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To cite this article: Mavis Boimah, Craig Chibanda, Johanna Schott & Stephen Awuni (2022) Doing it right to alleviate poverty: application of the sustainable food value chain development framework to Ghana's poultry sector, International Journal of Agricultural Sustainability, 20:7, 1454-1469, DOI: [10.1080/14735903.2022.2152605](https://doi.org/10.1080/14735903.2022.2152605)

To link to this article: <https://doi.org/10.1080/14735903.2022.2152605>



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Published online: 07 Dec 2022.



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Doing it right to alleviate poverty: application of the sustainable food value chain development framework to Ghana's poultry sector

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ABSTRACT

Some international organizations and civil society activists are blaming exporting countries of frozen chicken products for the underdevelopment of the domestic poultry sectors in developing nations. However, concrete evidence that supports or rejects these criticisms is missing. Against this background, this study was conducted to examine the performance of Ghana's poultry sector by employing quantitative and qualitative methods. Results of our study highlight the poor economic, social, and environmental performance of the Ghanaian poultry sector. Moreover, weak vertical and horizontal coordination among actors in the value chain in addition to low commitment from supporting stakeholders emerge as the root causes of the challenges the sector faces. We propose an integrated set of sustainable solutions to support the development and growth of Ghana's poultry value chain. Besides, continuous mutual cooperation is required from all actors and stakeholders in the value chain who operate in transparency and trust.

ARTICLE HISTORY

Received 27 April 2022

Accepted 24 November 2022

KEYWORDS

Poultry; value chain; poverty alleviation; sustainable; performance; Ghana

1. Introduction

Ghana is witnessing an annual rise in consumption of imported frozen chicken meat since the early 2000s, see Figure 1: Zamani et al. (2021) and Amanor-Boadu et al. (2016). This development on one hand is attributed to the rapid urbanization, and growth in both population and incomes of Ghanaians (Atarah, 2005; Alagidede et al., 2013; Naggujja et al., 2020). On the other hand, the domestic poultry sector which focused mainly on chicken has over the years failed to meet the ever-increasing needs of consumers (Banson et al., 2015; Killebrew, Gugerty, & Plotnick, 2010). Frozen chicken cuts are imported from the United States of America (USA), Brazil, Argentina, the United Kingdom (UK), and Europe. However, for more than a decade, the EU's share in total imports keeps growing significantly (see Figure 2) with the exception of the year 2014 where a decline is seen in demand for EU-28 poultry meat imports which could largely be attributed to the implementation of the Ghana Broiler

Revitalization Project (GHABROP) in that year (Netherlands Enterprise Agency, 2020; Zamani et al., 2022). The GHABROP aimed at achieving a 20 million broiler production target accompanied by a 40% reduction in imports by the year 2016. Notwithstanding, the increasing share of the EU in total imports is based on Ghanaian consumers' positive perceptions about chicken meat from Europe; described as having the highest quality (Egyir et al., 2012). Although there are alternate animal protein sources such as beef, mutton, chevon, snails, grasscutters as well as fish, chicken meat, notably the imported versions are widely consumed across the country due to its affordability. As shown in Figure 3, the annual per-capita consumption of chicken meat in Ghana surpasses that of beef and the other meat products. Thus, the share of imports in domestic consumption of chicken meat has significantly increased over the last two decades (Zamani et al., 2021) while the poultry meat import bill keeps rising, bringing the state of Ghana's poultry sector into debate.

