



## The Peculiar Characteristics of the Marketing System of Indigenous Village Chickens

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### ABSTRACT

For smallholder farmers, indigenous village chickens (IVCs) serve as a source of food, income, and ritual items. In practice, there is a high demand for IVC products, and when this demand is coupled with low investment in production inputs, it makes IVC production a rewarding rural business. Regardless of a lot of complaints about its efficacy, the marketing system of IVCs remains a viable transaction method and perfectly matches the extensive production system. This study documented the marketing system of IVCs operating in smallholder settings using a cross-sectional study. There is high volatility in the demand for IVC products, which is attributable to the demographic structure of the community and the weak purchasing power of consumers. The market price of live birds is fixed in line with the specifics of the multifaceted demand of the local community. Agroecology significantly affects the age at which the birds reach marketable size ( $t = 3.508$ ,  $df = 113$ ,  $p = 0.001$ , 95% CI -1.9359 to -0.5384). There is an inclined tendency to sell live birds rather than eggs ( $x^2 = 46.512$ ,  $df = 1$ ,  $p\text{-value} = 9.104e-12$ ) and most of the home-hatched birds are sold out. Due to the involvement of hundreds of millions of smallholder farmers that are living in rural areas, millions of actors are needed to execute the market transaction, which significantly reduces the income accrued by smallholder farmers and the utility of consumers.

### INTRODUCTION

Indigenous village chickens (IVCs) are common sources of nutritious foods of animal origin, the incidental income of smallholder farmers, and support the socio-cultural life of rural communities (Mapiye *et al.*, 2008; Desta, 2021a, 2021b). Although it might be of marginal importance in terms of an economy of scale, IVC production is a reasonably important and well-established rural enterprise. The income generated from IVC production is used to buffer the instant cash needs of the smallholder farmers and contributes to asset building. IVC production is a source of permanent income for middlemen and traders involved in primary, secondary, and terminal markets, and it has created casual jobs for smallholder farmers, their families, and relatives (Desta & Wakeyo, 2013). IVC products and services are highly sought by consumers and ritualists. By its very nature, IVC production represents organic farming; hence, there is a growing demand from people who prefer to consume environmentally-friendly products (Wong *et al.*, 2017). The texture, leanness, flavor, firmness, and pigmentation of IVCs products attract high demand, at least in the nonconventional market (Hamid *et al.*, 2017). Besides, the low cost associated with IVC production makes it an economically viable business in smallholder farmers' settings.

The fast-growing human population, urbanization, and decent growth in the per capita income of developing countries (Mottet &



Tempio, 2017) and an ever-increasing knowledge of the dietary value of IVC products have created high market demand for IVC products in developing countries living with an inherent shortage of poultry products. Although the traditional market channel is believed to be the principal cause of disorganized transactions of IVC products (Mapiye *et al.*, 2008), it has been proven that market actors have a well-established nonconventional marketing channel that aligns with the specifics of the IVCs production system. However, the long chain of middlemen and traders significantly reduces the returns that would otherwise accrue to smallholder farmers and consumers (Desta, 2021a). Nevertheless, this system has developed due to the very nature of the IVC production system, in which hundreds of millions of smallholder farmers are involved in keeping small family flocks (Alders & Pym, 2009; Bettridge *et al.*, 2018), which requires the participation of millions of middlemen to collect live birds and eggs from rural households living in scattered conditions and hundreds of thousands of open local markets, each supplying a few live birds and eggs.

Demand for IVC products and the fixing of prices is principally driven by public and religious holidays (Alemayehu *et al.*, 2015), accessibility and geographic distance from the terminal market and consumers, and phenotypic attributes of the live birds and eggs. The price is fixed through dedicated negotiation. Prices could vary based on breed, sex, plumage color and pattern, overall appearance, size, age, season, health status, and meatiness of the bird (Ndenga *et al.*, 2017; Conteh & Sesay, 2019). Accessibility to the road and market information also play a role in determining market prices. Generally, when there is a widespread outbreak of disease, the price of chicken tends to decrease (Delabougli *et al.*, 2020). IVC production is little impacted by the drivers of the macroeconomy because it virtually relies upon cheap and freely available local resources and the nonconventional expertise of smallholder farmers. IVC production is run with little investment, and this farming system has made IVC production a low-risk venture. This study highlights the main attributes of the IVCs marketing system and its socio-economic importance.

