feel and express pain and suffering (Broom, 2011; Mendl *et al.*, 2019).

The following provides notable chronological highlights of events in the evolution of animal welfare:

1) Ancient Civilizations (Prehistoric times - 600 BCE):

- Early human societies had varying attitudes toward animals, ranging from reverence and protection to exploitation.
- Some ancient civilizations, like the ancient Egyptians and Greeks, held certain animals in high regard and established laws to protect them.

2) Religious Influence (600 BCE - 1800 CE):

- Religious texts, such as the Old Testament in Judaism, Quran, and Hindu scriptures, promote compassion and respect for animals.
- Philosophers like Pythagoras and later Saint Francis of Assisi advocated for the ethical treatment of animals.

3) Animal Welfare Movement (1800s):

• The Industrial Revolution brought increased urbanisation and factory farming practices, leading to concerns about animal welfare.

• Influential figures such as Richard Martin and William Wilberforce in Britain campaigned for the welfare of working animals and passed laws against animal cruelty.

4) Formation of Animal Welfare Societies (19th century):

- Animal welfare societies, such as the Royal Society for the Prevention of Cruelty to Animals (RSPCA), founded in 1824, emerged to promote animal welfare and enforce animal protection laws.
- 5) Laboratory Animal Welfare (20th century):
 - Concerns grew regarding the use of animals in scientific experiments, leading to the establishment of regulations and guidelines for laboratory animal welfare.
 - Organisations like the American Society for the Prevention of Cruelty to Animals (ASPCA) and the Humane Society of the United States (HSUS) expanded their work to address animal experimentation.
- 6) Modern Animal Welfare Movement (Late 20th century Present):
 - Animal welfare concerns expanded to various areas, including factory farming, use of animals for entertainment, and wildlife conservation.
 - Animal welfare legislation and regulations are being enacted globally, expanding to issues such as housing, animal transportation, humane slaughter, and the use of animals in entertainment.
 - Non-governmental organisations (NGOs) and grassroots movements are playing a significant role in advocating for animal welfare, raising awareness about animal cruelty, and supporting legislative processes to improve good animal welfare standards and practices.

Despite these remarkable improvements in best practices globally, poor animal welfare practices are still prevalent and remain a challenge. This apparent neglect has been attributed to several reasons, such as poor awareness and education, inadequate resources, poor policy frameworks, and socio-cultural influences [including traditional or religious biases] among other constraints.

However, on a more positive note, animal welfare is receiving increasing recognition as an important contribution to an interconnected myriad of animal, human, environmental, ecosystem health (One Health), and sustainable development outcomes. This has led to the development of the on-going 'One Welfare' concept that encourages interdisciplinary partnership to improve animal and human welfare simultaneously and incorporate the environmental components of welfare (<u>Marchant-Forde and</u> <u>Boyle 2020</u>).



Picture 2.1 – Compelling Case of Animal Welfare in Africa, AU-IBAR, Africa Conference for Animal Welfare (<u>Oluwarore et al., 2022</u>)

For example, adopting good management practices can contribute to a reduction in animal and zoonotic diseases (Madzingira, 2017) and reduce mortality on farms. Research has shown that good welfare improves growth, feed efficiency, production performance and can foster human and animal bonds that can be positive for human health and social wellbeing. CIWF (2022) provides additional insights to this, stating that good husbandry practices have not only shown to have a positive impact on animal health but are advantageous for the environmental footprint of the farm and benefit economics and social performance. Therefore, the "One Welfare" recognition has stimulated concerted efforts by stakeholders to improve the welfare of animals, reduce their pain and suffering which will benefit food safety, meat quality and other important outcomes (Animal Welfare Institute, 2018).

Additional reading and videos		
Video: <u>What is Animal Welfare</u> ?		
Animal Welfare: A brief history		
<u>A history of Animal Welfare Science</u>		
Brief History of the Animal Protection Movement		
One Welfare - A framework to support the implementation of OIE animal welfare standards		
One Welfare - A platform for improving human and animal welfare		

<u>RSPCA: What is One Welfare?</u> Video: <u>What is One Welfare? Three things you need to know</u> Video: <u>Why Animal Health and Welfare matter to One Health</u>

THE 5 FREEDOMS OF ANIMAL WELFARE

In the quest for improved animal welfare, a major advancement in the recognition, understanding, and establishment of good animal welfare systems and practices has been the development of the Five Freedoms of Animal Welfare. The five freedoms are globally validated basic guidelines or welfare indicators to determine the welfare of animals, including hens. It has been influenced by several in-country and international animal health and welfare organisations, including the World Organization for Animal Health (WOAH). They include freedom from thirst and hunger, freedom to display natural behaviour, freedom from discomfort, freedom from fear and despair, as well as freedom from disease, pain, and injury (Mellor, 2018).

The following provide detailed explanations of the 5 freedoms of animal welfare (which are applied to all animals, including hens and other poultry species):

- Freedom from hunger and thirst meaning the expected provision of adequate measures of feed and water in timely, consistent, balanced, and nutritious rations devoid of contaminants and free of disease-causing organisms.
- Freedom from discomfort meaning the provision of a comfortable environment that involves healthy, and quality housing, bedding, and existence that is devoid of restrictions, unpleasant perceptions, and harsh environmental conditions (including but not limited to rainy, extreme cold or hot weather, noise, or fearful situations).
- 3. Freedom from pain, injury, and disease meaning providing adequate care and environmental conditions that are devoid of, but not limited to, any form of infliction of painful or injurious experience (flogging, kicking, fighting, etc.), provision of standard animal and farm management practices and biosecurity measures; prompt and quality veterinary care and treatment; and good antimicrobial stewardship.
- 4. Freedom to express normal behaviour This includes the provision of conditions that are not unduly restrictive, with the ability to move around (including flying, jumping, vocalising, feeding, and interacting with animals of its kind) within the considerable limits of a protected and safe environment, providing a natural setting or environment as possible that allows the animals to express their natural/normal behaviours.

5. Freedom from fear and distress – this includes considerate humane treatment of animals in a manner that does not induce fear, anxiety, distress, or other forms of psychological suffering in the animals.

The <u>Farm Animal Welfare Council (FAWC)</u> provides additional context to the 5 Freedoms of Animal Welfare and mentions three major scientific approaches to understanding animal welfare. These include:

- The importance of how an animal feels, i.e. emotions such as pain, boredom and contentment.
- The biological function in which an animal's fitness is assessed by productivity indices such as growth, milk yield, reproduction, as well as disease and injury.
- A concern for naturalness, i.e. an animal should be kept in an environment within which its species has evolved, with respect for its nature and range of normal behaviors.

All three elements are relevant to an animal's quality of life and relate in various ways to the Five Freedoms. It is also important to note that while the Five Freedoms have their distinct roles, logically, they all feed into and impact each other in several ways. For example, an animal's "freedom from hunger and thirst" contributes substantially to the satisfaction of the other 4 Freedoms in varying degrees.

Additional reading and videos Video - <u>The Five Freedoms of Animal Welfare: TOLFA Education</u> Video - <u>The Five Freedoms of Animal Welfare and how it improves product quality</u> <u>WOAH - Animal Welfare and the five freedoms</u> <u>Five Freedoms: The Gold standard of Animal Welfare</u> Farm Animal Welfare in Great Britain; Past, Present and Future

THE 5 DOMAINS OF ANIMAL WELFARE

Though the 5 Freedoms of Animal Welfare provide a strong basis for assessing animal welfare standards, an updated framework called the 5 Domains of Animal Welfare has since been established. The five domains of animal welfare include Nutrition, Environment, Health, Behaviour, and Mental Domain and it is described as a science-based best practice framework for assessing animal welfare and quality of life. The first four domains provide information about the animal's various experiences, which make up the fifth domain, the Mental Domain. It allows a distinction to be made between the physical and functional factors that affect an animal's welfare and the overall mental state of the animal arising from these factors. It also recognises that animals can experience feelings, ranging from negative to positive. In the last 20 years, this framework has been widely adopted by organisations globally as a tool for assessing the welfare impacts of research procedures, pest animal control methods, and other interventions in animals' lives.



Picture 2.2 - Five Domains of Welfare. (Source - Zoo Aquarium, Australia)

The Five Freedoms and Five Domains frameworks, comparatively, contain essentially the same five elements. However, the Five Domains explore the mental state of an animal in more detail and acknowledge that for every physical aspect that is affected, there may be an accompanying emotion or subjective experience that may also affect welfare. This is useful in terms of reinforcing the message that emotional needs are equally important as physical needs for animals. It is the animal welfare assessment model adopted by many organisations worldwide. For example, <u>Zoo Aquarium</u> (2022) indicates that while they recognise the value of using the Five Freedoms for driving the prevention of negative welfare in animals, they also apply the Five Domains for animal welfare assessment to progress beyond preventing bad animal welfare to include actively promoting positive animal welfare.

Five Freedoms	Five Domains
1. From hunger and thirst	1. Nutrition
2. From discomfort	2. Environment
3. From pain, injury, and disease	3. Health
4. To express normal behaviour	4. Behavioural interactions
5. From fear and distress	5. Mental state/experiences

Table 2.1 - Comparing Five Freedoms and Five Domains (Source – <u>RSPCA)</u>

One of the advantages of the 5 domains model is that it recognises the importance of positive welfare in assessment of an animal's wellbeing, and not just the absence of negative affective states. As described by the RSPCA, the 5 Domains show that to help ensure animals have a 'good life' they must have the opportunity to have positive experiences, including satisfaction and satiation. To enable this, those responsible for the care of animals need to provide them with environments that allow and encourage animals to express behaviours that are rewarding. Thus, the Five Domains provide a means of evaluating the welfare of an individual or group of animals in a particular situation, with a strong focus on mental well-being and positive experiences.