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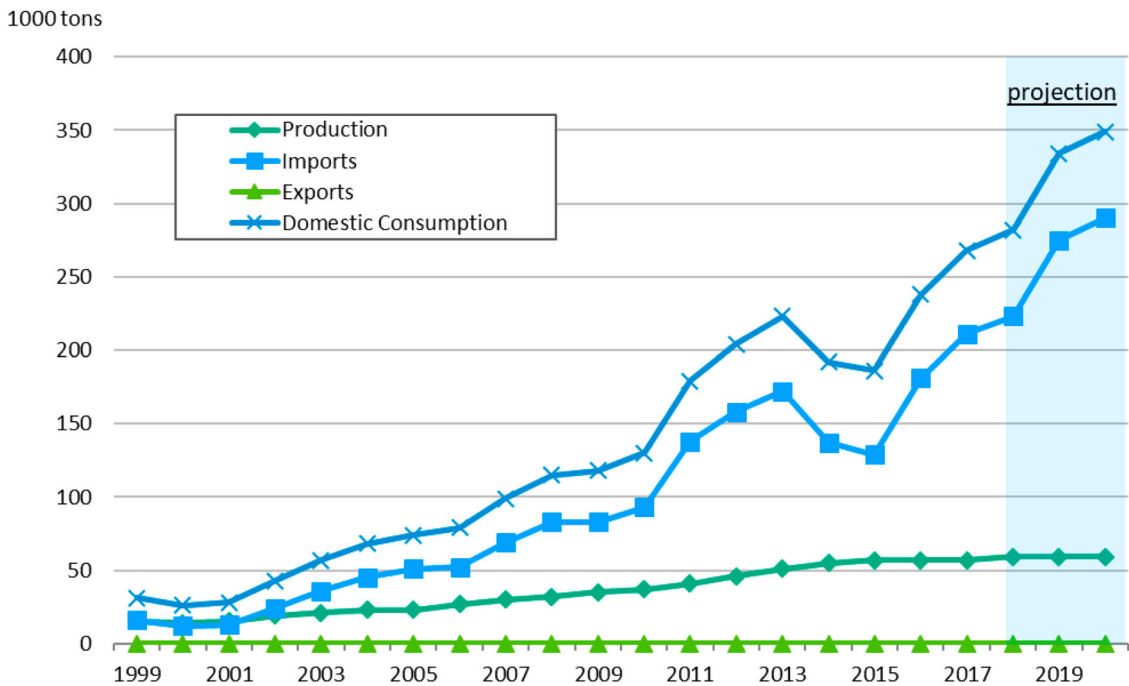


Figure 1. Development of poultry production, imports, exports and consumption in Ghana (in 1000 metric tons). Source: Zamani et al. (2021) based on USDA dataset.

Critics are pointing to the influx of cheap frozen chicken imports as the ultimate cause of underdevelopment of the domestic poultry sectors in most

developing nations (e.g. Marí, 2017, 2015; Rudloff & Schmieg, 2016). Nevertheless, concrete evidence that supports or rejects these criticisms is missing in

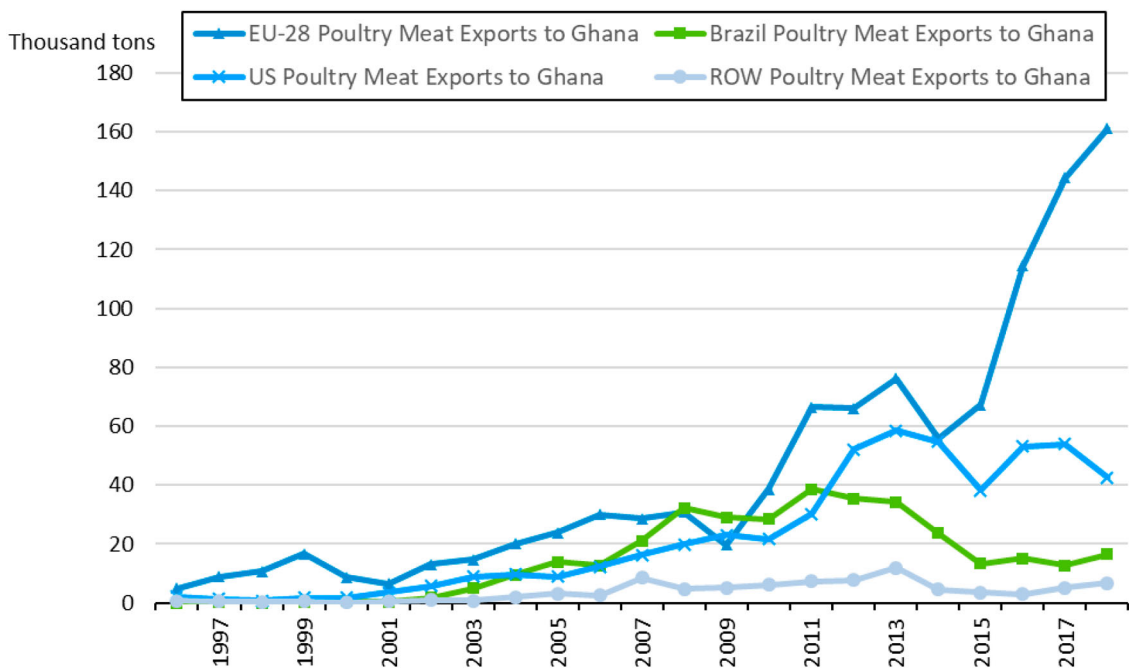


Figure 2. Poultry Meat Exports to Ghana (1996–2018) in 1000 tons. Source: (Zamani et al., 2021). ROW indicates rest of the world

