

Review Article

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## Existing Status and Prospects of the Chicken Production in Ethiopia

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## Abstract

Chicken production plays an important role in providing human food consumption, growth of domestic products, and creating employment opportunities in Ethiopia. By considering this, the present paper aims to deliver, synthesize, and summarize the compiled information on the existing status and prospects of chicken production. The poultry sector can be characterized into different production systems based on selected parameters like breed, flock size, housing, feeding, health, technology, biosecurity and others. Attempts have been made to introduce different exotic poultry breeds to small holder farming systems of Ethiopia to improve the existing low performance of indigenous chickens. Among these, Rhode Island Red, Fayoumi, Potchefstroom Koekoek, Sasso, Bovan Brown, Issa Brown, and Leghorn are being kept under various husbandry systems. Besides, indigenous chicken ecotypes have wide ranges of morphological and phenotypic variation within and among them accounts about 90.9% out of 60.5 million. The ecotypes such as barley plumage color, red plumage color, white plumage color, and black plumage color have been characterized in the country and distributed across different agro-ecological zones. The average annual egg production of indigenous and exotic chicken breeds did not exceed 60 and 250 eggs, respectively. The age at first egg ranges from 6-7 months indicating late maturity. Major Challenges of chicken production in Ethiopia were sudden diseases outbreak, predation, low genetic quality, market instability, feed source scarcity and weak extension service. A rapidly increasing human population, greater purchasing power/rising incomes and increasing urbanization of the country are responsible prospects for a growing demand and consumption for poultry products. Therefore, mindfulness should be emphasized on enhancing the improvement of chicken farming systems for better production and reproduction performance.

Keywords: Breeds; Challenges; Chicken; Production; Prospects.

## Introduction

Ethiopia is believed to have the largest livestock diversity and population in Africa [1]. Livestock in general and poultry production in particular plays significant socio- economic roles in developing countries [2]. The contribution of sector to the agricultural GDP was estimated to be 15-17% of gross domestic product (GDP); 35-40% for agricultural GDP; and 37-87% of the household income [3]. The term poultry; in Ethiopia; is almost synonymous to domesticated chickens (Gallus domesticus; red jungle fowl). Other poultry species such as guinea fowl; geese; turkeys and ducks are not common in the country [4]. Chickens are one of the most common and widespread domestic animals; it constitutes more than 90 percent of the poultry population and are; by far; the most important and largest constituents of poultry species in all parts of the world [4, 5]. The Ethiopian chicken population is estimated to be about 60.5 million; of which 54.06; 2.61 and 2.83 million are indigenous; exotic and hybrid chickens; respectively [4, 6]. Chicken production plays a crucial role in the provision of affordable animal protein for human food consumption and cash income generating [4]; creates an employment opportunity for the youth; religious/cultural considerations; empowering women (in rural areas) and ultimately ensuring household food security are amongst the major reasons for keeping chickens by rural communities [4, 7, 8].

However; the information on the existing production status and prospects of chicken production in Ethiopia under different husbandry systems has not been fully studied and not well compiled. Therefore; reviewing sensible findings on existing status and prospects of chicken production seems to be a corner- stone to deliver synthesized and summarized information to the beneficiaries and readers. Moreover; assessing the current state of chicken production performance; prospects; problems; a will contribute to the future plans of production scheme in the country. Accordingly; the objective of this paper is to review existing status and prospects of the chicken production in Ethiopia and thereby to deliver synthesized and summarized information for scholars that would enable to design appropriate research programmes on chicken resources.

## Literature Review

# Existing production system; productivity; and breeds of chickens in Ethiopia

**Chicken production systems:** In Ethiopia chicken production systems show a clear distinction between the traditional; low input system on the one hand and modern production systems using relatively advanced technology on the other hand [4, 9]. The poultry sub-sector in Ethiopia could be characterized in different major production systems based on some selected parameters such as market access; production objectives; management; scale of operation; breed; flock size; management practices; technological input and level of biosecurity exercised [4, 9-11].