KEY ANIMAL WELFARE VIOLATIONS

While several violations of the Five Freedoms of Animal Welfare occur to varying degrees in many countries, many others have established and implemented legal frameworks for animal welfare that guide its practices and sanctions defaulters who violate them. Such violations and poor welfare practices common to poultry and other animals are listed as follows:

- Inhumane transport practices causing discomfort these include overcrowding, prolonged standing/lying, exposure to uncomfortable weather or other environmental factors, etc.
- Inhumane slaughter [painful, fearful, or distressing to animals] and inappropriate stunning methods or methods of terminating the life of the animal [e.g., during destruction of animals for disease control purposes]
- Inhumane handling and mutilation practices especially without anaesthesia (such as tail docking, beak trimming, castration, dehorning, disbudding, branding)
- Inhumane animal training for sports, entertainment, or leisure (e.g. cock fighting)

- Factory farming including restrictive or confined housing (e.g., cages for birds, stalls for pigs)
- Lack of quality and timely intervention of veterinary care and treatment (including the use of untrained animal health practitioners)
- Antimicrobial misuse [poor quality veterinary services or unethical practice] or overuse [to compensate for poor animal welfare induced immunosuppression]
- Administration of growth hormones, with resultant anatomical and physiological conditions that cause discomfort and pain to the animal.
- Tail docking to manipulate the functional or aesthetic features of the animal, and/or using painful methods.
- Forced molting of egg-laying hens, which causes physiological fatigue and distress to the animal, and/or using discomfort causing methods.
- Inadequate provision of food and water or withdrawal of food and water for manipulative purposes, such as for forced molting of birds, preslaughter to manipulate the live weight of the animal or to avoid too much faecal wastes.
- Barren environments that do not provide opportunities for animals to perform important normal behaviours.

This link contains a drive with several pictures depicting animal welfare violations and poor practices

LEGAL FRAMEWORKS FOR ANIMAL WELFARE IN NIGERIA

According to the <u>Animal Protection Index Reports (2020)</u> for Nigeria, there is no independent law governing animal welfare or poultry welfare specifically. However, there are some provisions related to animal welfare issues in other laws. These include the following:

- The <u>Criminal Code (1990)</u> (which addresses animal cruelty) The phrasing of the legal provision in this area seem to acknowledge that animals can suffer both physically and psychologically. It also includes protection for some groups of animals, such as those employed for draught purposes, for which overloading or overworking is illegal.
- Animal Disease Law and Act of 1988 This empowers and provide the mandate for Veterinarians to work in their capacities. This law has been amended twice over the course of its existence. The most recent amendment is the 2024 <u>Animal Disease Control Act</u> which offers extra safeguards for farm animals, such as establishing a cap on the number of animals that can be transported at once in order to guarantee adequate ventilation.

The Department of Veterinary and Pest Control Services (DVPCS), under the Federal Ministry of Agriculture and Food Security (FMAFS), oversees animal welfare. In the DVPCS, the Chief Veterinary Officer of Nigeria (CVON), who is the delegate for the World Organization for Animal Health (WOAH) on Animal Health and Welfare, oversees the Ministry's national WOAH focal point and Division for animal welfare. To address the dearth of a comprehensive legal framework for animal welfare in Nigeria, local and international stakeholders have since been engaging the DVPCS and other relevant government MDAs and policymakers in the country. Now, a holistic and comprehensive Animal Welfare Law and Policy is currently being drafted and is awaiting stakeholders' validation. Generally, this Policy is being established to align with the existing Global Animal Welfare Strategy (GAWS). However, while this has been in development since 2016, many of the improvements and revisions made have yet to be put into operation or enacted.

To support the operationalization of the policy, resource mobilisation and stakeholder engagement are currently ongoing in the country by the DVPCS-FMARD. Also, an Animal Welfare Council with several related technical working groups (TWGs) has been established. These TWGs include:

- Livestock and Production Animals TWG (which is responsible for addressing all issues of livestock and production, which includes poultry farming)
- The Aquatic Animal TWG
- Companion animals TWG
- Wildlife animals TWG
- Animals used in sport TWG.
- Animals in transit TWG
- Animals in Research TWG
- Awareness and Advocacy TWG
- Ethics, and Policy TWG

While active work and collaboration are ongoing to establish these legal and policy frameworks for animal welfare, the other main challenge remains in empowering law enforcement to enforce compliance of these laws and regulations to ensure animals are protected and kept safe (Advocate for Animals). Given that veterinarians, animal scientists and health professionals influence how animals are treated at local, national, and international levels, it is recommended that their training (undergraduate, postgraduate, vocational) includes a good grounding in animal welfare education. Providing extensive training in this regard will bring about improvements in animal welfare as well as changed attitudes and behaviour of farmers, consumers, and other stakeholders towards animal welfare (Mogoa et al., 2007). Furthermore, such

enlightened professionals have better capacity to provide technical support and advice to farmers on integrating good welfare practices on their farms.

QUESTIONS AND ANSWERS SESSION

DISCUSSION POINTS

- Participants should reflect on animal welfare in general. Were you aware of animal welfare before now? Did you consider its importance in the management of animals? Have you ever thought about animal welfare in your daily activities? How do you think animal welfare can achieve better production outcomes or better food quality? Can you give an example where increasing animal welfare results also increased human wellbeing and environmental health?
- Discuss the above-listed general animal welfare practices and violations. Which of the animal welfare violations listed are common in Nigeria?
- What do you think can be done to address and prevent poor animal welfare practices in Nigeria?
- Discuss your thoughts and feedback on the animal welfare legal framework in Nigeria. Is this enough? Are there gaps? Recommendations? What do you think can be done to fully establish and implement the Animal Welfare Law in Nigeria?
- What do you think can be done for progress in the establishment and implementation of legal frameworks for poultry welfare in Nigeria? How can you support this?

This module gives an overview of hen welfare, provides clarity on good hen welfare practices/standards and their corresponding benefits

OVERVIEW OF HEN WELFARE

Over the last few decades, hen welfare has been a topic of increasing conversation, debate, and action among stakeholders, including animal health and welfare professionals, researchers, animal rights activists, poultry farmers, policymakers, consumers, and government officials. As chickens are considered to be the most farmed land animal globally, it is important to stress the importance for improving their welfare (CIWF, 2022; Heng and &Peterson, 2013). While the Universities Federation for Animal Welfare (UFAW) reports that there were about 20 billion chickens globally in 2013, this statistic has now increased to 33 billion in 2020 (Statista, 2022). Out of these, there are 7.9 million egg-laying hens in the world (Yuhuan and Fu, 2019), and egg production has correspondingly increased, such that in 2020, China and India alone produced over 700 billion eggs (Statista, 2022).

These statistics demonstrate the high demand, supply, and trading of poultry meat and eggs globally - which has led to the rapid growth of commercial layer-hen farms. Unfortunately, such commercial systems do not support the management and welfare of the animals in a way that respects their innate needs or enables their expression of natural behaviours. Therefore, these have led to the perpetuation of poor welfare practices that cause immense suffering, pain, and poor well-being for hens. In response to these unacceptable welfare issues, there have been increasing actions towards improvements in what is now observed as good hen welfare practices (Fraser, 2008).

NATURAL HEN WELFARE BEHAVIOUR

To understand the difference between good and poor welfare practices in birds, hens, and poultry farms, it would be helpful to briefly discuss what is considered "normal" or natural behaviour in healthy hens. Normal hen behaviours refer to the natural and instinctive behaviours exhibited by hens when they are in a healthy and optimal environment. These behaviours are essential for their physical and psychological well-being. Understanding and promoting these behaviours is crucial for ensuring good hen welfare in cagefree systems including free-range, enriched deep litter and backyard settings (Hartcher and Jones, 2017).

Some of the normal hen behaviours include the following:

1. Foraging Behaviour: Hens are natural foragers and spend a significant amount of time searching for food. Foraging behaviour includes scratching the ground, pecking, and exploring the environment for insects, seeds, and vegetation. Foraging provides several benefits to the hens by providing them with essential, varied nutrients, encourages natural feeding patterns (Appleby and Hughes 1997), allows them to exhibit their natural behaviours, reduces stress, and reduces unwanted behaviours such as injurious feather pecking.

2. **Dust Bathing:** Dust bathing is an important behaviour for hens as it helps them maintain good feather condition and skin health. To do this, hens will usually find a suitable area, most likely a patch of loose, dry soil, and vigorously flap their wings and roll around in the dust. This behaviour helps clean their feathers, remove parasites, and regulates their body temperature. Dust bathing is an essential natural behaviour that should be facilitated in hen housing systems <u>(Lay et al., 2011)</u>.

3. **Nesting Behaviour:** Hens have a strong instinct to nest and lay eggs in a safe and secluded location. In natural environments, hens will search for suitable nesting sites, often hidden and protected from predators. Therefore, providing appropriate nest boxes or areas in housing systems is crucial for allowing hens to exhibit this important nesting behaviour. This behaviour helps maintain their reproductive health and reduces stress <u>(Hester and Shea-Moore, 2003)</u>.