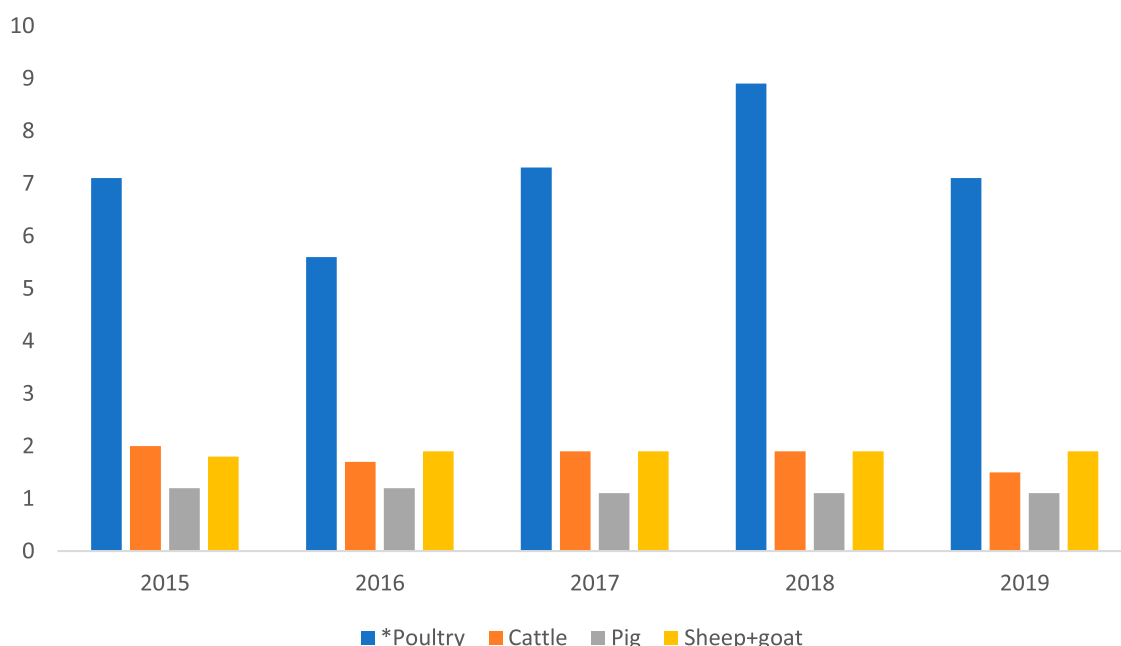


Figure 3. Annual Per-capita Meat Consumption (kg). Source: Calculations based on data from MoFA/SRID (2020). *Poultry: Chicken accounts for over 97% of poultry imports, Turkey meat: 2.9%, Other: 0.03% (Other: ducks, geese, guinea fowls).

the literature. As one would guess based on the criticisms, some governments in developing countries, including Ghana, are under pressure to impose protectionist measures, for example, a ban on imports. In this regard, Ghanaian poultry producers and other value chain actors may take advantage to cash-in from such a policy. However, it would rather make much sense to holistically examine the poultry sector of Ghana to have a better understanding of the underlying factors limiting its ability to meet consumer demands.

Sustainable value chains are being promoted and gaining ground in the literature (Ertz & Sarigöllü, 2019; Hart & Milstein, 2003; Monastyrnaya et al., 2017; Nosratabadi et al., 2020; Petit et al., 2021). The volumes of literature recommend a move from 'business-as-usual' concepts to more sustainable ones that incorporate in addition to economic targets, social and environmental goals. Notwithstanding these recommendations, methods for diagnosing the constraints of actors within struggling value chains are missing. Furthermore, the complexity of food value chains often makes it difficult to identify the foundation of their underperformance and thereby propose solutions that could produce lasting and prudent results. Developed by the FAO (2014a), the Sustainable Food Value Chain (SFVC)

framework provides a particular approach to assessing the situation of value chains and helps to identify multiple interconnected challenges and their root causes, and to develop support strategies for a sustainable upgrade. Especially for developing countries, the development of sustainable food value chains could serve as potential channels for poverty reduction for the majority of poor households (FAO, 2014a). However, to the best of our knowledge, no study has so far adopted the SFVC framework as a guide to value chain analysis and development.

A few studies document Ghana's poultry sector, for example, Mensah-Bonsu et al. (2019), Banson et al. (2015) and Kusi et al. (2015). These studies applied the traditional conventional approach to analyse the poultry value chain by examining the profitability of farms and listing the constraints and challenges of actors. Drawing on the SFVC framework, first, our study measures the performance of Ghana's poultry value chain, considering the triple bottom line concept of 'economic (profit)', 'social (people)', and 'environment (planet)'. Second, we find answers to why actors fail to take advantage of the growing consumer demand for chicken meat. This is done by identifying and examining the interlinked challenges actors are facing and their underlying causes. In particular, we aim to assess the interplay between

frozen chicken imports and the domestic value chain. Third, based on the outcome of the analysis in the previous sections, we propose a holistic set of economic, social, and environmental strategies that can be inclusively harnessed to improve the sector's competitiveness in the long term.