## MATERIALS AND METHODS

### The study sites

The study site, the Wolaita zone, is located in southern Ethiopia between geographic coordinates of 6.4° and 7.1° north latitude and 37.4° and 38.2° east longitude. Wolaita covers an area of 3,982 square

kilometers. Its elevation ranges from 1,200 to 2,950 meters above sea level (masl). Based on elevation and according to the customary classification method of agro-ecological zones adopted in Ethiopia, Wolaita is divided into three agro-ecological zones: kolla or lowland (35%, less than 1,500 masl), woina dega or intermediate highland (56%, 1,500 to 2,400 masl); and dega or highland (9%, greater than 2,400 masl).

### Sampling methods

A cross-sectional study was conducted in two districts of the Wolaita zone: Damot Gale, representing the highland region; and Humbo, the lowland region. This study was conducted in 6 representative rural villages selected from the 2 agroecological zones or districts (3 from each agroecological zone) in consultation with the respective district's office of livestock extension advisory service. The two study sites exhibit a significant contrast in ecological settings.

Interviewed farmers from each village were selected using a systematic sampling method using a master list of smallholder farmers found in each village. Accordingly, after dividing the total number of farmers in the list by 20 (the sample size of each village), the first farmer was randomly drawn using a lottery method from the first-class interval. Subsequently, the additional 19 farmers were selected at a fixed interval equal to the class interval.

### The studied traits

A semi-structured questionnaire pre-tested on 10 farmers was administered to 119 farmers (20 in each village, except for Taba, from which 19 farmers were interviewed). Farmers were interviewed on their demographic characteristics, marketing systems such as the plasticity of demand, and drivers of market demand and pricing. The agroecological zone, the sex, family size, and education level of the respondents were recorded as explanatory variables.

### Statistical analysis

The statistical analysis of the degree of relationship was performed using IBM SPSS Statistics 23 (IBM Corp., 2015) and R (R Core Team, 2016). Statistical analysis was performed using Chi-Square test, T-test, and F-test. Data summary statistics were produced using SPSS and graphical presentations were made using Excel.

## RESULTS

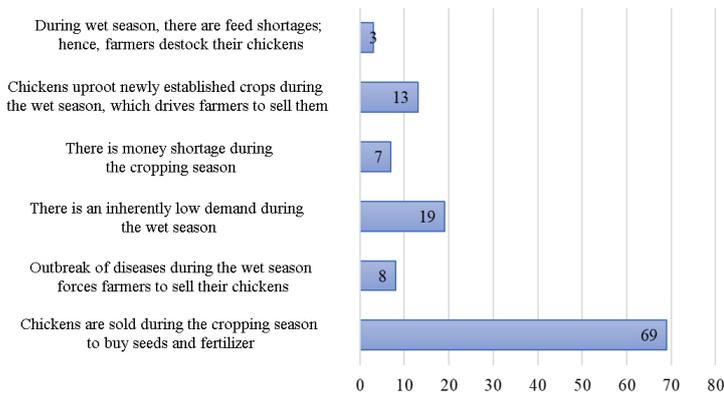
Findings of the study report seasonality in the demand for IVC products, drivers of market supply and



demand, the prevailing market outlets, the comparative advantage of selling live birds versus eggs, and the rate of flock turnover through market transactions.

**Seasonal variation in the marketability of chickens**

Respondents reported that IVCs were sold at higher prices during holidays. IVCs were particularly expensive during Easter (34.4%, 118/343), Ethiopian New Year, i.e., 11<sup>th</sup> of September (34.1%, 117/343), and Christmas (31.5%, 108/343); however, the three proportions do not show statistically significant differences, demonstrating that consumers give comparable weights for the three main holidays (x-squared = 0.1526, df = 2, p-value = 0.9265). This standing high seasonal demand is ascribed to the well-established demand during holidays. Nevertheless, chickens usually become cheap in some seasons. For example, respondents reported that, during the wet season (summer, June to September) (50.8%, 60/118), and minor rainy (spring, March to May) seasons (49.2%, 58/118) (x-squared = 0.0256, df = 1, p-value = 0.8729) chickens are sold at lower prices. According to the respondents, several factors drive the plasticity of market demand among seasons and they are summarized in Figure 1. The reported reasons for the low demand for chickens (Figure 1) during summer (the main rainy season) show statistically significant differences (x-squared = 153.92, df = 5, p-value < 2.2e-16). These reasons show that crop production is significantly supported by the income generated from IVC production, which shows the integration of IVC and crop production.



