

CLIMATE CHANGE, FOOD SECURITY, NATIONAL SECURITY and ENVIRONMENTAL RESOURCES

GLOBAL ISSUES & LOCAL PERSPECTIVES

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CLIMATE CHANGE, FOOD SECURITY, NATIONAL SECURITY AND ENVIRONMENTAL RESOURCES (GLOBAL ISSUES & LOCAL PERSPECTIVES)

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Preface

This book adopts an exegetical approach as well as a pedagogic model, making it attractive agriculture and environmental economics teachers, professional practitioners and scholars. It eschews pedantry and lays bars the issues in such clarity that conduces to learning. The book elaborates on contemporaneous climate change, food security, national security and environmental resources issues of global significance and at the same time, is mindful of local or national perspectives making it appealing both to international and national interests. The book explores the ways in which climate change, food security, national security and environmental resources issues are and should be presented to increase the public's stock of knowledge, increase awareness about burning issues and empower the scholars and public to engage in the participatory dialogue climate change, food security, national security and environmental resources necessary in policy making process that will stimulate increase in food production and environmental sustainability.

Climate Change, Food Security, National Security and Environmental resources: Global issues and Local Perspectives is organized in four parts. Part One deals with Climate Change with Six Chapters, Part Two is concerned with Food Security with Nine chapters, Part Three deals with National Security with Five Chapters, while Part Four pertains Environmental Resources, has Five Chapters.

Ahmed Makarfi / Eteyen Nyong

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CHAPTER 16

Turkey Farming

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Introduction

The Turkey (*Meleagris gallopavo*) is well established in North America and Europe. The bird is a native of North America but domesticated in Europe and presently turkey farming is more popular around the world as source of food particularly in Western countries with the major turkey producing countries being United States of America (USA), Canada, Germany, France, Italy, Netherlands and the United Kingdom (Dotché *et al.*, 2024; Ogunyemi, 2022) However, its potential for extensive production has been greatly overlooked particularly in developing countries and the rest of the world. This has been attributed to attention given to modern turkeys' bred for intensive production (NRC, 1991). Considering the continuous rise in the cost of production of cattle, sheep and goat, which are the primary sources of animal protein in Nigeria, it has become paramount to explore efficient and less common but potential sources of animal protein for economic sustainability (Okoruwa *et al.*, 2006). Turkey has a promising potential as alternative livestock for meat production (Putra *et al.*, 2022; Nixey, 1986). The birds complement chicken production, while broiler meat market is facing problems of higher incidences of diseases and taste, turkey meat could be explored as alternative for consumers (Abera, 2022; Asaduzzaman *et al.*, 2017).

The bird is quite suitable for the upliftment of the livelihoods of small and marginal farmers because it can be easily reared in free range and under both intensive and semi-intensive systems of management with little investment on housing, equipment and management and it could create good job opportunities and economically empower youths that are unemployed within the society (Dotché *et al.*, 2021). Assaduzzaman *et al.*, 2017). Turkey production is gradually gaining attention and making its way into the chicken (broilers and layers) dominated market in Africa, (NRC, 1991)

The birds thrive under more arid conditions, they are natural foragers that can be reared as scavengers (NRC, 1991). They tolerate heat better, they range/forage further than chickens and

they have high quality meat (Food Safety and Inspection Service of the U.S. Department of Agriculture, 2021; Bundesministerium für Soziales, Gesundheit, Pflege und Konsumentenschutz, 2021; Yakubu *et al.*, 2013), which is low in fat, tasty and the percentage of edible meat is greater compared to chicken. As knowledge and breeding stock continue to be developed it is most likely that free range village/local/scavenger turkey will become increasingly popular around the world, Nigeria inclusive. This chapter therefore looks into the prospects of free range local/village turkey production for sustainable protein production, generation of employment and economic empowerment for resource limited population in Nigeria.

Appearance and Size

This chapter lays emphasis on the more self-reliant, less highly selected turkey found in Mexico and few Latin American countries, which have been semi-improved and exported to other regions of the world, Nigeria inclusive. They do not require artificial insemination and with little attention they care for themselves and their young. Full grown “criollo” turkeys of Mexico are less than half the size of some improved strains. The males weigh between 5-8kg while the females weigh 3-4kg (Food and Agriculture Organization of the United Nations, 2022; Council of the European Union, 2021; Cuca In: NRC, 1991). They vary in color from white through splashed or mottled to black. The skin on the neck and head is bare, rough, warty and blue and red in colour. It is characterized by a short fleshy protuberance (snood) on the forehead, which resembles a finger. In males it swells during courtship. The front of the neck also has a pendent wattle. From the centre of the breast a bundle of long coarse bristles (beard) also stands out prominently.