Our study aims to improve the current literature on the Ghanaian poultry value chain in three ways. First, it sheds light and provides a better understanding of the underlying causes of the underperformance of the poultry value chain. Second, it provides insights into the role of frozen chicken meat imports in the domestic poultry sector. Third, the approach adopted in our analysis reinforces the United Nations' central goal of 'Sustainable Development' and contributes to the second Sustainable Development Goal (SDG 2) that seeks ways to 'end hunger, achieve food security and improved nutrition and promote sustainable agriculture' (United Nations, 2016).

2. Materials and methods

2.1. Conceptual framework of the study

The SFVC framework (Figure 4) (FAO, 2014a) is founded around the core value chain, with four different core functions: *production*, *aggregation*, *processing*, and *distribution*. An important element of the value chain is its *governance structure* which describes the nature of the linkages between actors at particular stages in the chain (horizontal linkages) and within the overall chain (vertical linkages) in terms of factors such as price determination, information exchange, standards, payment mechanisms, market power, and market systems. The value chain actors can receive three major forms of support from *input*, *finance*, and *service providers*. Consumers who are important players in the value chain determine the value based on their choices in the *national* and *international* markets. The actors and support providers operate in a particular enabling environment in which societal and natural environmental elements are differentiated. The SFVC concept recognizes that food value chains are dynamic, market-driven systems in which value addition and sustainability are explicit, multidimensional performance measures, assessed at the aggregated level (FAO, 2014a). The concept moves away from the traditional approach of value chain analysis where well-known constraints are listed along with proposed recommendations. Instead, the concept takes a universal perspective to identify the interlinked foundational causes of why value chain

actors fail to take advantage of existing end-market opportunities. It is divided into three phases:

- (i) *Measuring performance*: Assesses the domestic value chain (VC) in terms of the economic, social, and environmental outcomes it delivers relative to its potential.
- (ii) *Understanding performance*: Exposes the root causes of underperformance by considering how the VC stakeholders and their activities are linked to each other and their economic, social and natural environment in a system; how these linkages drive the behaviour of individual stakeholders in terms of their commercial behaviour, and how value determination in end markets drive the dynamics of the system.
- (iii) *Improving performance*: Follows a logical sequence of deriving a core VC development strategy based on the analysis conducted in phase (ii) and the vision stakeholders have agreed on and selects upgrading activities and multilateral partnerships that can realistically achieve the scale of impact envisioned.

2.2. Data and sampling procedure

The study dwelt on both primary and secondary data sources. Primary data collection occurred between February 2020 and April 2021 in four regions of Ghana (Greater Accra, Ashanti, Eastern, and Ahafo). Semi-structured questionnaires and interview guides were used to gather data from actors and stakeholders¹ in Ghana's poultry value chain using various methods – the typical farm approach, one-on-one semi-structured interviews, telephone calls, the Delphi method, and secondary data based on desk reviews of literature. A mixed methods approach was used in analysing the data.

2.2.1. The typical farm approach

Chibanda et al. (2020) define the typical farm approach as a method for developing empirically grounded farm data sets that represent the most common production systems. The approach was used to construct synthetic farms called 'typical farms'. The typical farms were then used to analyse the economic performance of broiler chicken farms in Ghana. The typical farm approach was carried out through a series of steps that Chibanda et al. (2020) refer to as the *Agri benchmark* Standard Operating Procedure (SOP). In the analysis of broiler farm



Figure 4. The Sustainable Food Value Chain framework. Source: FAO (2014a).

economics in Ghana, Chibanda et al. (2022) explain in detail how the typical broiler farms were constructed. We summarize these steps below:

Step 1: Identification of the most important broiler production regions and the most common broiler production systems.

The most important broiler production regions in Ghana and the most common broiler production systems were identified through a desk literature review and consultation of local experts (researchers, veterinary and extension officers).

Step 2: Farm visits

Broiler farms that represent the identified typical broiler production systems were selected from the

most important broiler production regions (hot spots). As stipulated by the 'standard operating procedure to define typical poultry farms' developed by Thobe et al. (2020), the farms selected to represent each production system have moderate sizes (not too small or large in terms of the number of birds produced by farms in a particular production system) and moderate management (not the worst or best-performing farms in the production system in terms of performance and profitability). In line with Chibanda et al. (2020), in countries like Ghana where there is limited national data on farms, local experts knowledgeable about the farms were consulted. More specifically, extension and agricultural officers from each region

were consulted in the farm selection process because they have in-depth knowledge of farms in their regions. The selected farms were visited, and one-on-one interviews were conducted with the producers.

