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Agriculture, Renewable Natural Resources, Animal Husbandry and Health

GES 105: AGRICULTURE, RENEWABLE NATURAL RESOURCES, ANIMAL HUSBANDRY AND HEALTH

Edited by

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ANIMAL HEALTH MANAGEMENT: PRINCIPLES AND PRACTICE

Eyarefe, O.D. and Jeremiah, O.T.

Introduction

Health according to Dorland dictionary of medical science is a state of complete physical, mental and social well-being rather than mere absence of disease and infirmity. Animal health issues are daily becoming a great concern because animals coexist with man in the same ecosystem and share from common natural sources of food and water. One of the ways therefore, to guarantee human health is to facilitate and ensure animal health. The present campaign of "one health, one medicine" has this as its philosophy. Viewed from the economic, social and nutritional angles, animal health is important for the following reasons:

(1) Diseases of animals are transmissible to man (zoonotic diseases). These zoonoses which may be viral, bacterial, protozoan or parasitic can only be stemmed when adequate attention is paid to health issues of concerned animal species. Examples of such diseases include: rabies, cow pox, tuberculosis, brucellosis, trypanosomiasis; etc.

(2) Animals and their products are sources of income to their owners, and foreign exchange to nations. Animal products like tusks of elephants, hide and skin, beef, and milk from cattle and poultry products are important for industrial, nutritional and revenue generation purposes.

(3) Animals like dogs and cats are good companion animals that contribute to man's social well-being.

(4) Animals such as mice, rats, guinea pigs, etc., are fundamental species in scientific investigations and biomedical research. For instance, the effects of some synthetic foods and drugs on human beings were deduced from the responses of animals to such foods and drugs.

(5) Some animal products are sources of food and dietary supplements to man. Examples include eggs, butter, oils (cod liver oil), etc.
(6) Some ancient and modern games, such as polo game, horse race, horse dance, chicken fight, dog race to mention a few, have animals as key players, and contribute immensely to man's social satisfaction. In some traditional setting, the horse is a symbol of royalty, and it is adorned for the king and nobles as part of their royal dignity. Due to the close human contact, the health of such animals cannot be downplayed.
(7) Modern security outfits have evolved in recent times with trained dogs of diverse breeds playing prominent roles in tracking and hunting of criminals as well as in the discovery of prohibited drugs and their peddlers.

Therefore, trivialising animal health issues is inimical to human health, existence and progress in a world of rapid social and scientific advancement.

Content

Factors Affecting Animal Health in Nigeria

Nigeria is a developing country with unique social, religious and traditional diversities with reference to values and attitude to animal species existence and health. A society's attitude to animal health is influenced by her level of awareness of the importance of animals to the economic, social and nutritional wellbeing of the society. The following factors affect animal health in Nigeria:

(1) Disease

A disease is any process, which disrupts an animal's normal function (Hunter 1996). Animal disease may result from the following factors:

(a) *Infectious Organisms:* These include viruses, bacteria, fungi, protozoa and parasites (ecto-, endo-, and haemo-parasites).
(b) *Neoplasia (tumors):* These are growths caused by complex processes of uncontrolled proliferation of cells to form tissues (lump), which may spread to other organs of the body (malignant) or exist solitarily (benign).

(c) *Mechanical or Thermal Injuries:* These include burns, trauma (gunshot injuries, fracture, luxations or sprain).
(d) *Chemicals:* Chemical poisoning may result from ingestion of salts of heavy metals (lead poisoning), herbicides, acaricides and petroleum products (engine oil, gasoline or kerosene).
(e) *Metabolic Diseases:* Ketosis, Monday morning disease (horses), pregnancy toxemia (sheep), and milk fever (cattle).
(f) *Digestive Diseases:* Bloat, diarrhoea, constipation, colic, impactions, etc.
(g) *Congenital Diseases:* Atresia, free martinism, and hermaphrodism.