In this review; the poultry production systems of Ethiopia are classified into the industrial medium and large scale intensive systems (commercial); and the different categories of family poultry production systems (i.e. small-scale intensive; semi-intensive; extensive scavenging and small-extensive scavenging systems) (Table 1). In 1989; the participants of a workshop in Africa defined the term "rural poultry"

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	Industrial and commercial large scale intensive	Family poultry production systems			
		Small-scale intensive	Semi-intensive	Extensive scavenging	Small-extensive scavenging
Location	Peri-urban areas; near capital and major cities	Peri-urban areas; near smaller towns		Everywhere; dominates in rural areas	
Production/farming system	Poultry only	Poultry only	Usually Poultry only	Mixed, livestock and crop	Mixed, often landless
Other livestock	No	No	Sometimes	Usually	Rarely
Flock size (adult birds)	> 1 000 broilers > 500 layers	> 200 broilers > 100 layers	50–200	5–50	01-May
Access to markets	Yes (export/urban)	Yes (urban/rural)	Yes (urban/rural)	Limited (rural)	Rarely (rural)
Poultry housing	Yes; conventional materials; good quality houses	Yes; conventional materials; good-quality houses	Yes; Conventional materials; houses of variable qualities	Sometimes; usually made from local materials	Seldom; usually made from local materials or kept in the house
Poultry breeds	Commercial	Commercial	Commercial, crossbred or indigenous	Indigenous or crossbred	Indigenous or Rarely crossbred
Source of new chicks	Commercial day-old chicks or pullets	Commercial day-old chicks or pullets	Commercial day- old chicks or natural incubation	Natural incubation	Natural incubation
Source of feed	Commercial balanced ration	Commercial balanced ration	Scavenging, Regular supplementation	Scavenging, occasional, supplementation	Scavenging, almost no supplementation
Access to vet services and pharma	Yes	Yes	Yes	Sometimes	Rarely
Access to cold chain	Yes	Yes	Yes	Rarely	No
Poultry mortality	Low to medium < 20 %	Low to medium < 20 %	Medium to high 20 to > 50 %	Very high >70 %	Very high >70 %
Contribution to food security	<1.35%	<2.79%		>95.8%	

Table 1: Characteristics of the chicken production systems

as "any genetic stock of poultry (unimproved and/or improved) raised extensively or semi-intensively in relatively small numbers (less than 100 at any given time). The term was later replaced by "family poultry" to encompass the wide variety of small-scale poultry production systems found in rural; urban and peri-urban areas of developing countries [9].

The scavenging family poultry production systems are the principal providers for the domestic market; contributes over 98% of most of the national marketable poultry products [12]. The rural chicken sector constitutes about 98% of the total chicken population; which largely consists (about 95%) of the indigenous or native domestic fowl and characterized by a disease resistant; adaptive to the prevailing harsh environmental conditions; and low level of input and output (FAO; 2007). The share of the intensive and semi-intensive poultry systems in the national market is currently on the rise.

**Chickens breeds in Ethiopia:** The Ethiopian poultry population is estimated to be about 60.5 million; of which 90.9; 4.4 and 4.7% is indigenous; exotic and hybrid chickens; respectively [4, 6]. The Ethiopian indigenous chickens are none descriptive breeds typically called 'native ecotypes' closely related to the red jungle fowl (wild ancestors of the domestic chicken) and vary in plumage color; comb type; body conformation; weight; and may or may not possess shank feather [10, 13].

There are about ten identified and characterized indigenous chickens ecotypes available in the country; namely; Barley plumage color (Chefe and Gebsima); Red plumage color (Horro; Jarso; and Keyi); White plumage color (Naked-neck and Netch); Black plumage color (Tepi and Tikur); and Tilili [10, 13, 14]. Moreover; there are several ecotypes like white-barley; golden-red; black-tailed white; silver and buff/yellow; and indigenous ecotypes [13, 15].