Step 3: Focus groups

Focus groups were used to construct typical farms through the 'typification' of the individual farm data collected in Step 2. The process of typification of individual farm data entailed the focus group participants discussing each farm value until they reached a consensus that each value reflects the most common situation for the specific production system in the identified region. For example, if an individual farmer had stated that the mortality rate of his chickens is 3%, the focus group would discuss this value. The focus group would either agree that the 3% represents the typical situation in that production system in their region, or it would propose another figure that is more common in the region. A total of three focus group discussions were conducted, one for each identified production system. Each focus group was composed of 10 participants who included 5 broiler producers, 3 extension/veterinary officers, and 2 local researchers.

Step 4: Data analysis

The Technology Impact Policy Impact Calculations (TIPI-CAL) model was used to analyse the typical farm data. TIPI-CAL is a computer-based policy impact assessment tool used in farm economic analysis as it allows a detailed analysis of farm-level variables (Kress & Verhaagh, 2019). Although the model can be used to calculate several farm variables, in this study, it was only used to calculate the costs of production and profitability. More importantly for farm sustainability, TIPI-CAL calculates the short, medium- and long-term profitability of farms. The short-term² profitability was calculated by subtracting cash costs from total returns, while medium-term³ profitability was calculated by subtracting cash and depreciation costs from total returns. Long-term⁴ profitability was

calculated by subtracting cash, depreciation, and opportunity costs from total returns. The results obtained from the TIPI-CAL model were then cross-checked and validated by local experts (2 researchers and 3 farm managers).

2.2.2. Semi-structured interviews

Semi-structured interview guides were used to collect data from key informants in the Ghanaian poultry meat value and supply chains – in-person and via telephone calls. The interviews mainly revolved around their activities, products, prices, channels of distribution, challenges, and opportunities. A total of 25 key actors were interviewed (Table 1) between February 2020 to April 2021. The actors included input suppliers, producers, processors, and distributors (retailers, wholesalers). The interviews were recorded and later transcribed.

2.2.3. Delphi method

The Delphi method was used to identify and rank key issues confronting the Ghanaian chicken meat value chain. This method gathers a consensus of expert opinions through structured and anonymous group communications (Grime & Wright, 2014). Therefore, the Delphi method was used because it permits anonymous and controlled feedback, iteration, and statistical analysis of group responses (Soisontes, 2015). Additionally, it is commonly used in the ranking of issues in poultry value chains. Most recently, it was applied by Soisontes (Soisontes, 2017) to identify and rank sustainability issues in the poultry value chains of Thailand and Germany. Since the study took place during the period when there were strict COVID-19 restrictions, it was extremely valuable that the method allowed data to be collected from a group of experts without them physically meeting each other. The Delphi study was composed of 21 poultry experts who included researchers, input suppliers, producers, policy-makers, and slaughterhouse managers (Table 2). The experts were selected based on their experience and knowledge of the Ghanaian poultry sector. The Delphi study was conducted from 9 November 2020 to 21 December 2020 through two rounds of e-mails between the researchers and the experts using a questionnaire designed based on desk literature reviews. In the first round, the experts were requested to judge the importance of 14 challenges facing the value chain through the use of a five-point Likert scale ('5 = most important', '4 = important', '3 = fairly important', '2 = less

Table 1. Value chain actors interviewed.

Actors/stakeholders	No. interviewed
Hatchery operators	2
Feed suppliers	2
Producers	8
Processors	3
Live chicken retailers	2
Frozen chicken importers	1
Frozen chicken wholesalers	3
Frozen chicken retailers	4
Total	25

Source: Own survey data.

important' and '1 = least important') while the second question, an open-ended one, requested the identification and importance of other challenges not included in the initial list. The first-round responses were analysed using the mean and standard deviation, and fed back to the experts in the second round.

3. Results

3.2. Measuring performance

3.1.1. Poultry farm economic performance

Four chicken meat production systems were identified through the typical farm approach. The production systems include traditional free range (village), small-scale commercial, medium-scale, and large-scale integrated production systems with their key characteristics described in Table 3. Comparing Ghana's chicken production sector with that of Senegal, also a West African country with a population almost half of the size of Ghana's population where poultry production is 45 days per cycle, small commercial units produce 1000–2000 birds, large commercial units more than 10,000 birds, and an industrial vertically integrated unit produces 120,000 birds (Arnoldus et al., 2020). Production in Senegal is all-year round while in Ghana, it is mainly a seasonal activity towards major festive celebrations. On an annual basis, Senegal produces more than 400% of what is produced in Ghana.