(2) Nutrition

This is a major factor affecting animal health because most people in Nigeria live below poverty level which by extension affects animal welfare. Good and balanced dietary nutrient is relevant in promoting good health in the following ways:

(a) Maintenance of reproductive functions e.g. good libido, pregnancy, lactation, nursing care and growth of neonates.
(b) Resistance to diseases through boosting of body immune system.
(c) Prevention of deficiency syndrome e.g. mineral, vitamin and protein deficiency syndrome.
(d) Maintenance of daily activities.

Factors that could hamper good dietary utilisation include:

(i) Conditions such as diarrhoea, obstructions and congenital anomaly.
(ii) Parasitic competition e.g. gastrointestinal parasite (*Toxocara canis* in dogs).
(iii) Loss of appetite: This may be due to bad management or disease.

(3) Religious Taboos

In places where religious belief prevents the eating of any particular species of animal, outbreak of diseases among such

species could be very devastating, because funds for quick interventions are withheld by stakeholders who are opposed to the rearing of 'such' forbidden species of animal. The recent outbreak of African swine fever in southwest Nigeria is a good example.

(4) Veterinary Medical Care

Animal health care facilities are nonexistent in many villages, towns and cities, making livestock farmers to suffer untold hardship in the process of disease management. Besides, there are few extension officers to disseminate research information on proven methods of disease prevention through husbandry and vaccination to farmers; as a result, the wealth of information available for the health and maintenance of their animals is not within their reach.

(5) Environment and Husbandry Factors

These are factors in the environment, as well as rearing and raising methods that predispose animals to diseases.

(i) Unhygienic animal houses: These may predispose animals to infectious diseases.
(ii) Bushy environment: This could predispose animals to snakes and scorpion bites.
(iii) Feeding with contaminated food and water: This could predispose animals to food and water borne diseases, and death.
(iv) Use of faulty drinkers and feeders may predispose to starvation, oral injuries and anorexia.

Recognition of Signs of Health and Ill Health among Animals

Disease recognition and treatment in animals are complex tasks, which require adequate veterinary training. Obvious animal disease symptoms, including abnormal behaviours should be referred to the veterinary doctors. Nevertheless, recognition of basic signs of ill health by the livestock farmers, animal handlers or caregiver is important as this could enhance the alert process or movement of the animal to the animal health centre for appropriate care. Familiarity with signs of health through daily observation and interaction is a rule of thumb in recognising signs of diseases in animals (table 11.1).

Table 11.1: Signs and Symptoms Used to Identify Animal Health Status and Challenges

Signs	Normal (health)	Abnormal (ill health)
Death	In old age. Of natural cause and may involve just one animal.	Involve two or more animals. Involve animals of various ages. Suspicions of a predator or disease causing agent.
General body features	Sleek appearance of coat. Well-muscled body with less ribs and hipbones prominence. Well-rounded hindquarters.	Dry and rough coat appearance. Prominent ribs and hipbones. Asymmetrical abdomen.
Head	Clear bright and moist eyes. Slightly moistened and cool muzzle or nasal plenum. Wet oral cavity without gum or tongue ulcers or blisters.	Sunken eyes, unilateral or bilateral ocular discharges, which may be serous, mucoid or mucopurulent. Bilateral nasal discharge. Drooping of copious saliva, with or without gum or tongue ulcers and dental injuries.
Skin	Slack, smooth, loose and glossy, and well aligned with the body.	Skin is dry, scaly, with sores and heavy skin parasite such as lices, ticks and mites.
Visible mucous membrane	Mucous membrane of the mouth (gums), nostrils, eyelids (conjunctiva), vaginal, prepuce and rectum are normal (pink).	Mucous membrane of the eyes, gums, vagina, anus and prepuce may be yellow, cyanotic, paper white, cherry or red in colour.
Posture in movement or standing position	Walking in a balance stable fashion Walking with swaying head and nodding slightly. Stand alert and confident. Raise limbs with ease.	Walking with staggering gaits. Limping or carefully carrying limbs, with obvious signs of discomfort. Last among flocks. Sleepy while standing.

Table 11.1 contd.

