

Review Article

Constraint and Opportunity of Village Chicken Production in Ethiopia

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Abstract

The higher chicken ownership of women was observed in all of the three agro-climatic zones Feeding, watering, cleaning, house construction, treating sick chicken, and buying and selling live chicken are common activities in poultry farms. Approximately 80% of the chicken populations in Africa are reared in free scavenging systems. Small holder farming families, landless labourers and people with incomes below the poverty line are able to raise chicken with low inputs and harvest the benefits of eggs and meat via scavenging feed resources. In most African countries, the rural chicken population accounts for more than 60% of the total national chicken population. Ethiopia is more responsible for chicken rearing in both male and female headed households, while men are responsible for crop cultivation and other off-farm activities. In a number of African countries, approximately 80% of the chicken flocks are owned and largely controlled and managed by rural women. In male headed households, the wife and husband are co-owners of the chickens but sometimes children own some chicken in the flock and are allowed to sell their chicken and eggs to cover expenses for school or to purchase clothes. The proportional contribution of poultry to the total animal protein production of the world by the year 2020 is believed to increase to 40%, the major increase being in the developing world. However, most communities lack the required husbandry skills, training and opportunity to effectively improve their household chicken production.

Keywords: Chicken; Village; Rural; Market**Introduction**

Ethiopia has an estimated of 49.3million with indigenous chicken of non-descriptive breeds accounting 97.3%, hybrid chicken 2.32% and exotic breeds 0.38%. Moreover, 97.3% of indigenous chickens has been distributed in different agro-ecological zones of Ethiopia (CSA 2011) and their distribution indicate their adaptive potential to different environmental conditions, diseases and other stresses. Village chicken fulfills many roles in the livelihood of resources poor households of Ethiopia such as food security, income generation and others. Despite of their significant roles, rearing them has been considered as side line Agricultural activity. Animal production in general and chicken production in particular plays important socioeconomic roles in developing countries. Nearly all rural and peri-urban families in developing countries keep a small flock of free range chicken.

Approximately 80% of the chicken populations in Africa are reared in free scavenging systems [2]. According to Robert et al and Sonaiya, smallholder farming families, landless labourers and people with incomes below the poverty line are able to raise chicken with low inputs and harvest the benefits of eggs and meat via scavenging feed resources.

In most African countries, the rural chicken population accounts for more than 60% of the total national chicken population. The proportional contribution of poultry to the total animal protein production of the world by the year 2020 is believed to increase to 40%, the major increase being in the developing world. However, most communities lack the required husbandry skills, training and opportunity to effectively improve their household chicken production.

Poultry production is an important economic activity in Ethiopia, beside its social and cultural benefits. Poultry plays a significant role in family nutrition. The chicken population of Ethiopia is estimated to be about 65 million heads [3]. Despite the high number, their contribution to farm households and national income is relatively very low. Ninety nine percent of the poultry population consists of local birds. Modern poultry production started in Ethiopia some years ago mainly in colleges and research station. The activities of these institutions mainly focused on the introduction of exotic breeds to the country and distribution of these breeds to the farmers including management, feeding housing and health care practices [4].

Poultry refers to all domestic birds, kept for production of meat and eggs for human consumption such as chicken, turkey, ducks, geese, quails, ostrich, and guinea fowl. The developments of innovative ideas for improving real poultry production require complete understanding of the system and its operators. Furthermore, research directions and strategies should be geared to addressing farmer real problems and constraints so as to help them expand and become self-sufficient. Hence important element is in the sustainable development of community is the active involvements of the community members in any development activities, which should start with their participation in identifying their own problem and constraints and deciding on the best alternatives and most appropriate strategies to meet such needs. Therefore the objective of the paper was to review constraints and opportunity of village chicken production in Ethiopia.