The use of trade measures (e.g. ban and tariffs) has popularly appeared in policy discussions (Andam et al., 2017) as a way to increase domestic production. In other words, increasing tariffs will spur domestic production and vice versa. Before Senegal banned the importation of frozen poultry meat in 2006 as a

way to prevent the spread of the Avian Influenza virus, it had lowered its import tariff from 55% in 1998 to the Economic Community of West African States (ECOWAS) Common External Tariff (CET) rate of 20% in 1999 (Johnson, 2009; Killebrew, Gugerty, & Plotnick, 2010). Nevertheless, the domestic supply of chicken could still meet 66% of the nation's demand by the year 2005 (Zamani et al., 2021, p. 12). Ghana also adopted the CET rate of 20% in 1999, however, domestic production could only meet 30.6% of demand by the year 2015, and 21.3% in 2017, even after the ECOWAS CET was revised upwards to 35% in the year 2016. Clearly, this shows that high tariffs do not guarantee the growth of Ghana's poultry sector. Meanwhile, the per capita consumption of chicken in Ghana amounts up to 9.6 kg per year (2018), which is more than double of the consumption in Senegal, which is 4.1 kg per year (2018) (Zamani et al., 2021, pp. 11 and 12). Taking the annual demand and consumption of chicken meat in Ghana into consideration, our study reveals that the scale of production in the commercial systems is far insufficient pointing to the sector's underperformance.

Many producers prefer to import high-quality day-old chicks from Europe at higher prices (€ 0.98/chick) than to buy them either from the Ivory Coast at € 0.75/chick or locally in Ghana at € 0.58/chick due to high mortality rates of chicks from the latter two sources as shown in Table 4. The situation is further complicated by the lack of a hatchery bill that regulates and ensures biosecurity and hygiene standards.

The Feed Conversion Ratio (FCR) is a key measure of efficiency in poultry production. According to the Technology Transfer Center of the Ghana Atomic Energy Commission (GAEC), 1.56 kg of feed is required to produce a 1 kg live bird, nevertheless, broiler producers in Ghana typically use more than 2 kg of feed (Chibanda et al., 2022). This is largely attributed to poor-quality formulated feed and in some cases, to the raising of local day-old chicks with lower rates of feed conversion.

Broiler chicken production in Ghana is generally characterized by high production costs. Our study compared the production costs of the typical commercial broiler production systems using the typical farm approach. Figure 5 shows that the large-scale integrated system has the highest production costs, followed by the small-scale system and the medium-scale system. Furthermore, for all production systems, feed and day-old chick costs are the most significant cost items. Based on the data collected,

Table 2. Response rates across the experts and rounds.

Group (Initial size)	Invitations sent to experts to join Delphi study (28)	1st Round (21)	2nd Round (21)
Producers	7	5	5
Researchers (academia)	5	5	5
Input suppliers	4	3	3
Slaughter house managers	2	2	2
Veterinary officers	5	3	3
Policy-makers	5	3	3
Responses	21	21	21
Response rate	75%	100%	100%

Source: Own survey data, 2020.

Table 3. General characteristics of typical chicken production systems in Ghana.

	Traditional free range (village)	Small-scale commercial	Medium-scale commercial	Large-scale integrated
Farm size	<200 birds per year	<5000 birds per year	5000–20,000 birds per year	>20,000 birds per year
Biosecurity measures	Very low	Low to moderate	Moderate	Moderate to high
Feed source	Free-range feeding and supplementary feeds (grains and food leftovers)	Commercial feed-mills	Operate their own feed-mills	
Day old chicks	Local Ghanaian fowl breeds hatched on the farm	Exotic breeds that are often imported	Exotic breeds that are often imported	Farms often own a hatchery and produces its own exotic breeds.
Marketing	Live birds are often sold locally, used as a gift or, occasionally, sold to poultry traders for cash	Live birds sold in local communities, live markets and to small restaurants	Live chickens are sold in live markets and to traders. Seldomly, the birds are slaughtered and sold to fast food shops and restaurants	Chickens are often slaughtered on the farm and sold to retailers and restaurants.

Source: Own survey data, 2020.

feed costs represent 56% of the total cash costs in the small-scale system; 62% in the medium-scale system, and 42% in the large-scale system.