**Figure 1** – The main causes for the reduction of chicken price during wet season.

**Phenotypic attributes as drivers of market demand**

Farmers stated that the market price of chickens is determined by a combination of phenotypic characteristics. These attributes are presented in Figure

2. The market offers significantly different values for the reported traits (x-squared = 168.7, df = 3, p-value < 2.2e-16). This analysis shows that body size (meatiness) and plumage color are the principal drivers of the market price of IVCs.



**Figure 2** – Phenotypic characteristics determining the market price of indigenous village chickens.

**Market outlets**

The respondents usually sold their chickens in nearby weekly-dedicated local markets. Most of the respondents sold their chickens to middlemen (64.8%, 118/182), while local consumers bought a decent proportion (25.3%, 46/182), and local people in need of a replacement flock represented the lowest proportion (9.9%, 18/182) (x-squared = 48.114, df = 2, p-value = 3.566e-11). This data shows that most of the sold chickens are used for consumption. The marketable age of chickens shows a wide variation (range: 3 to 12 months) with a mean and standard deviation of 6.804±1.9820, with a median of 6, and a mode of 6. Agroecology has a statistically significant effect on the age at which chickens reached a marketable size (t = 3.508, df = 113, p = 0.001, 95% CI -1.9359 to -0.5384). Group statistics show that in the highland region, the mean and standard deviation of marketable age was 6.170±1.0148 with a standard error of the mean of 0.1356, while in the lowland region, it was 7.407±2.4468 for mean and standard deviation, with a standard error of the mean of 0.3185. This disparity in growth rate could be ascribed to the better availability of scavenging feed resource base in the highland region, which has a comparatively high potential for crop production. The univariate analysis also confirms the statistically significant effect of agroecology (F = 12.194, df = 1, P = 0.001), the two-way interaction of literacy level and family size (F = 1.918, df = 18, p = 0.035), and the three way-interaction effect of agroecology, literacy level, and family size (F = 2.480, df = 6, p = 0.035) on the marketable age of IVCs.



### The comparative advantage of selling live birds versus eggs

The respondents were interviewed about the comparative advantages of selling live birds versus eggs. They reported mixed feelings about the benefit of selling either eggs or live birds (Table 1). The proportions of reported comparative advantages show statistically significant differences ( $\chi^2 = 235.65$ ,

$df = 7$ ,  $p$ -value  $< 2.2e-16$ ). Farmers preferred to sell live birds (84.1%, 143/170) compared to the sale of eggs (15.9%, 27/170 ( $\chi^2 = 46.512$ ,  $df = 1$ ,  $p$ -value =  $9.104e-12$ ). Farmers give more emphasis on the income generated from the per unit sale of a product and on the building of assets using IVC production as a wealth creation system. However, to cover incidental expenses, farmers prefer to sell eggs as compared to live birds.

**Table 1** – The reported comparative advantages of selling live birds versus eggs.

Response	N	%
The selling of chicken makes more money to buy large animals	29	17.1
The selling of chicken makes more money to buy expensive materials	7	4.1
The selling of chicken generates more money	81	47.6
Eggs should have to be left for hatching to produce a replacement flock	26	15.3
It is better to sell the eggs because chicks can be killed by predators or they may die due to various problems	2	1.2
It is better to sell eggs because we do not get back the chicken once it is sold out	1	0.6
To cover incidental expenses, it is better to sell eggs	22	12.9
It is better to sell eggs because eggs laid per hen make more money than the hen itself	2	1.2

### The turnover of the juvenile flock

Respondents estimated that 100% of cockerels and pullets were used as replacement flocks and for selling. The descriptive statistics are presented in Table 2. Regardless of the small size of the family flock, most of the home-hatched and grown cockerels and pullets were sold. A small proportion of the respondents

(10.3%, 12/117) also reported acquiring the flock through a contractual agreement in which the flock receiver rather than the owner is responsible for the provision of all care, whereby the owner transfers the chickens to the contract receiver on an agreed basis. Ultimately, both groups equally share the output of the flock, i.e., eggs and live birds, obtained after the transfer of the flock.