4. **Social Behaviour:** Hens are social animals and have a hierarchical social structure within their flock. They engage in various social interactions, including grooming, preening, and vocalisations. Social behaviour helps hens establish and maintain social bonds, reduce stress, and promote overall welfare. It is important to provide adequate space and opportunities for social interactions to minimise unwanted aggressive and feather pecking behaviours within the flock (Duncan, 2006).

5. **Roosting:** A roost is an elevated bar, tree branch, or narrow plank on which chickens perch to sleep (<u>Telkamp, 2023</u>). Hens have a natural instinct to roost and this has been part of their survival instincts long before their domestication over 5000 years ago (<u>Telkamp, 2023</u>). Therefore, roosting behaviour is important for hens to feel safe, secure, and protected from predators. They roost by seeking high spots to spend the night and this involves perching or resting on

elevated structures. Providing suitable perches or elevated structures in housing systems allows hens to exhibit roosting behaviour, contributing to their overall welfare (Weeks et al., 2002).

6. **Perching:** Is a natural behaviour for hens and is an important part of their daily routine. Hens have strong feet and legs that are adapted for perching on branches, roosts, or other elevated surfaces. Perching serves several purposes for hens including muscle exercise, for safety or to avoid other hens, and to exhibit roosting behaviour (Appleby and Hughes, 1997).

7. **Sunbathing:** Chickens enjoy basking in the sun and will often stretch out with their wings spread wide to absorb warmth and soak up vitamin D. Sunbathing not only feels good for chickens but also helps keep their feathers in good condition <u>(Freire et al., 2003)</u>.

GOOD HEN WELFARE PRACTICES

Good hen welfare practices (or any animal welfare practice) should start with the farmer or caregiver of such animal(s) who is expected to provide good *stockpersonship* (having harmonious interaction with the hens). It is important that those who care for hens or establish poultry farms have a good, positive, and welfare-enhancing attitude towards the animals they are responsible for. Therefore, those who care for laying hens and pullets should demonstrate genuine care and compassion, knowledge in hen health and welfare, and adhere to the farms protocols at all times (DEFRA, 2018).

Key features of systems and practices that provide good hen welfare and management include (but are not limited to) the following:

- Ability of hens to lay their eggs in a nest and to carry out <u>normal behaviour</u> <u>and desire</u> for activities such as perching, foraging, ground pecking and scratching, dustbathing, and nesting.
- 2. Housing that includes appropriate stocking density, perch space, freedom of movement, and provision of environmental enrichment.
- 3. Fresh, unpolluted air and good ventilation.
- 4. Adequate space for walking, perching, flying, foraging, dust bathing etc.
- 5. Optimal lighting program adjusted for day and nighttime routines.
- 6. Adequate temperature.
- 7. Good litter material and management.
- 8. Minimal noise levels.
- 9. Good quality feed at correct life stages and clean water, with optimal feed and water consumption supply
- 10. No physical mutilation.

- 11. Balanced natural breeding programmes and suitable growth patterns.
- 12. Good antimicrobial stewardship.
- 13. Quality and timely veterinary care and treatment on demand.
- 14. Internal and external parasite control, e.g. worm counts, deworming treatments, ectoparasite treatment programmes.
- 15. Pest and rodent control, and protection from predators.
- 16. Humane catching and handling.
- 17. No forced moulting
- 18. Humane transportation considering journey duration and distance, weather, and stocking density.
- 19. Culling and slaughter using the most humane methods.
- 20. Good human-animal interaction, including observations of behaviour and vocalisation.
- 21.Good biosecurity e.g., at the farm entrance, buildings, egg room, range, and general farm environment.
- 22. Good standards of cleanliness.
- 23. Regular inspections of the flocks recommended to take place at least once a day, or (preferably) twice a day. In this case, the farm housing and system should be designed to enable all birds to be easily inspected, so that stockkeepers can recognise signs of poor health and welfare, and take appropriate action. Regular inspections help ensure that health and welfare issues are identified and addressed quickly. Also, regular human contact can help reduce fear among the flock and improve production.

BENEFITS OF IMPROVED HEN WELFARE

Improved animal health - When an animal is treated humanely, especially within the context of the five freedoms of animal welfare, it stands a higher chance of living a healthy, optimally productive, and vibrant life. This rationale is supported by <u>Madzingira (2017)</u> who states that "good animal welfare requires good husbandry, including disease prevention and treatment, humane handling and slaughter, and the provision of suitable nutrition and shelter. Evidence that an animal has a good welfare state includes having low levels of disease, displaying innate behaviour reproduction, and longevity. Therefore, poor animal welfare can manifest as high mortality rates, poor reproduction, increased disease, poor feather condition and skin, heavy internal and external parasites, e.g. worm and red mite burdens, and severe malnutrition" – all evidence of poor health, which invariably leads to poor productivity.

Improved quality of life of animals - Animal welfare is embedded in providing suitable, optimal environments where animals can express their natural behaviours without restriction, fear, or pain. In recent years, the evidence and scientific knowledge of the mental complexity of animals have become increasingly proven and generally accepted. It is stated that poor animal welfare negatively affects the animal, making them experience negative emotions such as pain, causing stress and suffering, and impacting their ability to express their natural behaviours (Nicks and Vandenheede, 2014). Such mental suffering and psychological stress may present as unwanted behaviours such as injurious feather pecking issues (abnormal behaviour specific to hens), phobias, anxiety, compulsions, and depression, undermining their immune system and health (Nicks and Vandenheede, 2014). Therefore, welfare-enhanced environments establishina and living conditions considerably improves the quality of animals' lives as sentient beings.

Mutually beneficial existence with humans - Coexistence with animals has always been an integral part of human existence, with animals and humans often co-existing in a mutually beneficial relationship. Animals commonly provide companionship, security, food, work support, entertainment, employment, income, and even psychological and mental health support. Humans are expected to give animals care and companionship, healthcare, shelter, feed and water, security, freedom to live and express natural behaviours, and an improved quality of life. This close relationship makes animal welfare an even more pertinent discussion.

Meeting emerging consumer demands - In our ever-changing world, welfare systems (and animals produced from such systems) are now being questioned by consumers and the public. Animal welfare is being entrenched as part of several measures to determine acceptable sustainable animal health, welfare and management systems (WOAH). These measures are being put into place by and for institutions such as the World Trade Organization (WTO), World Organization for Animal Health (WOAH)] and consumers. Now, in many countries, consumers and government policies are demanding food products from farms and companies that are pro-animal welfare. This is driving a growing change across the world where farmers, producers, sellers and value chain stakeholders are aligning with such standards and demands to implement and integrate higher animal welfare practices on their livestock and farming productions systems.

Food Quality and Safety - As detailed by <u>Poultry Site, 2019</u>, there is some evidence that hens raised and slaughtered in farming systems that adhere to

higher health and welfare standards provide a healthier overall nutritional profile and quality to consumers. Generally, cage-free eggs, especially those from free-range and organic systems, are shown to have some nutritional benefits compared to caged eggs. Any stress that hens undergo before and during the slaughtering process can lead to lower quality of meat, eggs, and other by-products. Also, prolonged stress can increase bacterial growth during and after the slaughtering (Rouger et al., 2017) and some products could harbor pathogenic bacteria such as Salmonella and Campylobacter. Therefore, reducing stress during the rearing period and slaughter process can produce higher quality and safe products. (Fuseini et al., 2023). This can be achieved by utilizing the most humane and effective stunning and slaughter methods which will reduce harmful post-mortem processes, thereby improving food quality and safety.

Improved productivity and sustainable livelihoods – In many parts of the world, the degree of attention paid to farm animal welfare (including hens) is rising at an interesting rate, and this is geared to benefit all stakeholders, including the farmers. In their research, <u>Stevenson (2011)</u> found that a higher hen welfare farming practice under a free-range system increases the economic benefits for farmers when compared to other production systems. According to the survey, welfare-oriented farming only costs 2 pence more, and with this, farmers were able to recoup these costs and make increased profits due to the premium charges that are placed on the products.

Contribution to SDGs - Improving animal welfare contributes to several United Nations Sustainable Development Goals (SDGs), primarily related to health, the environment, livelihoods, and responsible consumption. SDGs also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity (UNDP, 2023). The 17 SDGs are integrated — they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability (UNDP, 2023). As adapted from Henriksen (2017), animal welfare is an integral part of sustainable development and contributes to the following Sustainable Development Goals (SDGs):

• Goals 1 and 2: No Poverty/Zero Hunger

On a wider scale, transitioning to more humane and sustainable farming practices, such as cage-free systems, can contribute to reducing poverty and hunger by promoting efficient use of resources and improving food security. For many women and low-income households in rural agrarian communities,

the comparative affordability and practice of cage-free farming provides them with a source of nutrition, income and social capital <u>(Jensen and Dolberg, 2003)</u>. In concurrence, <u>Idamoroko and Hosu (2022)</u> highlights that the raising of birds in cage-free systems has helped to increase food security and sustainability.

• Goal 3: Ensure Good Health and Well-being.