Most of the chickens kept by smallholder farmers in the village

chickens production systems are unimproved indigenous flocks and are characterized by low input-low output levels; slow growth rates; their low productivity and reproductive performance; prolonged age at sexual maturity [16, 17]; these is for the reason that the impact of environmental and low genetic potential Aboe. However; they are appreciated to with stand certain harsh environmental conditions; excellent scavenger; hardy; resistant; capable to broodiness; ideal mothers and good sitters [10, 18]; good egg and meat flavor and can perform better under poor management than cross and exotic breeds [19].

Exotic chickens were first introduced into Ethiopia in 1953 and 1956 by Jimma Agricultural and Technical School and Alemaya College of Agriculture; respectively [20]. Four breeds of chickens (Rhode Island Red; Australorp; New Hampshire and White Leghorns) were imported from Kenya; Denmark and the United States during this time. Later; the Debre Zeit Agricultural Research Centre (DZARC) was also involved in evaluating the performance of these breeds including additional introductions such as the Brown Leghorn; Light Sussex; Barred Rock; Lohman Silver and Koekoek; and two broiler parent stocks from Hubbard breeders (Hubbard classic and Hubbard JV) were tested [4, 20]. Currently; highly productive breeds; such as Bovans Brown; Issa Brown; Rohde Island Red (RIR); Fayoumi and Koekoek were among the chicken breeds widely distributed to village producers and are being kept in backyard chicken production systems with certain inputs; although the supply of the RIR and Fayoumi has almost ceased [4, 21]. Instead; several medium- and large-scale intensive producers are involved in the distribution of exotic breeds to producers in the different family poultry production systems. At present Ethiochicken is the largest supplier of exotic breeds mainly to the extensive scavenging and semi-intensive family poultry producers; operating in the four largest poultry producing regions (the SNNPR; Oromia; Tigray and Amhara). Nowadays; the broiler and layer breeds kept by most of the intensive poultry farms in the country include Cobb broilers; ISA;

Sasso; Red barred; Lohman brown; Dominant Sussex; Novo Brown and Ross layers imported mainly from the European Union are currently available in the country [4, 21].

**Productivity and production performance:** The production performance of indigenous scavenging chickens of Ethiopia is low because of their low egg production potential; high chick mortality; longer reproductive cycle; the low genetic potential (slow growth rate; late sexual maturity and broodiness for an extended period) [15, 22]. The mean annual egg production/hen/year of indigenous hens' ranges from 53-60 within a range of 38-46 gm of egg weight under farmer management condition [4]. The average age at first egg of indigenous pullets in Ethiopia is 6-7 months that indicating late maturity [15]. Despite their lower productivity; indigenous chickens are still the major suppliers (98%) of poultry products in Ethiopia [4, 23, 24].

On the other hand; the annual egg production performance of Fayoumi chickens is 144 eggs; which is lower than 185 eggs of Rhode Island Red and 173 eggs of White Leghorn under a smallholder farmer's husbandry system in Northern Ethiopia. However; according to Desalew; the average eggs laid/year/bird was 276.1; 266.32; and 178.07 eggs for Isa Brown; Bovan Brown and Potchefstroom Koekoek; respectively. Average age at first laying was 160.5; 165.5 and 153 days for Isa Brown; Bovan Brown and Potchefstroom Koekoek; respectively. Bovan Brown was superior for egg weight; yolk height; albumin height; albumin weight; Haugh Unit and eggshell thickness than others. Furthermore; the Potchefstroom Koekoek chicken breed performed significantly better as assigned to household conditions with or without supplementation at the stage of age at first egg in Southern Ethiopia [25]. So that Isa Brown; Bovan Brown and Rhode Island Red chickens were well-performed relatively under scavenging conditions.