Importance of Village Chicken Production

Ethiopia is more responsible for chicken rearing in both male and female headed households, while men are responsible for crop cultivation and other off-farm activities. In a number of African countries, approximately 80% of the chicken flocks are owned and largely controlled and managed by rural women. In male headed households, the wife and husband are co-owners of the chickens but sometimes children own some chicken in the flock and are allowed to sell their chicken and eggs to cover expenses for school or to purchase clothes. According to chicken were among the most adaptable domesticated animals and more people are directly involved in chicken production throughout the world than in any other single agricultural enterprise. The impact of village chicken in the national economy of developing countries and its role in improving the nutritional status, income, food security and livelihood of many smallholders is significant owing to its low cost of production. According to Moreki et al., family chicken are rarely the sole means of livelihood for the family, but is one of a number of integrated farming activities contributing to the overall well-being of the households. It provides employment and income generating opportunity and is a priority animal for holy day and religious sacrifices [4,2]. Village chicken also play a role of converting household leftovers, wastes and insects into valuable and high quality protein. There are only few alternative animal protein sources available in the tropics including chicken and eggs. Family chicken meat and eggs contribute 20-30% to the total animal protein supply in low-income and food-deficit countries. Village chicken could be particularly important in improving the diet of young children in sub-Saharan Africa [5]. Chicken provide major opportunities for increased protein production and incomes for small holder farmers because of short generation interval, high rate of productivity, the ease with which its products can be

be sold due to their relatively low economic values, its minimal association with religious taboos and its complementary role played in relation to other crop–livestock activities. Indigenous chicken production in Ethiopia family chicken production is an appropriate system that makes the best use of locally available resources [6]. Data on livestock populations in Africa show that chicken population is the highest. In sub-Saharan Africa, 85% of all households keep chicken under free range/extensive system, with women owning 70% of it, providing scarce animal protein in the form of meat and eggs as well as being a reliable source of cash income.

Production and reproduction performances of village chicken

The productivity of village chicken production systems in general and the free range system in particular is low. This is due to low egg production and high mortality rate also characterized the low productivity of local chicken due to low egg production performance, production of small sized eggs, slow growth rate, late maturity, small clutch size, an instinctive inclination to broodiness and high mortality of chicks. In Ethiopia, a local scavenging hen on average lays about 36-40 eggs/year. The average egg weight of local hens around Arsi, Ethiopia, was reported to be 38 gm [7]. The average number of eggs/clutch of local hens in Burkina Faso was estimated to be 12 eggs which is comparable to the range of 12-18 eggs reported by [2], but higher than that of 10 eggs/clutch reported by in Guinea and 9 eggs/clutch by in Mali. Halima reported an average productivity of 9-19 eggs/clutch with 2-3 clutch periods/hen per year and an average total egg production ranged from 18-57 eggs/year per hen for local hens in North-West Ethiopia. The average number of clutches/hen per year and the number of eggs/clutch of local chicken in Sudan were 3 and 12 eggs, respectively. The other major limiting factor of village chicken production is feed, in terms of both quantity and quality. The nutritional status of local laying hens from chemical analysis of crop contents indicated that protein was below the requirement for optimum egg production and the deficiency is more serious during the short rainy and dry seasons [8]. In addition to the above mentioned constraints; Singh reported other vital problems affecting the productivity of village chicken including: low productivity of local chicken (attributed to low genetic potential, disease and poor chicken management practices), poor extension services and inadequate credit facilities, availability of few or limited research activities, lack of organized marketing system, seasonal fluctuation of price and lack of processing facilities.

Role of women in village chicken production and ownership

Chicken production in most developing countries is based mainly on scavenging system and Rural women and children traditionally play an important management role. They are generally in charge of most chicken husbandry practices, since small-scale animal production does not require heavy manual labor. According to Bradley, family poultry could be easily managed within home steads and the management has been associated with women for various historical and social factors. A survey in four African countries (Ethiopia, Gambia, Tanzania and Zimbabwe), showed that women dominate most activities of village chicken husbandry, except for shelter construction and marketing. The result also showed that various gender based constraints such as poor access to information and heavy workloads should be addressed to meet the needs of women and opportunities for improving village chicken production.