**Table 2** – The turnover proportion of juvenile flocks.

Reported uses	Range	Mean	Std Dev	Median	Mode
Replacement cockerel, %	10 to 60	17.6	9.34	20	10
Cockerel allotted for sale, %	40 to 90	82.3	9.32	80	90
Replacement pullet, %	10 to 100	33.0	15.55	30	30
Pullet allotted for sale, %	0 to 90	65.3	16.71	70	70
Contract flock management, %	0 to 80	44.2	26.44	30	30

## DISCUSSIONS

In the scavenging production system, the marketing of IVCs has long been adopted in a way that satisfies the needs of smallholder farmers, middlemen, and traders involved in the market transaction, as well as consumers. Although it is informal, significantly flexible, could vary in line with prevailing conditions, and the transaction cost could be high due to the long market channel (Desta, 2021a), the indigenous marketing system includes the basic components of the conventional value chain system. The scavenging production system is often criticized as a cause of a disorganized marketing system (Das *et al.*, 2008; Mapye *et al.*, 2008). However, regardless of its low economy of scale, the marketing

channels developed in this particular system have been long ratified for their efficacy, and they are functioning well to address the demand of the community (Gumataw *et al.*, 2016). The transaction knowledge developed by the stakeholders of the nonconventional value chain needs to be acknowledged as a legacy of the indigenous marketing system. IVCs are branded based on their origin. For example, Wolaita chicken is one of the brand names that are given at the terminal markets of Addis Ababa.

Per capita consumption of poultry meat and eggs is the lowest in less developed countries (Mottet & Tempio, 2017), attributable to the combined effect of inadequate supply and weak purchasing power. These conditions make the community an irregular consumer



of IVC products. Although this consumption pattern is detrimental to the health of growing children, pregnant and breastfeeding women, elderly individuals, and patients in need of high-protein foods, the rest of the population largely relies upon protein foods of plant origin (vegetarians), which might be advantageous from a health perspective (Fraser, 2016). Moreover, although the per capita consumption of meat and eggs is low in absolute terms, due to the nutrient enrichment and compositional integrity, citizens of developing countries may get more nutrients per unit amount of IVC product.