#### Challenges of chicken production in Ethiopia

Sudden diseases outbreak: fowl cholera; new castle disease; coccidiosis; fowl influenza (infectious bronchitis); fowl pox; and salmonella [26]; Feed resources scarcity; the high cost of commercial ration; lack of feed quality control; Predators: wild cat locally called as "shelemetmat"; eagle; and foxes were the most common chicken predators recognized [27]; Low genetic quality: unavailability of improved breed day-old-chicks in time; Marketing instability and poor sales: market season of the year; color of the plumage; the weight of the chicken; and the type of comb were some of the criteria that influenced the market price of chickens [15]; Weak Agricultural Extension Services: feed source; medicaments; equipment; health services; inadequate availability of credit services; inadequate availability of water and electricity; extension; low level of education among primary producers; poor coordination in the value chains; fluctuation in demand especially as demand declines drastically during the Orthodox Christians' fasting periods (and other similar services is very limited and rudimentary [4, 15, 19]. In Addis Ababa the high price of feed; shortage of land; unavailability of pullets in time; high cost of pullets; feed quality; shortage of water; lack of available feed in nearby areas; marketing difficulties during selling of poultry products; health problem; lack of access to credit; and inadequate training were reported by Nebiyu [26]. On the other hand; major constraints of chicken production among poultry producers under an intensive system in collectively were lack of knowledge to prepare mixed feed; the high price of mixed feed; unavailability of commercial feed in nearby area and unavailability and cost of feed ingredients.

#### Prospects of chicken production in Ethiopia

The poultry sector continues to grow and industrialize in many

parts of the world; however; poultry and egg markets in Ethiopia are at an early stage of development [4]. The prospects for the future growth of poultry in Ethiopia is high; with an average eggs and poultry meat consumption of about 57 and 0.66 kg per capita which are one of the lowest when compared with about 1.64 kg in East Africa; around 6.73 kg meat in Africa and the world standard level of 180 eggs and 9.00 kg of meat [4, 28, 29]. Poultry meat and egg production accounted for more than 28% of the total animal protein produced worldwide in 1997. This proportional contribution of poultry is estimated to reach 40% by the year 2025; the major increase will be in the developing world [30]. These estimates and predictions serve to indicate great scope for increased production and consumption of poultry products [31]. Still scavenging family poultry production systems are the principal providers for the domestic market; supplying most of the marketable poultry products. Nowadays; the supply of poultry meat and eggs remained very low during the past several decades [4]. A rapidly increasing human population; greater purchasing power/rising incomes and increasing urbanization (in many parts of the developing world in general) of the country are responsible for a growing demand and consumption for poultry products; as a more sustainable and cheaper source of protein in the coming years; will rise in the future have been strong drivers of growth [4, 31]. There exists wide gap between the supply and demand. As a result of these; a significant rise in the supply of feed ingredients is expected and the poultry sector would be the major beneficiary. Forecasts indicate the Ethiopian poultry sector is expected to grow annually by between 6-10 percent until 2025 [3, 4].

For many decades development agencies; international agencies; governments and non-government organizations have been interested in helping to develop village poultry production. The pace and scope of such support have expanded over the last 20 years and some major initiatives have been undertaken [32]. The diverse agro-ecology and agronomic practices prevailing in the country together with the huge population of livestock in general and poultry in particular; could be a promising attribute to boost up the sector and increase its contribution to the total agricultural output as well as to improve the living standards of the poor livestock keepers [33]. Despite of the huge total indigenous chicken population in Ethiopia; the contribution of chickens to farm household and national economies is not proportional to their large numbers [4]. There exists wide gap between the supply and demand. Keeping this in mind; to meet the fast growing demands of chicken products; and to improve the per-capita consumption; suggesting best performing poultry sector is the best need.

\*Favourable pre-conditions to operate sustainable poultry sector development in Ethiopia:-

• Poultry keeping is widely known and practiced in the country and large growing domestic market

 Increased recognition of poultry production as a business and employment opportunity for the youth and rural women

 Absence of any ritual spiritual taboo; religious festival days were associated with increased poultry consumption and sales.