Distribution

The unimproved domestic turkey is basically limited to Central Mexico and scattered to areas throughout Latin American countries. Few turkeys are found in tropical countries. Even though some village birds are kept in India, Egypt and other regions, they are descendants of semi-improved strains exported from North America and Europe.

Habitat and Environment

Turkey can be raised almost anywhere. Their natural habitat is the open forest and wooded areas of the North American continent although in Mexico, they are raised from sea level to beyond 2,000m altitude from the rainforest to desert and from near-temperate climates to the tropics (Askerov *et al.*, 2021; NRC, 1991).

Free Range System of Turkey Production

The free range system of turkey production has the following advantages:

- i. Reduces cost of feed by 50%
- ii. Low investment
- iii. Cost benefit ratio is high (huge returns on investment)

In the free range production system under one (1) acre of fenced land 200-250 adult turkeys can be reared. Shelter should also be provided at night with a space of 3-4sq ft/bird. Trees should be planted to provide shade and cooler environment. The area of the range should be rotated to help reduce the incidence of parasitic infection.

Biology

Free Range Feeding

Their range of diet is broad since they are very good scavengers. Turkeys consume greens, fruits, nuts, grasses, berries, roots. They also feed on insects (locusts, crickets, termites, grasshoppers, etc.), snails, earthworm, slugs and kitchen wastes, which are rich in protein. The birds can also be fed on leguminous fodder. These broad range of food items are bound to reduce feed cost by 50% and this helps to maximize profit and it also spells out good returns on investment. In order to avoid weakness and lameness of the leg in free ranging birds, calcium should be supplemented at the rate of 250g/week/bird in the form of oyster shells. Also, about 10% of the feed could be substituted with vegetable waste to reduce the cost of feed.

Breeding / Reproduction

Reproduction is generally seasonal and it is stimulated by increasing day length (a minimum of 12 hours). Turkey birds reach sexual maturity at 6 months of age and may begin breeding at the same time. Ten (10) days after mating, the hens search out for a nest and commence laying. Industrial birds in the temperate region lay an average of 90 eggs/year while the turkeys in the tropics rarely lays more than 20 small eggs weighing 60g prior to brooding.

Turkey Meat

The global total turkey meat production estimated at 5.6million tons in 2012 was much higher than 5.1 million tons in 2003 (Sergey *et al.*, 2024)FAOSTAT, 2012). Turkeys are reared mainly for meat only. (The meat is the leanest among other domestic avian species). The meat is a popular delicacy at Christmas thus it is synonymous with Christmas and the annual American National Thanksgiving Celebration in November. The meat is gradually gaining increased popularity because of its gamey flavor and lower fat content (Asaduzzaman *et al.*,2017). The annual per capita consumption of turkey meat in the aforementioned countries range from 4-8kg/year. The meat has high nutritional value and curative properties. According to Olumu (1983) people prefer it because of its leanest nature, protein (22.20%) and fat (9.30%). It is rich in essential amino acids and vitamins like niacin, vitamin B6 and B12, minerals (potassium, calcium, magnesium, iron, selenium, zinc and sodium). It is also rich in unsaturated fatty acids as well as essential fatty acids and low in cholesterol.

Turkey Egg

The birds begin egg laying from 30 weeks of age and its production period is 24 weeks from point of lay. Turkey hens lay as much as 60-100eggs/year under adequate feeding and artificial

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lightening management. Usually, they lay about 70% of the eggs in the afternoon. Turkey eggs are tinted and weigh about 85g. The incubation period is 28days in turkey. The egg shell is strong and the egg is noticeably pointed at one end. The turkey egg has protein, lipid and carbohydrate content of 13%, 12%, 1.5% respectively (Oyeagu *et al.*, 2022; Olomu, 1983). The cholesterol is 15.67-23.97mg/gm of yolk. Incubation in turkey is propagated through two (2) methods:

- i. Natural Incubation with broody hens: Naturally turkeys are efficient brooders and a broody hen can hatch 10-15 eggs. In order to obtain 60-80% hatchability and healthy poult only clean eggs with good egg shells and shape should be placed for brooding.
- ii. Artificial Incubation: In this method of incubation, eggs are hatched with the aid of incubators. The temperature and relative humidity in setter and hatcher are as follows:

Setter

Temperature (99.5°F)

Relative Humidity: 61-63%

Hatcher

Temperature (99.5°F)

Relative Humidity: 85-90%

The egg should be turned at hourly intervals on daily basis. The eggs also need to be collected frequently to prevent soiling and breakage and also in order to get better hatchability.