Figure 6 shows that the three commercial broiler production systems are profitable in the short-term i.e. during major festive seasons (Christmas and Easter) of which the large-scale integrated system is the most profitable. The seasonality in demand for domestic chicken thus renders an all-year production of chicken in Ghana economically non-viable because producers would have to continue feeding full-grown chickens after the 45-day cycle, noting feed as the major cost involved in broiler production (Figure 5). It is thus impracticable for farmers to produce off-season. The results also show that the medium-scale production system is unprofitable in the medium- and long terms. This is because medium-scale broiler farms that are typically located in the border town of Dormaa sell their live birds to traders from Ivory Coast at a much lower price than the prices in the domestic markets. This shows that the exportation of live chickens to the Ivory Coast by Ghanaian producers is not economically sustainable as the producers do not earn returns that are enough to cover depreciation while their operations have high opportunity costs. Most broiler-producing farms in Ghana have

shut down and more are still shutting down due to high production costs. To stay in operation, others have switched to the production of eggs which have an all-year demand and are on this account more profitable to producers.

3.1.2. Social performance

Many commercial farms established in the late 1960s and early 1970s have closed down since the year 2000 (Kusi et al., 2015, p. 476) although our economic analysis shows that seasonal broiler production is profitable in the short term. Subsequently, other value chain actors were affected by the closure of farms. Hatcheries for instance are operating only up to 60% of their capacity (Agbehadzi et al., 2019; Banson et al., 2015; Kusi et al., 2015, p. 218) due to low demand. Many thousands of Ghanaians as a result have lost and are still losing their jobs. Moreover, workers currently engaged on poultry farms are poorly paid, receiving salaries between € 14.1 and 28.2 per month (Grantham et al., 2021, p. 245). The daily minimum wage was increased from € 1.66 in 2020 to € 1.76 for the year 2021–2022 on the 3rd of June 2021 by the National Tripartite Committee (NTC) (Affre, 2021). This brings the monthly minimum wage (30 days) to € 52.8. However, poultry farm workers earn less than the minimum wage which in itself is practically too low for a decent living. At least workers should receive wages that are four times higher than the minimum wage in Ghana (FAO, 2014a) to ensure social sustainability in the value chain. Besides, workers on poultry farms operate under poor conditions (i.e. without personal protective equipment such as footwears, nose masks, overalls, and gloves) due to the lack of effective monitoring and regulation by the

Table 4. Comparison of mortality rates of imported and locally hatched day-old chicks.

	Small-scale commercial	Medium-scale commercial	Large-scale integrated
Source of Day-old chicks	Imports (Europe)	Imports (Ivory Coast)	Locally hatched
Mortality rate (%)	2.88	4.08	10.00

Source: Calculations based on own survey data, 2020.

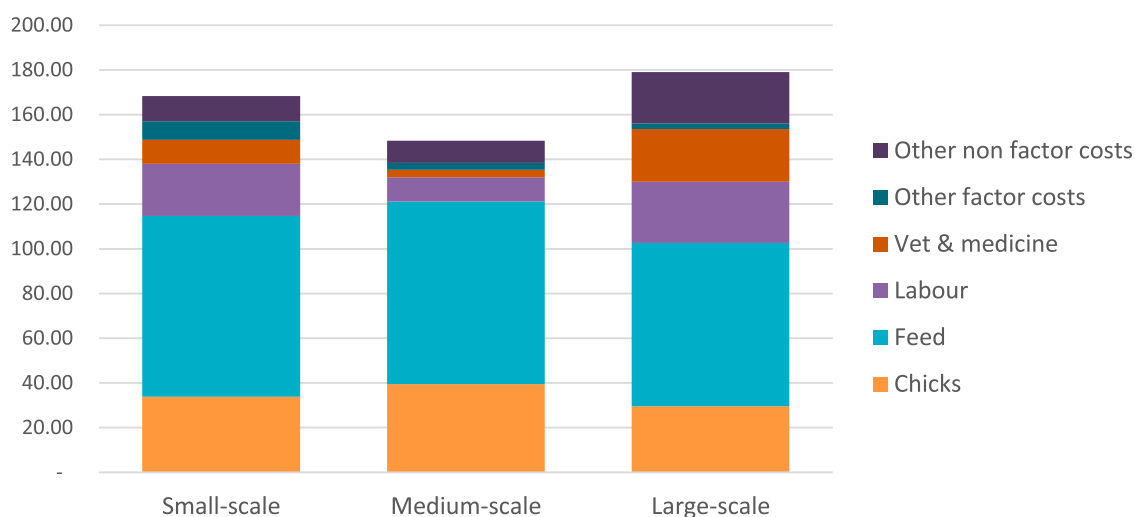


Figure 5. Comparison of production costs (Euros per 100 kg live weight). Source: Calculations based on own survey data, 2020.

appropriate institutions. Also, most poultry farms in Ghana according to Ayim-Akonor et al. (2020) do not have footbaths which puts the workers at a high risk of zoonotic diseases.