Good animal welfare policies and enforcement support the mitigation of zoonotic diseases. The emergence of the concept of One Health is an acknowledgement that the health and welfare of humans, animals, and the ecosystem are related (WAOH). Animal welfare is directly linked to the increase in the health status and well-being of humans by providing them with healthy nutritional requirements such as proteins, vitamins (B12, B3), lipids, and Iron (James and Frank, 2019). Also, animal welfare is one of the most effective ways to reduce antimicrobial resistance in humans (Van *et al.*, 2019). Cage-free farming (especially in free range systems) reduces high levels of ammonia, which is observed in poultry farms, redistributing these nutrients back into the ecosystem in a gradual and natural way to avoid overwhelming the surrounding ecosystem with a periodic huge dump of nitrogenous litter.

• Goal 6: Good water and Sanitation

Good animal welfare will considerably increase the water quality and environmental sanitation of the communities. Since high level sanitation standards are required in animal welfare, water contamination will be reduced and more clean water available to meet other competing needs (Hutton and Chase, 2017).

• Goal 8: Decent Work and Economic Growth

Good animal welfare production systems offer an increase in the economic value of the animals and job satisfaction for farmers producing such poultry products. Additionally, good animal welfare policies reduce the occupational hazards that might occur during all farming practices to include handling and slaughtering of animals.

• Goal 12: Responsible Consumption and Production

Transitioning to cage-free farming aligns with sustainable production practices and responsible consumption. Consumers increasingly seek products that are produced with greater consideration for animal welfare and environmental and sustainable impact.

• Goal 17: Partnership for the goals

Good animal welfare policies offer a public and private partnership both locally and globally <u>(Keeling et al., 2019)</u> thereby enhancing the relationship between organisations working on improving animal welfare and various stakeholders. In 2010, Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE), and the World Health Organization (WHO) agreed to share responsibilities and coordinate global issues to address health risks in both the animal-human-ecosystems. Also, public-private partnerships through collaborations among governments, businesses, and consumers are essential for promoting cage-free farming practices, setting standards, and advocating for policy changes, to ensure the welfare of animals in agriculture.

Ultimately, the advancements of cage-free farming aligns with the broader principles of sustainable development and the efforts to create a more ethical, equitable, and ecologically responsible global food systems.

Additional reading

Farm animal welfare: the benefits What is animal welfare and why you should care? The many benefits of Animal Welfare Costs and benefits of improving farm animal welfare

QUESTIONS AND ANSWERS SESSION

DISCUSSION POINTS

- Reflecting on the good welfare practices of farmers which one(s) is/are surprising to you and why? What new knowledge have you gained from this lecture on hen welfare?
- Based on what has been discussed, do you implement any hen welfare practices on your farm or in farms you know?
- How can we effectively promote good hen welfare practices and eliminate poor hen welfare practices in Nigeria?
- Among all the benefits listed, what are the top 3 benefits that you look forward to receiving when you implement improved hen welfare? Why?
MODULE 4: INTRODUCTION TO HOUSING SYSTEM

This module provides a deeper insight into one of the most important hen welfare concerns of our time - Housing. Here, we have an overview of hen housing and discussion on the qualities and criteria of good housing.

OVERVIEW OF HOUSING FOR HENS

History of Evolving Hen Housing

Housing facilities and infrastructure for hens (and other animals) is often at the top of the agenda in hen welfare, and a continually researched topic among animal health and welfare practitioners, and industry stakeholders. Housing is a primary concern for farmed animals (Widowski, 2016), due to its important linkage with health and welfare especially if it is impacting pain and suffering and prohibiting natural behaviours. Over time, housing and infrastructure for hens have evolved and some types of housing e.g., cage-free now provide the opportunity for better welfare outcomes (National Academy of Sciences). During the 20th century, hens used to be kept in small to medium-sized flocks in barns or in free-range systems (which, as mentioned earlier, are optimum for allowing hens to perform a wide range of their natural behaviours). However, the increasing global food demand drove advent of intense commercialization of egg production which began as far back as the 20th century in Europe. As farms and flocks became much larger, concerns began to arise about the welfare of hens from disease challenges and predation, food safety (of eggs), contamination of meat and egg products.

In the 1920s and 1930s, caged systems were manufactured for laying hens to reduce disease spread, (e.g., coccidiosis and roundworms) and injuries due to feather pecking. It was also considered that the conventional cage system simplified husbandry by increasing efficiency and required less land space. These have been the basis and reason for farm conversions to caged systems, where it is assumed that some of the above-listed issues are completely mitigated. Unfortunately, cages have come at a great cost to laying hens, causing pain and suffering to them, preventing them from performing natural behaviours such as foraging and dust bathing, which in effect causes negative impact to their welfare, health and limits their overall well-being.

In the 1960s, the conventional cage housing system started to receive criticism, thereby building momentum and movement for welfare-enhanced

alternatives that has been developed and propagated by scientists, industry professionals, government institutions, and the public (consumers).

In the late 1980s and 1990s, international regulations began to evolve, restricting the use of conventional cages and promoting greater use of cagefree systems. Some notable documented events that began these discussions include:

- The work of animal welfare activists in the 1960s (the publication of the book 'Animal Machine' by Ruth Harrison) described the negative impacts of intensive poultry and livestock farming, leading to investigations by the United Kingdom (UK) government into welfare issues. Further research into intensively farmed animals to include poultry formulated recommendations, which later became known as the Five Freedoms of animal welfare (Vencomatic Group, 2021).
- In 1976, the Council of Europe published a convention which clearly stated that "the necessary space required for the physiological and ethological [behavioural] needs of the birds should be properly allocated to them", leading to the European Union establishing minimum space standards and stocking density for laying hens.
- In 1999 the EU introduced new laying hen-specific legislation which banned the use of conventional barren battery cages by 2012. It provided minimum standards for hens in different systems including 'enriched' cages, and alternative (cage-free) systems (<u>Official Journal of European Committees</u> (1999); <u>National Academy of Sciences, 2015).</u>
- In 2012, all conventional cages (also known as barren battery cage) systems were banned by the European Union (EU). Subsequently, the United Kingdom (UK) (which was part of the EU at the time) and New Zealand have also banned conventional battery cage systems, while Canada will begin their phase-out in 2036. These decisions were based on comprehensive scientific reviews and empirical data on the negative welfare impact of these housing systems on hens (RSPCA, 2023); SPCA Certified)

The growing movement to phase out battery cages has led to increased consumer awareness and action, many of whom are now choosing to purchase eggs from cage-free systems. For example, in the UK, 75% of egg production was cage-free with the majority of this (around 60%) from free-range systems<u>(Praharee, 2023)</u>; UK DEFRA, 2024). However, despite this progress, most laying hens worldwide are still housed in cages and more work

is required (and being done) to increase adoption of alternative cage-free housing across the world that will improve the welfare of hens.

CRITERIA FOR GOOD HOUSING FOR HENS

The type of housing systems farmers adopt is important for health, welfare, and productivity for laying hens. While it has been recognised that management practices vary between the housing systems <u>(Intechopen, 2019)</u>, key criteria used in determining a good housing system for hens include the following:

- Allowing for the ability to express natural behaviour Good housing for hens must provide positive welfare-driven experiences, allowing hens to express their natural behaviour and prevent or mitigate the occurrence of pain and suffering. This should include availability of pecking enrichments, aerial or raised perching, secluded nest boxes, and areas for dust-bathing
- Ventilation Hens must always be provided with adequate ventilation, as this ultimately aids the effective expulsion of excess heat, odours, dust, and moisture from the building. It also helps in dispersing the concentration of ammonia levels and disease organisms that may be airborne in the house, and helps keeps bedding dry and friable (Harris, 2012).
- Comfortable Bedding or Flooring for the Hens A good housing system for hens should have comfortable flooring material which may include an appropriate amount of litter, other bedding material, which can encourage foraging and dustbathing. Poor flooring or bedding can cause injury, hyperkeratosis of birds' feet and may increase the risk of egg breakage (Yin, 2023)
- **Nesting**: Secluded draught-free nest boxes should be provided as part of meeting hen's normal needs of laying eggs in privacy, calm, and without disturbance. Nesting material must also be safe enough to hold eggs, maintain hygiene and prevent breakage. Nesting is a priority behaviour for hens
- Feeding and Watering The housing should provide the appropriate feeding equipment such as feed troughs or chain feeders, and provision of clean water by a suitable drinker system <u>(Yin, 2023)</u>. There should also be appropriate spacing of feeders and drinkers to ensure that hens can access these feeding and drinking troughs without competition.
- **Controlled Access** A good housing system for hens should ease movement for all stock persons and farm managers while preventing unwanted access by visitors and unauthorised persons. Without such precautions, there is a higher probability of biosecurity issues and increased theft.

- Optimal Lighting and Temperature System A good lighting and heating system is a very important aspect of good housing for hens and should be adjusted to optimal levels depending on weather conditions and climate. During cold seasons, hens require a level of warmth to ensure consistency in egg production and to help maintain their routine activities. Adequate warmth helps promote good health in the hens and without provision for a good lighting and heating system, production can be impaired, and activities of the birds restricted, which can increase disease spread amongst the flock. On the other hand, heat stress, borne out of hotter weather conditions, is a great concern for poultry especially in warm climates like Nigeria and many parts of Africa. Heat stress can potentially lead to an increase in mortality and a drop in production. Therefore, care must be taken to provide balance and optimal temperature and lighting conditions for the poultry farm.
- Convenient to clean and easy waste disposal A good housing system for hens should be constructed in such a way that every part of the farm can be easily accessed to be effectively cleaned, disinfected, and the waste disposed of. This will significantly reduce the risks of the birds being exposed to diseases as well as high mortality, which could pose a health threat to other animals and humans (Yin, 2023).
- Groups according to age and species To prevent bigger birds from stepping on or pecking smaller chicks, a good housing system for hens would make provision for separating the birds into age groups and possibly according to the different species available on that farm. This also helps to reduce aggression amongst the birds (which can lead to other welfare issues such as feather pecking and disease challenges) (Yin, 2023), and help as a biosecurity measure.
- Must not be overcrowded Good housing for hens must allow for considerable spacing of hens and must not be overcrowded. Apart from the uncomfortable situation that overcrowding presents, it can cause unwanted behaviours such as injurious feather pecking, can inhibits birds' ability to express their natural behaviour, and increases the risk of spreading diseases.