According to Abubakar *et al.* in a village chicken production some parts of Nigeria and Cameroon, all gender categories are involved in chicken management, with children having the highest responsibility of housing the chicken at night and letting them out in the morning. Based on the result of the study, women own the majority of chicken (52.7%) followed by children (26.9%) and men (20.4%) in Cameroon; unlike the situation in Nigeria, where the majority of the chicken is owned by men (55.6%) followed by women (38.9%) and children (11.1%). In Bangladesh women are able to operate and manage technical enterprises like broiler farming, layer farming and duck farming efficiently with a high economic return on the investment also reported that rural women in North-West.

The Rural Poultry Production System in Ethiopia

The rural poultry production system in Ethiopia is typically a smallholder free range scavenging operation. Most of the birds are kept in small flocks under a scavenging system, and the feed resources for the birds are household refuse, home-stead pickings, crop residues, herbage, seeds, offered by the flock owner. Indigenous village birds in Ethiopia attain sexual maturity at average age of seven months (214 days). The hen lays about 36 eggs per year in three clutches of 12 to 13 eggs in about 16 days. If the hen incubates her eggs for 3 weeks and then rears the chicks for 12 weeks, then each reproductive cycle lasts for 17 weeks. Three cycles then make one year. These are very efficient, productive and essential traits for survival. If the capacity of the Scavenging Feed Resource Base (SFRB) and the seasonal variations are known, more efficient strategies for production of scavenging village chickens can be developed. In this context, feed supplementation should be considered according to the probable nutrient requirements of the birds and what the birds get from the scavenging sources. Chickens play an important role to the rural peoples' lives in-addition to supply of high quality protein to the family food balance, provide small disposable cash income and the socio religious functions of Ethiopian regions [6]. Keeping of poultry by local communities has been practiced for many generations. Poultry keeping is a widely practiced activity; in more than 90 percent of rural families keep one or more poultry species, in most of the region of the countries, (chickens, ducks, guinea fowl, geese, pigeon, etc.) and all ethnic groups tend to be involved in the production. Most poultry in Ethiopia is managed by women in smallholder farms, and is often a rural woman's dominant source of income. In these farms very little of purchased inputs are used with birds kept as Scavengers. According to the results of the total output of scavenging birds is low, because of low egg production, high chick mortality, and brooding behavior of the hen.

Feeds and feeding

There is no purposeful feeding of rural household chickens in Ethiopia and the scavenging feed resource is almost the only source of feed. Who stated that village chickens don't receive regular and adequate supplementary feeding? All the respondents reported that baby chicks and layers are given priority for supplementary feeding. According to the results of the discussion made with the key informants priority of supplementation is given to young chicks since young chicks could not fulfill part of their nutritional requirement by scavenging as compared to mature chickens. In contrast to this result reported that supplementary feed materials are offered indiscriminately to all classes of chicken on bare ground. This result is in line with that of who reported severe scarcity of scavenging feed resource during wet seasons indicating that availability of scavenging feed

resource basis depends on seasons and backyard conditions.