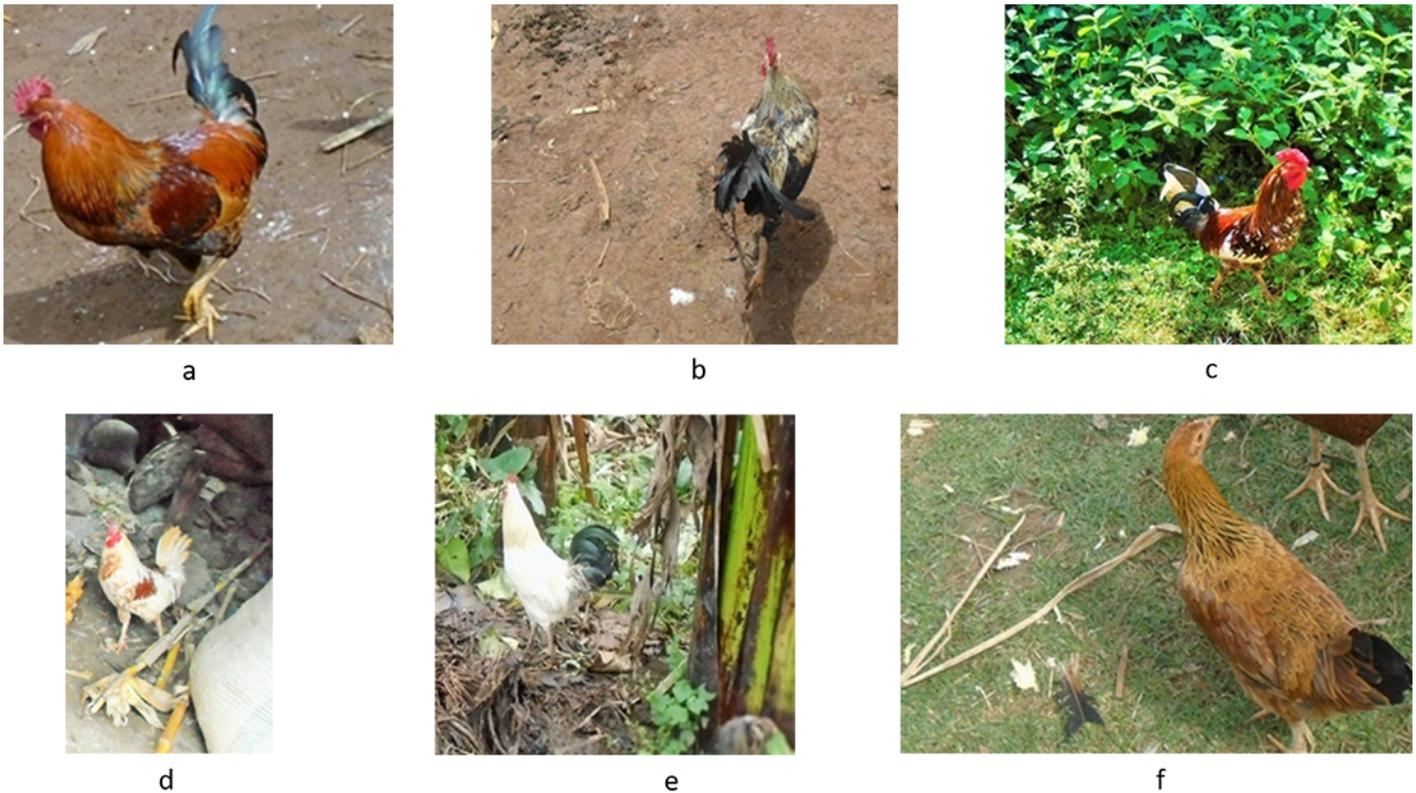
In some instances, weak purchasing power might be an important factor leading to low per capita consumption as compared to inadequate supply. For example, Uganda is known to be one of the least per capita consumers of IVC products (Waiswa *et al.*, 2021); however, at least once it has faced low market demand even for the highly sought eggs and meat from IVCs (Mugga, 2007). This condition elicits that enhancing production would have to match an increase in the purchasing power or per capita income of the community. In this regard, the system of IVC production has to operate in response to the prevailing demands. Nevertheless, a study conducted by Conteh & Sesay (2019) in Sierra Leone shows a deficit in the supply of IVC products. Increasing purchasing power is a driving force for the intensification of IVC production systems in rural settings and the expansion of commercial chicken production in urban areas with inherently high demand.

Farmers usually experience a spell of transient food insecurity (silent famine) (Cochrane, 2017) during summer (the main rainy season) because the grain stock harvested during the dry season significantly runs out. During summer, i.e., the main cropping season, farmers dreadfully need money to purchase production inputs such as seeds, fertilizer, and herbicides. Farmers also sell IVCs to buy grains to feed their families. Unfortunately, people's calorie intake increases during the cold season (Hussain *et al.*, 2014), i.e., summer. To meet the physiological demand of maintaining an appropriate body temperature, people need to consume more grains, the cheapest sources of energy. Therefore, the consumption of poultry products during the rainy season is often considered an extravagance, and farmers opt instead for relatively cheap grains to mitigate the chilly weather. In IVC production, the outbreak of disease often occurs during summer (Hailemichael *et al.*, 2017) and feed becomes scarce during summertime (Alemayehu *et al.*, 2015), which

forces smallholder farmers to destock a significant proportion of birds from their flocks.