QUESTIONS AND ANSWERS SESSION

DISCUSSION POINTS

- What type of housing system do you have on your farm? Based on what you have learned, how do you think this has impacted on the health and welfare of your birds?
- Before you started your poultry farm, did you carefully consider the type of housing system to adopt? What and who informed your choice of housing for your birds?
- Based on what you have learned, discuss what you will do moving forward to improve the housing of your birds.

MODULE 5: CHALLENGES WITH CAGE FARMING

This module discusses the common types of cage systems in poultry housing, summarises their harmful nature and how they negatively impact the health and welfare of hens.

Caged farming often includes the conventional battery cages, enriched cages, and other forms of restrictive housing systems for hens that negatively impact the expression of their normal behaviour, welfare and health. These have been elucidated below.

CONVENTIONAL BATTERY CAGES

Conventional battery cages are small, barren wire cages used for housing birds, primarily egg-laying hens (or layers). They may range from a few cages for a small farm or live market to many thousands of cages that may be stacked up to contain hundreds of thousands of birds. The space given to each bird is usually less than the size of a piece of A4 paper, and cages are often only about 40 cm high. Modern farmed chickens retain the strong desire to perform the behaviour of their wild ancestors which is restricted by confinement in battery cages. Therefore, hens in battery cages experience extreme confinement and behavioural restriction, without enough space to even stretch or flap their wings. The inability to perform such strong instinctive behaviour causes great frustration and stress for them <u>(EFSA, 2005)</u>.

Due to the restricted movement, constant standing on a wire floor, lack of perches, and inability to walk, flap their wings, exercise, or perch, hens in battery cages suffer very poor muscle and bone strength, leading to severe bone and muscle weakness, a high rate of bone fractures (especially at depopulation), frustration, abnormal and unwanted behaviours, and poor welfare.

ENRICHED CAGE HOUSING SYSTEMS

Enriched battery cages (also known as colony or furnished cages) are similar to the barren battery cage since they are also made out of wire metal cages, and often stacked in rows. The slight difference is that enriched battery cages provides hens with a little more usable space, housing more birds (typically holding 20 to 100 hens) and may provide additional environmental enrichment features such as perches, a nest box/area in which to lay eggs, and a litter or scratch area. However, the usable space per hen is still less than an A4 sheet of paper which represents the abuse of farm animals raised for food. In these cages, hens face extreme confinement, which restrict their abilities to move around freely, rest undisturbed and express their normal behaviours, causing them pain, stress and frustration. This is particularly important for laying hens which are often bred to live and lay eggs for well over a year, are considered to have the poorest bone strength and suffer more fractures at depopulation. Therefore, due to its restrictive architecture for hens and the limited opportunities for behavioural expression for hens, enriched cage is still not considered acceptable for welfare.



Picture 6.1: Enriched colony housing system (Egg Farmers of Canada)

While there are other variations of caged housing system for poultry housing (such as the Combi System), overall, many scientific studies have concluded that optimal health and welfare of hens cannot be achieved in battery cages, and their welfare is severely compromised in this housing system (RSPCA, 2023). The key welfare issues associated with cage housing systems are elucidated below:

 In all types of cages, hens' normal behaviours are either severely restricted or not provided for at all. Modern hens are highly motivated to express these behaviours which include wing flapping, scratching the ground, dust bathing, perching, nesting (before and during egg laying), foraging, and ground pecking, just like their wild ancestors. For example, nesting behaviour is triggered internally by changes in hormone levels, and hens are highly motivated to lay their eggs in a private, secluded nesting location. The internal drive to nest remains, even when hens are confined to a battery cage. However, the behavioural restriction imposed by all caged systems, leads to stress, frustration and poor welfare.

- Poor bone quality High levels of egg production in today's hens result in the use of excessive calcium for eggshell formation, at the expense of structural bone. This, together with the severe restrictions on movement in battery cages, results in bone weakness and osteoporosis, which lead to a high incidence of poor musculoskeletal health, chronic pain and bone breakages at depopulation (Baxter, 1984; Webster, 2005; Laywel, 2006). A report by the European Food Safety Authority (EFSA) shows that restriction of movement is one of the main causes of bone fragility in eag laying hens, and that the inability to behave naturally and the high levels of osteoporosis pose a particularly severe threat to the welfare of hens kept in barren battery cages (EFSA, 2005). It is important to note that all commercial laying hens in cage and cage-free systems are susceptible to osteoporosis (a condition that weakens bones) due to them being selectively bred to produce high volumes of eggs. This can weaken their bones and can lead to high levels of bone fractures. However, the restricted space in cages means hens are unable to properly move and exercise. This lack of loadbearing exercise makes their bones even weaker. Therefore, laying hens in cages are considered to have the poorest bone strength and to suffer more fractures at depopulation (the removal of birds from the house at the end of the laying period).
- Caged hens do not have access to 'personal space' and are usually prone to threats and aggression. Limited resources in 'enriched' cages can be dominated by higher ranking hens and there can be high levels of competition. They cannot escape from other hens or threats of any kind from other predators such as rats, wild cats, snakes etc.
- The lack of sufficient height and floor space in battery cages reduces welfare by preventing hens from adopting certain postures due to confinement, such as an erect posture with the head raised,- and performing particular movements such as wing flapping and wing stretching (Dawkins et al., 1989; Duncan, 2006).
- Foot and claw damage are more frequent in cages than in other systems, with lesions, fissures, and hyperkeratosis on the feet and overgrown, twisted, or broken claws (Tauson, 1980). Damage to the sole of the feet is caused by the high, localised pressure from thin floor wire (Appleby, 1991). Also, the cages' wire mesh can lead to poor feather condition (Mc Klean et al., 1986).
- Caged hens, not exposed to new stimuli, are usually more fearful than cage-free hens, and unable to retreat from potential threats.

QUESTIONS AND ANSWERS SESSION

DISCUSSION POINTS

- Discuss the challenges of the cage system which of the challenge(s) is/are surprising to you and why? What new knowledge have you gained from this module on the challenges of cage farming?
- Among all the challenges listed of cage farming, which one(s) have you experienced on your farm or someone else's cage farm? Did you know if the challenge was a result of the cages, or was it attributed to something else?

MODULE 6: ALTERNATIVE HOUSING SYSTEMS FOR HENS

This module provides a deeper understanding into the recommended alternative cage-free housing system and their benefits to hen welfare, health, and productivity.

Currently, multiple housing methods and systems for hens are in use for both personal and commercial purposes around the world. However, to reiterate, the health and welfare of hens should be prioritised to ensure that we are mitigating the risk of hens being exposed to pain and suffering, to the barest minimum possible.

The most recommended alternative housing systems (to cage housing) are the **Aviary** and the **Free-Range** systems and an outline of some of the benefits they provide are more detailed below:

- **Perches**: for hens to perch and roost at night. Perches improve bone strength as well as foot and claw condition.
- Nest box or areas: When a nest box is available, most eggs are laid in it as hens will make efforts to gain access to them even when they have no prior experience using one. Providing adequate nest boxes helps to reduce stress. Eggs laid in nests can be collected manually or transported automatically to a central collection point.
- Litter: Having dry friable litter for hens helps to reduce incidence of feather pecking, to maintain feather and plumage condition and promotes dust bathing and foraging opportunities.
- Increased behavioural opportunities: Additional space allows birds more freedom of movement, and therefore behaviours such as stretching, wing flapping, and walking are more unrestricted and varied. Hens also have a choice of environment and will be free to move to where they feel most comfortable.
- **Dietary health** can also be more varied allowing for a more balanced intake of nutrients needed for body maintenance and egg production.
- **Bone mineral density** is increased for hens in such cage-free housing compared with hens housed in conventional battery cages.

BARN OR AVIARY

Barns are sheds in which hens are housed on the floor and typically have access to litter and nest boxes, while an **Aviary (or Multi-tier)** is the same but has the addition of multiple-tiers and perches. **The popular deep litter system commonly used in Africa can be considered analogous to the Barn system**, **and can be well adapted into the Aviary housing**.



Picture 6.1: Aviary (Multi-tier) housing system (Newquip)



Picture 6.2: Floor-raised hens in a naturally ventilated barn. Credit: Jo-Anne McArthur / We Animals Media



Picture 6.3: Single-tier organic system. Credit: Stefano Belacchi / Essere Animali / We Animals Media

Generally, the aviary system (also known as the multi-tier indoor system) is considered the best non-cage alternative to cage systems for large scale egg production for many reasons which are detailed below (<u>Poultry World, 2017</u>).