Marketing systems of village chicken and eggs in Ethiopia

In Ethiopia marketing chicken and eggs is one of the functions of keeping free range chickens by Smallholder farmers. Village chicken and eggs are sold in local and urban markets to traders (collectors) or directly to consumers depending on the location of the farm dwelling. According to Assefa and Halima, small holder village chicken owners found in different parts of the country sell chicken and eggs to purchase food items, to cover school fees, to get cash for grain milling services, to purchase improved seeds and to adjust flock size. Tadelle also reported that few farmers in central highlands of Ethiopia exchanged their free range chicken for food and house hold items. Most consumers in Ethiopia prefer to buy local chicken from village producers, since they are considered to be tasty and better suited for preparation of the traditional chicken sauce (locally called 'dorowot'). Eggs from local chicken are often favored because of their deep yellow colored yolks. As a result, free ranging local chicken are in higher demand and fetch higher market prices in urban markets (ILRI 1995). According to Halima, the price of chicken is highly related to holy days, non-fasting season for the Orthodox Christians, plumage colour, comb type, size, age, sex, and market site and health status of chicken. The chicken and egg marketing channels in the country are informal and poorly developed. Chicken and eggs are sold to consumers within the villages, on roadsides and in local and urban markets (ILRI 1995). Extension interventions to improve village chicken production Improvement of the genetic potential of the local chicken could be done through selection within and/or upgrading through crossbreeding with exotic breeds. In Ethiopia, scientists and the government have been promoting a crossbreeding scheme through distribution of cockerels from selected exotic breeds with the intention of improving the productive performance of the local chicken for the last four decades. An alternative scheme to improve poultry production is introduction of exotic poultry breeds. The extension system has been disseminating exotic chicken breeds (dominantly White Leghorn (WLH) and Rhode Island Red (RIR)) as a poultry extension package to improve the productivity of local chickens. Unfortunately, no systematic effort has been made to evaluate the performance of these schemes. This is mainly because ownership pattern, control and access of resources, distribution of benefits and marketing have not been adequately addressed in the process of the interventions.

Chickens were kept for both egg and meat production. The eggs produced were used for brooding, trade and home consumption. Depending on the location of the farm dwelling, birds and eggs were taken by the farmer to the local market and sold to traders or directly to consumers. Traders from urban areas buy eggs in village markets to sell in big cities or to owners of restaurants. The price of eggs was directly related to supply and demand as well as the orthodox Christian fasting months. The income derived from the sale of chickens and eggs was used to purchase consumable food items, for school fees, grain milling services, purchasing of improved seeds of maize, wheat and other expenses. Most of the consumers prefer to buy eggs and chickens from producers of indigenous birds, since they were considered to be tasty, were better suited to preparation of the traditional "Doro wot" (chicken sauce) and the dark colored egg yolks were commonly favored. Birds were brought to the local market once or twice a week to be sold to local consumers, or to local traders. People carry their chickens to the market on foot

where there was no access to transport. Lack of recorded data on the performance of chicken and all aspects of management, lack of regular chicken health program and market information makes it difficult to assess the importance and contributions of the past attempts to improve the sector.

Ranking of poultry production constraints and common poultry diseases

Challenges in village chicken production systems the most striking problem in village chicken production systems is the high mortality rate which could reach as high as 80-90% within the first few weeks after hatching, due to diseases and predation. Newcastle Disease (NCD) is highly infectious and causes more losses than any other diseases in the tropics. The disease spreads rapidly through the flock and mortality could reach up to 100% [9]. Among the infectious diseases, NCD, salmonellosis, coccidiosis and fowl pox are considered to be the most important causes of mortality in local chicken while predators are an additional causes of loss. According to Tadelles, the high mortality of chicks under village chicken production in the central highlands of Ethiopia is due to diseases, parasites, predation, lack of feed, poor housing and insufficient water supply. Identified village chicken productions constraints and opportunities during the individual interviews were prepared into separate flip charts and presented to each group for rating them according to their order of importance. Symptoms of each poultry disease were identified during individual interview of the survey. Every identified symptom was translated in to its respective common name based on the case book records of poultry diseases in the Animal Health Clinics of each agro-ecological zone of the study area. This was done with greatest involvement of the experienced veterinarians of Animal health clinics in each agro-ecological zone of the Zone. Upon translation, the common poultry diseases were presented to the established Focused group discussion members of each agro-ecology of the zone for ranking.