Ethiopia has suitable climatic conditions.

• Good feed conversion as compared to beef (in intensive production) reduced greenhouse gas emission.

• Increasing production of agricultural commodities particularly feed ingredients (cereals and oil seeds).

Need to the increasing use of modern agricultural technolo-

gies by farmers; application of improved production practices and increased market access.

• The country's improved economic infrastructure; rapidly growing number of agro-processing industries; abundant and affordable Labour along with its excellent climate and fertile soil remains Ethiopia's comparative advantage attracting investors operate sector.

• Growing number of bulk consumers (hotels; restaurants; universities; colleges; hospitals; etc.) purchasing broiler meat and table eggs from exotic chicken breeds.

 Export opportunities to the Middle East by employing 'halal' slaughtering practices (although: competition from Brazil).

Support and attention from (business) development programs; both national and international.

• The Ethiopian Agricultural Research Institute is undertaking a breeding program to improve productivity of indigenous chicken and also searching for exotic chicken breeds suitable to the local situation.

• Broad outreach to rural farmers through development agents of the extension system for enhancing employment opportunities for women and youth.

✤ For sustainable development of the poultry sector; current governance; policies; and legal framework such as Agricultural Development Led Industrialization (ADLI) strategy; Climate Resilient Green Economy (CRGE) strategy; The Growth and Transformation Plan (GTP); and The Ethiopian Livestock Master Plan (LMP) are developed as a road map for the growth and transformation of the livestock sector [4].

✤ This year November 2022; in Arba Minch city; Ethiopia has officially launched a national program "Ye Lemat Tirufat" development campaign; which focuses on nutritional opulence to get a balanced diet at a household level by significantly improving milk; eggs; poultry; and honey production across the nation expected over the next four years through set strategy for the implementation and partaking in animal production. The Lemat; traditional food container (tray); represents a link between farmers; pastoralists; and consumers. The Government's commitment to the livestock sector is revealed under the Lemat Tirufat project; a four year's development campaign which is being implemented. Poultry sector development is also one of the major focus areas of the Ministry of Agriculture's (MoA) plan [3].

• In general; the commercial poultry sector of Ethiopia has positive prospects.

## Conclusion

Most of the related research findings in the issues of the status of chicken production and prospects in Ethiopia were collected; reviewed; synthesized and sourced. The productivity of chickens under the Ethiopian condition needs effective evaluation by starting from an intensive to extensive husbandry system. Chicken production; in Ethiopia; plays a crucial role by contributing to the growth of domestic products; family income; improving the nutritional status; livelihood of many smallholders; and employment opportunities is substantial. Despite this importance; the production and reproduction performance of chickens are low due to factors such as low productivity of indigenous chickens; low adaptive ability of highly productive chickens; high mortality rate; feed and water scarcity; and also a substandard management system that more based on a scavenging system is another problem. Moreover; the majority of the owners are using no separate housing system; feeding chicken on the ground; and providing water in a low-quality plastic container; further; lots of the producers treat their chickens in traditional methods. Consequently; the supply of poultry meat and eggs remained very low during the past several decades. In general; the current status of the production; reproduction; and husbandry system of Ethiopian chickens needs consideration to be given to breeds and awareness for producers. Ethiopia has prospects for transforming its poultry sector by promoting the active engagement of actors in the public and private sectors. A rapidly increasing human population; greater purchasing power/rising incomes and increasing urbanization (in many parts of the developing world in general) of the country are responsible for a growing demand. There is the need to increase use of modern agricultural technologies by farmers; application of improved production practices and increased market access. Supporting the existing systems and dealing with the emerging systemic bottlenecks; the MoA should consider main sets of issues when making interventions for the sustainable intensification of the poultry sector.

## **Conflicts of Interest**

The author declares that there are no conflicts of interest.

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