- 1. The aviary gives birds the choice of environment, an extra level of complexity, freedom and behavioral opportunities to climb, nest, perch, forage, dust bath and scratch both within the system and in the litter, and are equipped with laying nests, feed troughs, and drinkers.
- 2. Barns and Aviaries also provide opportunities for seclusion for birds, in the form of high level perches or tiers, which may be needed for them to rest away from active birds or to escape aggressive birds.
- 3. Barn and aviary-raised hens may show improvement in bone strength over hens raised in cages. Hens kept in barns and aviaries spend more time walking than those kept in cages.
- 4. Aviaries are much larger than standard cages and this provides more space for birds to move around and exercise freely and emulate a life they might have had in the wild. The large size means aviaries can house many birds providing plenty of opportunities for socialization. Birds are healthier when they can interact with others and act as a flock as they would in a natural environment.

While a variety of barn and aviary systems exist, the following guidelines from <u>Compassion in World Farming (CIWF)</u> based on science and best practices, can be adapted and utilized to ensure that optimal health and welfare outcomes of hens are achieved:

- Hens must not be permanently enclosed or their movement restricted within the tier via internal partitions.
- There must be a maximum of 15 hens/m² at the floor area, minimum head height between tiers of 50 cm, at least 2 meters between rows of aviary tiers, and a range of 15 to 22 cm of perch space per bird.
- There should be easy access between tiers and ease of movement through each row (with the inclusion of ramps, platforms and/or stepped systems)
- Access to the floor is very important and should include the area under the tiered structure as well as the alley between tiers.
- Nests should be appropriately placed with comfortable and soft floor, and should not be placed in areas with high risk of smothering (e.g. at the edges)
- Availability of dry friable litter that promotes dustbathing, pecking, and foraging.
- Availability of at least 4 different pecking substrates per 1000 hens
- Feed and water should be equally distributed throughout the tiers and rows to avoid congestion and aggression and allow for easy access for all hens.
- The litter should be kept dry and friable (without increasing the dust levels to a detrimental point for bird and human health), and the material should be suitable for dustbathing (e.g. wood shavings). Additional dustbathing boxes incorporating substrates such as sand or peat can be provided at floor level.
- Enrichment substrates that stimulate and satisfy pecking and foraging behaviour should be equally distributed for easy access along each tier. Pecking substrates such as straw bales, sawdust bales, alfalfa blocks, have been shown to be effective. Using the right environmental enrichment will also help to manage with intact beaks and reduce the risk of feather pecking and cannibalism.
- A veranda (which is enclosed outside area) is essential for barn and aviary systems to provide activity areas for supplementary foraging and dustbathing opportunities, and access to sunlight. It is important to make the veranda appealing by adding dry and friable litter, roughage, scattered grain, green fodder, such as freshly mown grass, drinking water, enrichment materials, perches, and partitions to hide behind.
- Light management is crucial to a well-managed barn and aviary system and dimming the lights at the proper rate, sequence, and optimal locations is important. Activity areas where feeding, drinking, scratching, dustbathing, and socializing occur should be kept slightly brighter than areas for rest or nesting. Nest areas must be dark, as hens want to lay

their eggs in a dark place. Lights must be placed inside the system to direct birds to food and water and placed underneath the system to keep birds from laying floor eggs. Lights can also encourage birds to move up into the higher tiers and perches of an aviary at night and descend to nest boxes in the morning.

- Ventilation and heating systems should provide a comfortable and uniform air flow throughout the barn. It is important to provide enough empty space so the air can flow through the system and to also ensure a dry and friable litter quality can be maintained.
- Dust and ammonia control should also be well maintained. With the presence of litter and dustbathing activity, the levels of dust and ammonia can reach dangerous levels for the health of the hens as well as for the health of the staff. Finding the right balance between keeping the litter dry to avoid production of ammonia, but not to dry that leads to very high dust levels, is important.

FREE-RANGE SYSTEMS

This is basically the same as a barn or aviary house, but with the additional possibility for the birds to go outside, weather permitting. With this key feature of access to an outdoor area, a free-range system requires a relatively large outside space (Kaye, 2021). Generally, free-range birds are not locked in the house during the day, except if there is a housing order – for example, an Avian Influenza outbreak.



Picture 6.4: Free-range system (Mulder, 2016)

Hens in the free-range systems often have the greatest range of behavioural opportunities, have better feather condition, and their eggs have been shown to have some nutritional benefits compared to caged hens (<u>Poultry Site, 2017</u>).

While free-range production systems are mostly subsistence and small-scale in Nigeria and many parts of Africa, commercial large-scale free range systems are very possible too. Countries like the United Kingdom have well demonstrated the viability and success of commercial free-range systems, as most of the country's cage-free production is mostly free-range and farms can have flocks of up to 16,000 birds in a house. Challenges such as risk of predation and infections, can be well mitigated by applying basic good farm management practices and biosecurity measures. These will be well discussed in Module 8.

QUESTIONS AND ANSWERS SESSION

DISCUSSION POINTS

- Which of these cage-free housing system is the most common in Nigeria currently? Why do you think it is common?
- Which of the cage-free housing are you most likely to transition to/maintain, and why?
- If you have used any of the cage-free systems, discuss your experiences and benefits that this has provided. What lessons have you learned? If relevant, what corrections or adaptations have you made?

MODULE 7: HOW TO TRANSITION FROM BATTERY CAGES TO CAGE-FREE FARMING SYSTEMS

This module gives insight guidelines on how farmers can transit from cages to cage-free farming systems, including some other crucial components.

RATIONALE BEHIND THE NEED FOR CAGE-FREE TRANSITION

As discussed previously, the gradual transition to cage-free systems has been driven by the glaring welfare issues over the years and consumer demands. Now, public concern for hen welfare and demand for cage-free eggs have translated into a market opportunity that gradually incentivises poultry farms to produce cage-free eggs. In fact, announcing to go 100 percent free-range or cage-free benefits brands by establishing their reputation as being committed to quality, food safety and animal welfare (Poultry Site, 2017). Therefore, companies and supermarkets such as Starbucks, Nestle, Unilever McDonalds, Unilever, Carrefour and more in Kenya, South Africa, North America, South America, Europe and China are responding to consumer buying habits and demands by announcing their commitment to have only cage-free eggs in their supply chain or have pledged to phase out eggs from caged systems by certain years (Poultry Site, 2017).

Consequently, several states and countries are banning the use of battery cages, and/or the sale of eggs from caged hens. This has led to the use of battery cages being on a rapid decline in the last six years, replaced by cage-free systems (Torella, 2021). The impact of the cage-free revolution is already becoming evident almost globally, encouraging consumers, producers, suppliers, retailers and regulators to adjust to a changing market (Kaye, 2023).

CONSIDERATIONS IN TRANSITIONING TO CAGE-FREE SYSTEMS

Transitioning to a cage-free system needs a systemic change and the following are things to consider when transitioning.

Housing: In transitioning to a cage-free system, the farmer must consider all aspects of management to enhance hen health, welfare, and productivity. All recommended housing systems mentioned in this guide must practice good farm management including hygiene, sanitation, and strict biosecurity measures to limit the transmission of diseases. Generally, all criteria and considerations mentioned in Modules 4 and 6 of this training guide must be integrated.

Feeding: Feeding cage-free layers is slightly different from feeding laying hens in caged systems, because the extra freedom to move means there is a marginal increase in energy being spent and consumption <u>(Mongeau and Risser, 2016)</u>. Also, feeding schedules and patterns through different life stages of the hen should be adapted e.g. pullets/laying hens will require higher protein at the beginning but then it needs to be tailored off as they get older. Furthermore, feeders must always be available in the most optimal quantity and spacing for the number of birds to prevent competition.

Breed of Choice: Selecting the right breed for the right housing system is fundamental to a successful production. Some breeds navigate around a system better than others and act differently from being inquisitive to extremely fearful. It has also been observed that some breeds show aggressive tendencies than maybe other breeds. While a lot is dependent on farmers' optimum management system, different breeds of laying hens also slightly vary in the rate at which they consume and utilise their feed to have higher weight gain. Therefore, it is necessary for the poultry producers to take these breed variations into consideration when setting up their cage-free farms or transitioning.

Nesting area and boxes: Crates or boxes for nesting areas should be provided before laying begins, to create a familiar environment for the birds and prevent floor eggs. For farms transitioning from caged to cage-free systems, the formerly used battery cage can be reused by fabricating it to suit this purpose. For example, cage doors can be totally removed to allow hens to move freely within the house.

Also, it is important to train hens to use nest boxes to avoid floor eggs, And where floor eggs do occur there are many management strategies that can be considered to help manage the problem. Training to use nest boxes should begin at a young age (pullet stage) before the birds begin egg laying. Providing young hens (pullets) with perches and platforms to jump onto (the height of which should be adjusted as the birds grow) will help the birds to learn to jump and access different levels helping them later in life to look for and access nest boxes which are placed off the ground. The following are key guidelines that can be employed to train hens in this way:

- It is important that pullets (young hens before the point of lay) are reared in systems similar to the layer house to help reduce the risk of issues such as floor eggs at the layer house.
- Hens should be given time to become used to nest boxes, for example, by providing access to the boxes soon after housing in the layer house

or just before they start egg laying if they've been in the house from chicks.

- It is also important to ensure that hens can easily access nests, this may be through the provision of appropriately designed and positioned perches and/or platforms.
- Walking the hens at night and ensuring all birds are off the litter area/floor and are roosting on perches can also help.
- Hens are highly motivated to find raised roosting, it is therefore important to ensure perches are provided we recommend a minimum of 15 cm of perch per hen.
- Walking the house in the morning (when most hens tend to lay their eggs) can help to identify any birds which are looking for nesting sites on the floor, these birds can then be gently placed into an empty nest box.
- Any floor eggs should be promptly removed to help prevent other hens from laying their eggs on the floor it may be necessary for farmers to inspect flocks more often at the start of the laying period to help with this.