Urination/ Urine colour	Urinate with ease. Urine in straw or slightly yellow in colour without blood tint.	Urinate with obvious signs of discomfort. Urine is red or deep yellow with some bloodstain.
Respiration	Breathing is quiet and barely noticeable in resting position. Only fast after physical exertion. The number of breath in resting position per minute (respiratory rate) is normal Horses 8 – 12 Cattle 12 – 16 Pigs 10 – 16 Sheep/goat 12 – 15	Breathing is with difficulty and irregular. Obvious sounds e.g. whistling, crackles, coughing. Abnormal respiratory rate.
Body temperature	Able to maintain constant body temperature even in extreme environment conditions. Horses 38.0^{0}C Cattle 38.0^{0}C Pigs 37.5 – 39.0^{0}C Sheep/Goat 38.0 – 39.5^{0}C Dog 37.5-39^{0}C	Shivering. Have abnormal body temperature
Faeces	Is of normal constituency (well formed) and colour depends on the diet. There may be a change in constituency if diet is changed.	Watery faeces. Hindquarter is stained with faeces.
Reproduction	Animal cycles regularly after puberty except when pregnant. The duration of pregnancy (gestation period) is normal for the breed/species	Animal may not cycle at all. Not able to become pregnant after mating.

Enhancing Animal Health through Husbandry Practice and Immunity

The best way to ensure the health of animals is to subject them to a good level of husbandry. Animals that are given balanced diet, clean and adequate water, good shelter coupled with good veterinary care (immunisation) are better equipped to overcome disease challenges, thus enhancing productivity.

Health Fostered Husbandry Practices

Health fostered husbandry practice could be promoted through the following measures:

(1) ***Nutrition:*** Balanced dietary formulations for different species of animals, as well as animals of different ages, have the potentials of boosting animals' health and productivity. Good pasture management is important for grazing animals to: ensure nourishing forages, prevent ingestible eggs and larvae of worms and the growth of poisonous plants. Accidental ingestion of poisons or poisonous plants however should be reported to the nearest veterinary centre for quick intervention.

(2) ***Provision of Shelter:*** Provision of shelter is necessary especially for animals under intensive system. Excessive heat or cold reduces the immunity of animals (immunosuppression), which could result in ill-health. Some diseases are also associated with direct sunlight (e.g. squamous cell carcinoma). Provision of shade from trees and tents has been found relevant for animals reared under extensive or semi-intensive system.

(3) ***Hygiene:*** Good hygiene through washing, disinfections and flaming animal house or farm equipment, thorough cleaning of feeders and drinkers are effective ways of killing and reducing microbial load to ensure health of animals. **Disinfectants** are chemicals that either kill or prevent multiplication of pathogenic microorganisms. They include:

(a) *Oxidising Agents*: such as Hydrogen peroxide and Potassium permanganate.
(b) *Halogens*: such as Sodium hypochlorite and iodine (iodine compounds).
(c) *Reducing Agents*: such as formaldehyde, phenolic compounds and cresol (e.g. Lysol).

Note: Disinfectants however, should be used with caution, and the manufacturer's instructions must be followed to avoid health hazards.

(4) ***Regular Grooming/Trimming of Hoovesf/Nails:*** Regular grooming of the hair coat ensures good aeration and circulation of blood to the skin. It also helps to improve coat aesthetics as well as eliminate coat debris and ectoparasites. Trimming of hooves and nails helps to prevent overgrown hooves and nails, thereby minimising lameness.

(5) ***Monitoring of Puberty, Estrus Cycle and Gestation Period:*** Knowledge of time of heat (estrus) should enable a timely provision of a proven sire (male) to mate the female animals. Information on gestation period also ensures the breeders' availability for appropriate care during delivery (parturition).

(6) ***Vaccination and Treatment of Sick Animals:*** To ensure a healthy flock of animals, adequate immunisation should be done especially against existing (endemic) diseases in the area. The assistance of the veterinary doctor may be needed to administer vaccines and treat the sick animals.