Brooding

The brooding period in turkey is 0-4weeks. However, during cold periods, it is extended to between 5-6weeks. Brooding turkey poults require double space as compared to chicken and brooding day old poults can be carried out by using infra red bulbs, gas brooders or traditional brooding systems. Turkeys are not the best starters in their life, they need tender care to ensure their survival through the first four weeks of life. The average mortality rate is 6-10% during the period. Naturally, young poults eat and drink reluctantly during the first few days of life mainly because they are nervous and also due to bad eyesight, therefore, they must be forced to feed. They are usually fed broken grains and seeds or fine mash (chick mash) with about 27% protein as well as finely chopped tender green feed prior to when they start foraging and have full access to pasture.

During brooding the common litter materials used include wood shavings, saw dust, paddy husk. The initial thickness of the litter material should be 2 inches and could be gradually increased to 3-4 inches. The litter should be raked at frequent intervals so as to prevent caking and parasitic infections.

Uses

- iii. The birds are raised exclusively for meat as a treat (for holidays, birthdays, weddings and Christmas)
- iv. They are also used as a source of cash by many rural populace/homes to supplement income.

Husbandry

The principles of turkey management (nutrition, housing, rearing, disease prevention and control etc) are basically the same as those of other poultry birds. Free ranging turkeys move around villages/houses. They are provided with kitchen scraps and some form of shelter. The male to female ratio is 1:12. Spacious nests are used for rearing turkeys (as a golden rule, turkeys require 3 (three) times extra space than chickens). Free range turkeys are normally confined when they start to lay in order to protect them from predator attacks. Eggs may also be gathered to prevent broodiness and this act increases production. The eggs may be kept for several days to cool (but not in refrigerator), when turned daily they can be placed under a chicken hen. Setting hens can be used to hatch about nine eggs at once. Hatching takes 28 days.

Limitations to Turkey Farming

- Young birds (poult) are easily affected by temperature fluctuations. Therefore, they should be protected against the sun as well as sudden cold particularly at night.
- Poults are also susceptible to dampness especially those associated with cold
- Any change in feeding routine or type of food affects turkey
- Young turkeys are susceptible to parasitic infection as well as the same type of bacterial and viral diseases as chicken (e.g. coccidiosis and fowl pox)
- The poults are also affected by a devastating disease called blackhead, which is caused by a common parasitic nematode, which can be contacted from chicken.

Medicines, vaccinations and proper sanitation and management practices are available to prevent, control and treat many diseases and pest problems.

Behaviour

Domestic turkeys prefer to walk instead of flying and they obtain all their food on the ground although they can fly short distances to avoid predators. Free range birds are able to survive with little management. The commercial / industrial birds have lost their abilities to survive on the wild; therefore, they can no longer thrive without human care. Turkeys prefer to make their own nest even though they can be induced to lay eggs in convenient places if they are provided with nest boxes.

Research and Conservation Needs for Sustainable Turkey Farming

Turkey development is almost non-existent or at a rudimentary stage in the third world countries and much of the rest of the world (Sharifi *et al.*, 2024; Semin *et al.*, 2021; NRC, 1991). In spite of the fact that turkeys are adaptable to all climatic conditions with low disease prevalence, low feeding cost, high market demand (festive seasons) and income generation, little research has been conducted on how to improve turkey production viz-a-viz research on physiology of the birds, disease, husbandry and marketing opportunities / strategies.

To improve turkey production the following steps should be considered:

- Conservation needs of genetic variability is more critical in turkey and should ne given attention.
- Unimproved types of turkey should be collected, assessed and a programme to conserve the stocks should be initiated
- An analysis should be made on traditional management and performance of turkeys
- More recognized turkey sub-species should be evaluated for their potentials as seed stock for third world countries.

Conclusion

Free range and semi-intensive turkey rearing systems, which require low investment facilities and equipments is a promising, viable and sustainable venture, which should be explored especially in rural areas for economic advancement of the rural poor and small scale farmers. The bird has promising potentials for backyard and commercial production.

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