Beak trimming: Beak trimming causes acute and chronic pain and should ultimately be phased out in cage-free systems. Where hot blade beak trimming is practiced, the priority should be an immediate end to its use due to the extreme suffering it causes. However, during a transition from cage to cagefree production, any beak trimming should only be conducted using infra-red technology. As producers gain experience in cage-free management, the aim should be to phase out infra-red beak trimming through the practice of good management and the provision of environmental enrichment elements for the hens (as previously discussed). The ultimate goal is to put an end to all beak trimming of hens, with hens being housed and managed in ways that help to reduce the risk of injurious feather pecking, so they can be confidently kept without the need for any beak mutilations. Infact, several countries such as Norway, Finland, Sweden, Austria, Switzerland, Denmark and more recently Germany have banned beak trimming altogether. Fortunately, welfareenhancing systems like the barn and aviary system allow hens to fulfill their foraging and dustbathing needs, thereby reducing the risk of feather pecking and the need for beak trimming.

Farm Management and Handling: The well-being of a flock is fundamentally dependent on the care that is provided by the farmers and other farm personnel. The stockpersons and farm managers should be aware that proper handling of birds is very important for bird welfare. It is widely known that laying hens that are incorrectly handled are susceptible to bone fractures resulting in

pain which can be observed in all housing systems. Managers and stockperson of the laying hen farms should be aware of the guidelines under which the farm is operating and implement suitable training programs for their staff.

QUESTIONS AND ANSWERS

DISCUSSION POINTS

- What are your key take-aways from the topic of transitioning to cage-free?
- If you currently run a caged-housing, what is your decision on transitioning from caged housing to cage-free housing?
- What will be your strategy to encourage the adoption of cage-free farming to other farmers?
- What are some factors that can discourage farmers from accepting cage-free farming/housing?
- Any personal beliefs against or rejecting the idea of cage-free farming? Why?
- How do you think we can effectively promote cage-free farming in Nigeria? Provide recommendations.

This module discusses the interconnectedness between poultry health and welfare, and provides key guidance to improving the wellbeing of hens through disease prevention and control measures in cage-free systems

LINKAGE BETWEEN ANIMAL HEALTH AND WELFARE

Animal welfare is defined as the state of the animal, the treatment it receives from animal care, animal husbandry, humane treatment, and how an animal is coping with the conditions in which they live <u>(Animal Welfare Institute, 2018)</u>. An animal in a good state of welfare is considered healthy, comfortable, well nourished, safe, able to express innate behaviour, and not suffering from unpleasant states such as pain, fear, and/or distress.

From the above definition, it is evident that the concepts of animal 'health' and 'welfare' are different but very much linked to each other. Though animal health largely focuses on the occurrence, impact, and treatment of diseases, infections, and health conditions; animal welfare addresses more of the sentience and mental complexity of animals, which include their ability to feel emotions, have needs, be conscious, and adapt to domestication without negatively impacting their freedom of expression of natural behaviours (Nicks and Vandenheede, 2014).

Though different in approach, they mutually impact each other (with animal welfare impacting animal health and vice versa) and are both integral to the overall optimal well-being and livelihood of animals. Good animal welfare, especially for farmed animals, encompasses disease prevention, appropriate shelter, management, nutrition, humane handling, and humane slaughter (Animal Welfare Institute, 2018). Therefore, the idea of welfare remains an important element in addition to traditional animal health concerns (Nicks and Vandenheede, 2014).

OPTIMISING HEN HEALTH AND WELFARE IN CAGE-FREE SYSTEMS

Farmers transitioning their farms from caged to cage-free systems would usually require knowledge and training on how to manage such cage-free poultry farms seamlessly. Such farmers usually have concerns about how to maintain hygiene and combat diseases and parasitism seamlessly, without compromising the welfare of their hens. Such concerns can be well addressed through proper guidance with the integration of a well-established wellstructured cage-free housing architecture, appropriate biosecurity measures, vaccination programmes, and standard good management practices <u>(Vencomatic Group, 2021)</u>.

Furthermore, it is important to note that it is the quest to optimise and balance both hen health and welfare outcomes that has led to the development of housing alternatives such as aviary and barn systems that provide such qualities. Farmers and regulators can utilise the opportunities that such housing systems provide to improve and integrate both good welfare practices and biosecurity that safeguards against disease vectors <u>(AVMA, 2012)</u>.

Detailed guidance is provided in the next sub-section.

POULTRY DISEASE CONTROL AND PREVENTION

Poultry farming has long been a cornerstone of global agriculture, serving as a vital source of protein in many regions who still depend on it for nutrition and economic livelihoods (Yohannes & Tekle, 2018). However, the industry faces persistent challenges from infectious diseases that threaten the health and productivity of poultry flocks. Common diseases affecting poultry farms in Nigeria include Newcastle Disease, Infectious Bursal Disease, Avian Influenza, Infectious Bronchitis, Fowl Typhoid, Fowl Cholera, Marek's Disease, Fowl Pox, Infectious Coryza, and Coccidiosis. These disease outbreaks have devastating consequences, ranging from increased bird mortality rates to diminished egg and meat production which threaten food security at all levels.

Beyond the impact on production, poultry diseases can directly harm public health if zoonotic, giving rise to epidemics and pandemics, and facilitating AMR (Grace et al, 2024) through antimicrobial misuse. Remarkably, food animals like poultry birds serve as significant reservoirs of drug-resistant bacteria, posing a substantial risk for the transmission of resistant bacteria to humans and the environment (Ayukekbong et al., 2017). The emergence of novel pathogens and the ever-present threat of zoonotic diseases emphasizes the need for robust proactive management strategies to protect public health and the sustainability of poultry operations.

This section will provide guidance on the essential principles of disease control and prevention. By implementing the strategies outlined herein, farmers can mitigate the risks posed by infectious agents and safeguard the health and welfare of their poultry stocks.



Picture 8.1: Best practices for optimal Poultry Health through disease control and prevention (Amarachi Ezeocha, OHDI, 2024)

The key components of poultry disease control and preventions include stringent biosecurity protocols, strategic vaccination programs, adherence to good farm management practices, meticulous record-keeping, and access (and use) of quality veterinary services. Each element plays a crucial role in fortifying the resilience of poultry operations against the threat of disease – which contributes to their overall welfare. These fundamental principles and practical strategies are well discussed below.

BIOSECURITY MEASURES

Biosecurity encompasses a set of management practices and physical measures designed to minimize the risk of introduction and establishment of infectious agents into a poultry farm and to prevent its spread onto and between sites, animals, and humans (Permin & Detmer, 2007; Huber et al., 2022). The role of biosecurity for the management of poultry cannot be overemphasised and strict adherence to it will ensure good poultry health and welfare. Good biosecurity is important for the prevention and control of diseases, and it is considered the most effective and economical way to manage poultry farms. This is because it saves farmers' money on preventable diseases, medications and reduces levels of morbidity and mortality(Dewulf and Van Immerseel, 2018). It is also a key precursor to practicing good antimicrobial stewardship and combating antimicrobial resistance (which is a huge concern in poultry birds and other food animals)

There are three components to consider in biosecurity. These include Conceptual, Structural, and Procedural Biosecurity.

Conceptual biosecurity, the primary level of biosecurity, revolves around the location of animal facilities. Physical isolation of farms is a primary consideration when siting farms and it is one of the most effective ways to limit disease risks. Ideally, poultry farms should not be close to public roads, areas with a high density of animal facilities (although this is not always possible), or next to slaughter markets, agricultural fairs, or animal exhibits. Similar isolation methods include limiting the use of vehicles and facilities; limiting access by personnel not directly involved with the operation; and controlling the spread of disease by vermin, rodents, wild animals, wind <u>(Torremorell, 2021)</u> and water sources (that encourage wildfowl settlements with implications for the spread of avian influenza).

Structural biosecurity, the secondary level of biosecurity, deals with physical factors, such as farm layout, perimeter fencing, drainage, number and location of changing rooms, presence of showers, air filtration systems, and housing design in general. Planning of this should also consider the on-site movement and traffic patterns of vehicles, equipment, animals, and feed (Torremorell, 2021).

Procedural biosecurity, the tertiary level of biosecurity, deals with routine procedures to prevent the introduction (bio-exclusion) and spread (biocontainment) of an infection within a facility. Such processes and activities should be constantly reviewed as part of a disease control program and quickly adjusted in response to disease emergencies. Examples include taking a shower or changing footwear and personal clothes with farm-dedicated clothes before entry into the farm, washing hands, and disinfecting equipment at the point of entry (Torremorell, 2021).

It should be noted that all three components of biosecurity are interdependent on each other and are equally important in ensuring that the spread and risk of disease and infection outbreaks are prevented and controlled. In line with these, a poultry farm must develop a biosecurity plan that should incorporate key activities of the biosecurity protocols. These include the following:

• **Controlled Access**: Secure the perimeter of the poultry farm to regulate access by unauthorized individuals, vehicles, and wildlife. Designate entry and exit points with biosecurity checkpoints for visitors and farm personnel, ensuring adherence to strict protocols including sign-in procedures, footwear disinfection, and compliance with all biosecurity measures.