Production constraints

All production constraints, except management skills, differed by agro climatic zones. Even within each agro-climatic zone, the rank order of importance of the different production constraints were not the same. The most priority constraints were the diseases affecting chicken followed by the lack of locally adapted and well performing chicken breeds in lowlands; whereas, the lack of locally adapted and well performing chicken breeds was the most priority constraint in midlands and highlands. Production constraints such as diseases, unavailability and poor quality of feeds, low management skills, predators attack, lack of modern technologies, and uncontrolled breeding were common findings in extensive chicken production systems. Up to date information on the type of the production constraints and their degree of importance is helpful to make necessary interventions at farm level. Farmers' response on lack of locally adapted and well performing chicken breeds as the main production constraint at farm level could be associated with the increasing market prices of chicken and eggs in Ethiopia.

Constraints of Village Chicken Production

Pertaining to constraints of agro-ecological zone wise, disease and predators were the first and second chicken production constraints in all lowland, midland and highland agro-ecological zones of the study area. However, weak extension support was the third poultry production constraint in lowland agro-ecology whereas capital scarcity was the third most im-

portant chicken production constraints in both midland and highland agro ecological zones, Comparable results have been reported from Rift valley of Oromia by Hunduma *et al.*, which stated that disease, predators, lack of proper health care, poor feeding; poor marketing information and replacement of indigenous chickens by exotic chickens were found to be major barriers of chicken production. In the same way, also reported that diseases (48.6%) and shortage of supplementary feeds were the most important chicken production constraints. diseases and predators were the first and second major constraints that cause loss of chickens in scarcity of extension service, predators and parasites were the most serious constraints of village chicken production in the highland agro-ecology (Derek Wonz) while diseases and scarcity of extension services were outlined as most serious constraints of village chicken production in both midland (GendeGorba) and lowland(Awash) agro-ecological zones of the Central highlands of Ethiopia. Likewise, reported that seasonal disease outbreak (mainly Newcastle disease), predators, lack of credit services, limited skill of management practices (improved feeding and housing) and low productivity of local chickens were the major identified constraints of village chicken production in Metekel zone of Northwest Ethiopia [10] Also reported comparable results in selected Changni town in Awi- administrative zone of amahara region in which poultry diseases, inadequate veterinary and extension services and high feed costs were the major constraints affecting village chicken production in the area. In the same way, also reported that outbreak of diseases, predators, theft, shortage of feed and housing problems at night were the major challenges of poultry farming in the Zhombe communal lands of Zimbabwe. Kingori *et al.*, also reported that low genetic potential of genotypes; poor nutrition, diseases and improper management were the critical challenges of village poultry production in Kenya. Fairly similar results have also been reported from three agro-ecological zones (Coastal Savannah, Rainforest and Guinea savannah) of Ghana by Hagan *et al.*, in which diseases (notably Newcastle disease), predators and theft were found to be the main causes of loss of birds or reduction in chicken flock size.

Feed, feeding and housing management

Village chickens mainly depend on scavenging for their feeds in many African countries like Ethiopia. Cereals like wheat, barley, maize, and sorghum are the common grains available for supplementation. In the present study, it was noted that village chicken were mainly depended on scavenging for their feeds. Some households provided supplementary feeds to their chicken. Grains were the main (78.7%) supplementary feeds provided for chicken. Additionally, chicken had access for family food leftovers. The amount and type of supplementation was dependent on the type and size of crop production in the different agro-climatic zones. Due to frequent movement in the field, chicken using considerable energy for physical activity and they are exposed to harsh climatic conditions, disease and predator attack. A previous study conducted by Dana *et al.* in Ethiopia showed that 83% of the 225 chicken farmers were practicing scavenging and supplementary feeding management system. no farmer was practicing a confined or complete ration system. Regarding housing conditions, this study revealed that almost 35.6% of the households had sheds for their chicken. The sheds were small in size and made from locally available materials. 34.1% of the cases showed that chicken spent their nights in the same house with humans. So, family housing and sheds were the major housing systems used by farmers to shelter chicken during the night.