Disease Prevention through Immunity

Animal bodies possess naturally occurring defense systems that protect them from infectious diseases. These defense systems are innate qualities of animals. Exposure to a particular infectious agent, either deliberate (vaccination) or accidental (infection)

results in antibody productions against the infectious organism. However, some mechanical barriers and physiological factors exist in animals that prevent disease occurrence. These include:

(1) ***Intact skin:*** The skin coat is the first line of defense. Maintenance of animal skin coat will ensure good immunity.
(2) ***Secretions from skins*** (sebaceous gland): The skins of animals contain oily glands, which have anti-microbial factors (fatty acid and low pH). Most bacteria, viral and fungi agents, are susceptible to low concentrations of organic acids.
(3) ***Flushing action of lachrymal, saliva and urine:*** The lachrymal glands and saliva contain anti-microbial properties that inactivate microbes.
(4) ***Cilia of the respiratory system:*** The movement of these structures inhibits bacteria movement and exposes them to inactivation by the mucous secreted by the global cells of the tract.
(5) ***Sneezing/Cough reflex:*** This reflex action dislodges and expels mucous blanket.
(6) ***Mucous membrane of the respiratory tract:*** This traps bacteria and inactivates such through lysosomal enzyme activities.
(7) ***Body temperature:*** Most animals possess body temperatures of between 37° and 39° centigrade that encourage poor growth of disease causing organisms.
(8) ***Defense cells:*** Animals possess a very complex system of cells that function to recognise and destroy invading disease causing organisms. These cells include:

(a) *Neutrophils*: These are relatively short live. They phagocytose harmful bacteria in the tissue.
(b) *Monocyte*: These are capable of migrating into the tissue to phagocytose bacteria or become larger, become more active and effective (***Macrophages***) against viruses, bacteria, protozoans, etc.
(c) *Lymphocytes*: These immune cells act to recognise invading microorganism and parasite and destroy

them through production of antibodies. Two types exist: T – (thymus derived) and B– (Bone marrow derived) lymphocytes. The B-type may be activated to plasma cells, which produces antibodies against the invading organism. These confer immunity on the animals through the development of "memory" against the organism following subsequent invasion. This ability of immune cells to react promptly against the invading disease-causing-organisms is called immunity.

(9) ***Vaccines and vaccinations:*** Vaccines are preparations containing weakened or dead microbes of the kind that cause disease, administered to stimulate the immune system to produce antibodies against that disease. This is achieved by altering the organisms in some way before inoculation, with the aim of stimulating a humoral or cellular immunity without producing the disease effects of the organism. Existing types of vaccines include:

(a) *Attenuated vaccines:* These are based on organisms that have been altered by passaging (transferring of the organism through a series of animals or laboratory culture to reduce the virulence of the organisms).
(b) *Inactivated vaccines:* These are organisms that have been killed by chemicals, heat or radiation.
(c) *Toxoids:* These are exotoxins of bacteria, which have been rendered non-toxic, and introduced into animal bodies to protect them against specific bacteria exotoxins.
(d) More types of vaccines are presently available which are as a result of recent advances in molecular biology, immunology and genetic engineering.

(10) ***Active and passive immunity***
Immunity resulting from recovering from infection or from vaccines is called **acquired or active immunity.** However, antibodies from a humoral response of mothers can protect their young ones naturally during pregnancy. New born animals do not possess a mature immune system, but they receive antibodies from their mother either through the placenta before birth, or from the first milk called colostrum. This immunity is sufficient to protect the young ones within few months of life until their own immune system is developed. This type of immunity is called **passive immunity.**

Conclusion

Animal health is strongly linked to the nutritional, mental and social well-being of human beings. In recent times, animal health issues have become increasingly of major concern with the transfer of many diseases from animals to humans. Hence, to guarantee human health, efforts must be made to ensure animals are healthy and safe for consumption. Animal disease recognition and treatment must be prompt and most animal handlers must be adequately trained. Therefore, familiarity with signs of health through daily observation and interaction will aid proper management of animal health. Nevertheless, recognition of basic signs of ill health by the livestock farmers, animal handlers or care giver is important as this could enhance the alert process or movement of the animal to the animal health centre for appropriate care.

Revision

(1) Describe the factors affecting animal health in Nigeria.
(2) Mention five signs and symptoms used to identify animal health status and challenges.
(3) List five diseases of cattle.
(4) Describe five ways that diseases can be prevented through immunity.
(5) Highlight five methods of enhancing animal health through husbandry practice.

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