 Sanitation Protocols: Provide dedicated footwear and protective clothing for all personnel and visitors entering poultry houses and install footbaths with disinfectants to prevent pathogen introduction (Payne et al., 2005). Implement regular equipment sanitization to prevent cross-contamination and manage poultry manure properly to minimize disease transmission and environmental risks.



Picture 8.2: Disinfectant footbath on a farm (Taranaki, 2018).

- Disease Surveillance and Monitoring: Regularly monitor poultry health for signs of illness, including behaviour changes, feed consumption, and production performance. Utilize diagnostic testing and surveillance programs to detect pathogens, monitor disease prevalence, and report disease outbreaks notification or confirmation to the veterinary authorities in your local government or state. Implement early detection systems like sentinel bird programs and passive surveillance networks to promptly identify and respond to potential disease threats.
- Quarantine and Isolation: Quarantine newly acquired birds, equipment, and supplies separately for a designated time. Isolate and treat sick birds promptly to prevent disease spread, implementing strict biosecurity protocols during care.
- Environmental Management: Proper waste management practices minimize pollution and maintain environmental hygiene within farms by

ensuring the prompt disposal of poultry waste, including manure, and bedding materials. This reduces the risk of disease transmission and environmental contamination while deterring pests and vectors that could introduce or spread diseases.

To encourage adherence to these measures, provide comprehensive training on biosecurity, disease recognition, and hygiene for all farm personnel and conduct regular audits to evaluate compliance and identify areas for improvement. Finally, stay updated on emerging diseases and biosecurity technologies.

VACCINATION

Vaccination is a cornerstone of poultry disease prevention, providing effective protection against a range of pathogens that threaten poultry health and productivity. Strategic vaccination programs help bolster the immune response of poultry flocks, reducing the incidence and severity of diseases (Marangon & Busani, 2007). Vaccines stimulate antibody production, enhancing the immune system's ability to recognize and combat pathogens, thus reducing disease transmission. Additionally, they offer economic benefits by reducing mortality rates, enhancing production efficiency, and decreasing the need for costly treatments.

Below is a table showing an example of a vaccination schedule for Layer birds in a Nigerian farm.

AGE	DISEASE VACCINATED AGAINST	ROUTE
Day 1	Marek's disease	Given at the Hatchery
Day 9 – 14	Newcastle disease Infectious Bronchitis	Drinking water, eye drop Drinking water
Day 14	Infectious bursal disease (Gumboro)	Drinking water
Day 28	Infectious bursal disease (Gumboro)	Drinking water
Week 4	Newcastle disease Infectious Bronchitis	Drinking water, eye drop Drinking water
Week 8	Fowlpox Avian Encephalomyelitis	Wingweb jab Wingweb jab
Week 9	Infectious Coryza 1	Intramuscular
Week 10 - 11	Newcastle disease	Intramuscular

Table 8.1: Vaccination	n schedule for layer	rs in poultry farms	s in Nigeria (<mark>E</mark>	<u>zenwankwo S., 2021</u>).
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Week 12	Infectious Coryza 2 Infectious Bronchitis	Intramuscular Drinking water
Week 16	Laryngotracheitis	Spray or drops
Week 17	Newcastle disease Infectious Bronchitis (IBV) Egg drop syndrome	Intramuscular
Every 2 months	Deworming is recommended	

While this serves as a guide to poultry vaccination, ensure to consult with a veterinary professional near you which you may find in <u>OHDI's Veterinary</u> <u>Directory</u> to customize vaccine plans according to your farm's specific needs, including considerations such as age, breed, and disease prevalence in your location. Additionally, seek their expertise for prompt responses in case of adverse reactions.

GOOD FARM MANAGEMENT PRACTICES

While we have covered several good management practices for poultry farms in previous modules, it is important to reiterate the need as an essential part of maintaining the health, welfare, and productivity of poultry flocks. Implementing management practices ensures that the living conditions, nutrition, and health of the birds are optimized, leading to better overall performance and reduced risk of disease outbreaks (Edgar, *et al.*, 2013). Here are key components of good farm management practices:

Housing and Ventilation: Proper housing design is critical to providing a comfortable and healthy environment for poultry. Housing should be spacious, well-ventilated, with regulated temperature and airflow. As mentioned earlier, the use of free-range housing, cage-free deep litter and nesting areas are encouraged for hen welfare. These systems enhance the comfort and psychological well-being of the birds contributing to disease control efforts. Free-range and cage-free environments allow poultry to exhibit natural behaviors, reducing stress levels and enhancing their resilience against diseases. Furthermore, the incorporation of deep litter and nesting areas provides birds with opportunities for dust bathing, perching, and nesting, which are essential for maintaining their physical and mental health. By promoting natural behaviours and minimizing stressors, we reduce their susceptibility to diseases.

Nutrition and Feeding: A balanced diet tailored to the specific nutritional requirements of poultry is fundamental for bolstering their immune systems and

overall health. When birds receive adequate nutrition, they are better equipped to resist infections and combat diseases. Essential nutrients, vitamins, and minerals provided through a well-formulated diet contribute to optimal growth, development, and immune function, thereby reducing susceptibility to illnesses. Consistent feeding schedules are equally crucial in disease prevention strategies. Regular access to feed ensures that poultry maintain stable energy levels and metabolic functions, which are essential for growth, productivity and maintaining a robust immune response. By adhering to scheduled feeding times, poultry farmers help minimize stress levels among the flock, as disruptions to feeding patterns can lead to heightened stress responses, compromising the birds' immune systems and rendering them more susceptible to infections. Additionally, by prioritizing access to clean water always, poultry farmers mitigate the risk of waterborne illnesses and promote overall health and well-being among their flocks.

RECORD KEEPING

Comprehensive record-keeping is essential for effective management and decision-making on poultry farms. By maintaining accurate records, farmers can track the health, performance, and management practices of their flocks over time, and make informed predictions and decisions, when necessary. Here are key aspects of record-keeping in poultry farming:

Health Records: Document health observations, including signs of illness, treatments administered, and mortality rates. Record vaccination dates, types of vaccines used, and batch numbers for traceability and regulatory compliance.

Production Data: Monitor production metrics such as egg production, hatch rates, and feed conversion ratios. Track growth rates, weight gain, and flock uniformity to assess overall performance and identify trends.

Behaviour and conditions of hens: Monitor the behaviour, activities, and body conditions of the hens, which can include listening and looking out for aggressive interactions, vocalization, competition, feather loss, lameness, combs and eye conditions etc.

Feed and Water Consumption: Record daily feed and water consumption to monitor adequate nutrition and hydration for the flock. Changes in feed and watering patterns can serve as early indicators of infection or illness among the birds.

Environmental Conditions: Document temperature and humidity levels within poultry houses to maintain optimal environmental conditions. Monitor

ventilation systems and equipment performance to prevent heat stress or respiratory problems.

Veterinary Interventions: Record veterinary visits, diagnostic tests, and treatment protocols for individual birds or the entire flock. Document medication usage, withdrawal periods, and any adverse reactions observed.

Regulatory Compliance: Keep records of farm inputs, including feed ingredients, medications, and disinfectants used. Maintain documentation of biosecurity protocols, training sessions, and compliance with regulatory requirements.

Data Management Systems: Utilize electronic or paper-based record-keeping systems tailored to the specific needs of the farm. Implement data management software to efficiently organize, analyse, and report farm data.

By maintaining detailed records, poultry farmers can make informed management decisions, identify areas for improvement, and demonstrate compliance with industry standards and regulatory requirements.

QUALITY VETERINARY SERVICES

Access to quality veterinary services is essential for maintaining the health and welfare of poultry flocks and ensuring timely intervention in case of disease outbreaks or health issues. Farmers should ensure to:

- Engage *trained and qualified* veterinary professionals and/or Community Animal Health Workers (CAHW), especially those with specialized poultry knowledge.
- Collaborate with veterinarians to enhance farm biosecurity measures, report diseases (when they occur) and establish emergency response protocols for disease outbreaks.
- Develop contingency plans for quarantine and safe disposal of affected birds to minimize disease spread and economic losses.
- Ensure compliance with regulatory standards in government and industry governing poultry health, welfare, and veterinary practices.

By partnering with qualified veterinary professionals and prioritizing the health and welfare of poultry flocks, farmers can optimize production efficiency and minimize disease risks.

Overall, the integrated approach of biosecurity measures, vaccination, good farm management practices, record keeping, and quality veterinary services collectively optimize poultry health and welfare. Biosecurity measures and vaccination form a proactive defence against diseases, while good farm management practices ensure optimal living conditions and nutrition for the flock. Record keeping provides valuable data for informed decision-making and regulatory compliance. Quality veterinary services offer expertise in disease prevention, diagnosis, and treatment, reinforcing the overall health management strategy. Together, these components create a comprehensive framework that promotes the well-being, productivity, and sustainability of poultry farming operations.

QUESTIONS AND ANSWERS

DISCUSSION POINTS

- Of all the above-mentioned diseases prevention and control measures, which ones have you been implementing? Which ones have you not been implementing?
- What successes have you recorded with your current disease prevention and control measures? What can you do better, based on what you have learned?
- What are the common poultry diseases encountered on your farm? How do you treat when there is an outbreak of disease on your farm? How do you curtail the spread of disease from one pen to another? Or from your farm to another farm?
- Generally, what are the biggest challenges you face on your farm? What kind of help are you looking to receive?

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