Health management

Diseases were one of the major bottlenecks for village chicken productions in Ethiopia. Newcastle disease was most widely distributed among the village chicken in Ethiopia. This was reported in several previous studies which employed different diagnostic methods such as virus isolation, Sero-epidemiological investigations and molecular methods to confirm the presence of the disease in Ethiopian village chicken productions. In this study survey, almost 56 to 71% of the visited farms were affected by this disease at least once. The disease occurred in all agro-climatic zones during the period studied, particularly affecting chicken in highlands. Farmers did not know how to differentiate the disease affecting their chicken. They knew only symptoms shown by affected chicken. The symptoms most commonly observed in affected village chicken were bloody diarrhea, nasal discharge, and sneezing, torticollis, and deaths within few days. Veterinarians when their chicken were sick. Farmers used their own traditional practices to resolve health issues of affected chicken. Households used local treatments such as lemon, pepper, alcoholic drink, salt and onion for trying to cure affected birds. Unhealthy chicken normally receive a mixture of one or more of the aforementioned traditional treatments with water or feed. Also, some farmer's let bleeding from the wings of sick chicken as a means of treatment. Normally the farmers believe that bleeding can give sick chicken relief from their pain and support recovery from the disease. Farmers smoke leaves of Eucalyptus tree in chicken sheds in order to protect the chicken from external parasites. Such indigenous knowledge of farmers is very helpful especially in conditions where there is no access to contact veterinarians and where there is no money to buy medicaments from animal health centers. The rate of village chicken mortality, Reasons for mortality can be poor management practices, bad quality and low quantity of feeds, predations, and diseases. Different types of disease cases were previously reported in Ethiopia [11]. The present study found that Newcastle disease was the major causes of mortality among village chicken in all of the three agro-climatic zones of Ethiopia which is in agreement with previous findings in Ethiopia [11] and in other African, Farmers used some strategies to protect flocks from predators. For instance, they select against white plumage color of chicken, avoiding white plumage which easily expose birds to predators.

Culling and replacement

Farmers used different systems to cull unproductive and/or sick chicken. Households sold their Unproductive chicken. Selling as a culling strategy was practiced at the households in lowlands, midlands and in highlands many factors can force farmers to cull their chicken. Diseases, low production and lack of feed are some of the major causes of culling. When culling is necessary, farmers cull their chicken in different ways. In this study, selling and home consumption were the dominant methods of culling in all agro-climatic zones. These results are in agreement with previous findings in Ethiopia. However, such culling methods can be a risk for human health if sick chicken are used for consumption. Zoonotic diseases can be easily transmitted from chicken to humans. Flock replacement was made by hatching, the households in lowlands, midlands and highlands used hatching as a method of flock replacement. Buying chicken from local markets was the second method of flock replacement in

all agro-climatic zones. Tadelle reported that 70% of breeding females in Ethiopia originated from hatching at home. Studies in other African countries also reported hatching as the main source of flock replacement under extensive chicken production systems. Flock replacement by hatching can prevent the introduction of chicken from other places to already existing flocks, reducing the risks of dissemination of diseases; however, it avoids the cleaning up of disease already entered into the flock because it lacks all-in-all-out practice. Such flock replacement method can also prevent gene flow between flocks with different genetic origin.

Chicken ownership and task sharing

The higher chicken ownership of women was observed in all of the three agro-climatic zones. Feeding, watering, cleaning, house construction, treating sick chicken, and buying and selling live chicken are common activities in poultry farms. This described that such activities were accomplished by family members including the mother, father and children, rural women accomplished of farm activities, except chicken house construction which was mainly done by rural men. There was a clear difference in task sharing among the different family members. According to the current findings, chicken ownership and management were dominated by rural women indicating that village chicken are the property of rural women which is in accordance with previously reported findings in Ethiopia [11].

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