The market price is fixed based on phenotypic attributes such as live weight, meatiness, age, sex, plumage color and pattern, season, acquittance to market information, religious and national holidays, and access to terminal markets (Gebreegziabher and Tsegay, 2016). For example, plumage color is considered to be an economically important trait (Huang *et al.*, 2020), and farmers' response also confirms that plumage color is one of the major drivers of market price. In Ethiopia, plumage color is one of the most important traits defining the ritual value of IVCs. For example, during Ethiopian New Year, silver birchen and black-breasted red cocks, and brown hens (Figure 3) are sacrificed. A speckled cock with patches of red, white, and black (that looks like Mille Fleur) is presented to a god around the third day of the Ethiopian New Year (13<sup>th</sup> September). A red pyle cock is presented to a god during the finding of the true cross (by the end of September, ~ 27<sup>th</sup> of September). A white cock is sacrificed somewhere in October, April, and June. A bird is rolled around the head of an individual believed to be possessed by an evil spirit or critically ill and the bird is thrown away in a bid to drive off the evil spirit that possessed an individual or the disease that makes the individual sick. In this ritual practice, it is believed that the evil spirit and the illness could be transferred to a bird after the ritual ceremony is over. The plumage color and sex of the bird used for this practice depend on the specifics of the witchcraft prescription. In ritual commitments, the chicken tends to be sacrificed and should be non-single-combed. Single-combed chickens are considered graceless and are not qualified for ritual sacrifice. Accordingly, single-comb chickens usually fetch a low market price.

Surprisingly, in Ethiopia, unlike in Orthodox Christian-affiliated national holidays such as Christmas and Easter, the price of chickens does not show a significant increase during Muslim public holidays — Maulid (the birth of the prophet Mohammed), Eid al Fitr (the end of Ramadan), and Eid al Adha (Festival of Sacrifice). This is in spite of Muslims representing 34 percent of the Ethiopian population according to the 2007 census (review by Ahmed, 2019). The low consumption rate of chicken at Eid al Fitr could be associated with the nature of fasting Muslims adopted. Although Muslims fast from dawn to dusk for ~30 days, during the nighttime they are allowed to consume foods of animal origin; however, consumption



**Figure 3.** Plumage color and sex specifics of indigenous village chickens prescribed for ritual practices.

- a. Black-breasted red (Photo credit Hailu Assefa)
- b. Silver birchen (Photo credit Hailu Assefa)
- c. Zagolma (Photo credit Hailu Assefa)
- d. Red Pyle (Photo credit Hailu Assefa)
- e. White cock (Photo credit Hailu Assefa)
- f. Brown hen (Photo credit Hailu Assefa)

of animal-origin foods is forbidden during the fasting period of Ethiopian Orthodox Christians. Hence Muslims may not be that much eager to eat chicken during holidays, unlike Ethiopian Orthodox Christians who have disallowed the consumption of animal products during fasting periods. During Eid al Adha, Muslims sacrifice camels, cattle, sheep, goats, water buffalo, domesticated banteng, and yaks (Brooke, 1987), with chickens missing from the list.

Smallholder farmers living in remote areas prefer to sell chickens to bypass middlemen because these intermediate traders pay comparatively better than neighbors or the general public, and they are reliable buyers of IVCs (FAO, 2014). Middlemen also have an established marketing network with terminal markets and consumers (Abebe *et al.*, 2016). At best, a few chickens are sold at a time by a household (FAO, 2014) and these have to be assembled at a central collection point by middlemen to produce a large volume for the terminal market.

## CONCLUSIONS

The extensive production system of IVCs unlocks the way for the development of a complex network of marketing systems. Prejudicing the weakness of the smallholders' marketing system without knowing much of its complexity could not help us to improve the extensive IVCs production system. Conversely, the nonconventional marketing outlet is proven to be an efficient system in the IVC production system. To address this controversy, the feasibility of the traditional marketing system needs to be studied in-depth in the context of the IVC production system. Studies should consider breed-wise differences in marketability, the role of different family members in marketing, the incomes generated at different levels of the market transaction process, the impact of enhanced management on the economic feasibility of family poultry production, and the marginal profits realized by middlemen.



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## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Verbal consent was obtained from the respondents

## CONSENT FOR PUBLICATION

Not applicable

## AVAILABILITY OF DATA AND MATERIALS

Will be available from the corresponding author upon reasonable request

## COMPETING INTERESTS

The authors declare no competing interest

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## AUTHORS' CONTRIBUTIONS

OW conceived the project idea; CW, OW, and TTD were involved in the management of the project, TTD and OW were involved in field data collection, TTD analyzed the data, and CW, OW, and TTD wrote the manuscript. All authors agreed to submit the manuscript.

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