3.1.3. Environmental performance

Most poultry farms in Ghana are situated near or within human settlements which leads to pollution of the immediate environments with bad odours from litter (bedding mixed with excreta). Also, the improper disposal of litter by most farms poses serious health consequences to both humans and the environment (Birhanu et al., 2022). A study by Ayim-Akonor et al. (2020, p. 635) of 76 poultry farms in the Ashanti region of Ghana found that 55.3% of farms improperly deposit litter on the farm. Due to its potential contamination with pathogens such as bacteria, fungi, parasitic protozoa, helminths, as well as heavy metals and pesticides (Kyakuwaire et al., 2019), the litter is capable of polluting groundwater and nearby water bodies which could pose public health hazards or health risks. Furthermore, improper disposal of diseased carcasses attracts flies which can spread infections or diseases to humans and birds. This can result in a cyclical spread of the disease (disease staying within the farm environment without complete eradication, i.e. the parasite keeps on alternating between the host and the intermediate host – birds and humans/other animals). According to the Public Health Act, 2012, act 851(9), veterinary and authorized health officers are required to specify how a diseased carcass is buried (MoLG, 2012), yet most

farms go on disposing dead animals without the presence of any of these officers. Currently, no laws exist for punishing the improper disposal of diseased carcasses in Ghana. Poultry farms in Ghana are therefore performing below environmental standards.

3.2. Understanding performance

3.2.1. Nature of challenges in the poultry value chain

The Ghanaian chicken meat value chain faces many challenges as exhibited in Figure 7. According to the judgment of the industry experts through the Delphi study, frozen chicken imports and high-costs of feed are the two most important challenges the value chain is facing.

From the semi-structured interviews, we established that a kilo of imported chicken sells between Gh¢ 12–14 (equivalent to € 1.68–1.96), while live fowls and dressed domestic chicken are sold between Gh¢ 30–70 (equivalent to € 4.2–9.8) and between Gh¢ 80–90 (equivalent to € 11.2–12.6) (OANDA Currency Converter, 16th September 2021) respectively during festive seasons. The semi-structured interviews also show that producers are only able to readily market their live chickens during festive seasons (i.e. Christmas, Easter, and Eid Al-Fitr) when there is a huge demand for domestic chickens due to the stiff competition from imports. Owing to this, the poultry sector witnessed a significant decline in its activities since the year 2000, resulting in the collapse of many commercial farms while

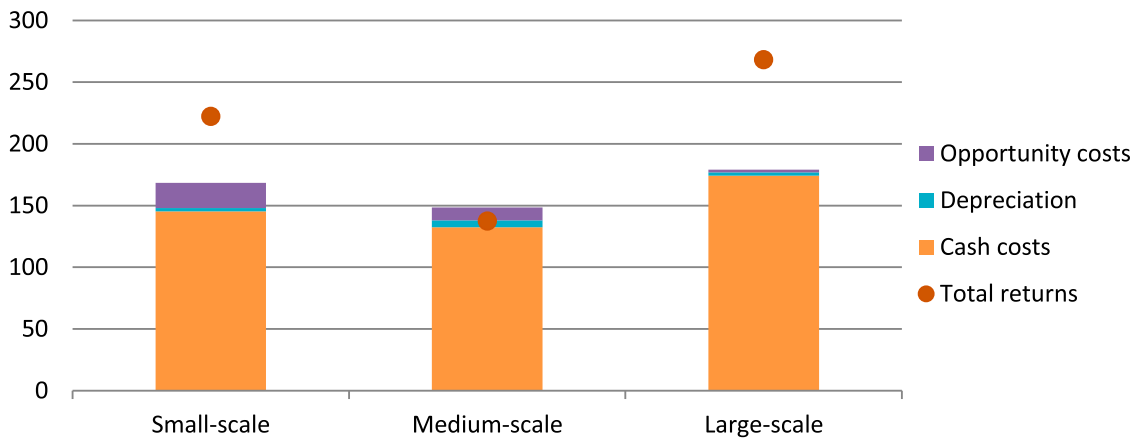


Figure 6. Comparison of profitability of the typical broiler production systems (Euro /100 kg live weight). Source: Calculations based on own survey data, 2020.

surviving ones are currently operating below their capacities (Kusi et al., 2015).

The huge price difference between imported and domestic chicken meat is linked in part to lower costs of production and economies of scale in exporting countries (EU, Brazil, U.S, etc.) (Thies et al., 2019)

compared to those in Ghana. Poultry producers in Ghana are faced with high production costs stemming from high costs of inputs and equipment – high energy costs, inadequate local supply of feed ingredients, and the imports of both feed ingredients and day-old chicks. These have a direct impact on the

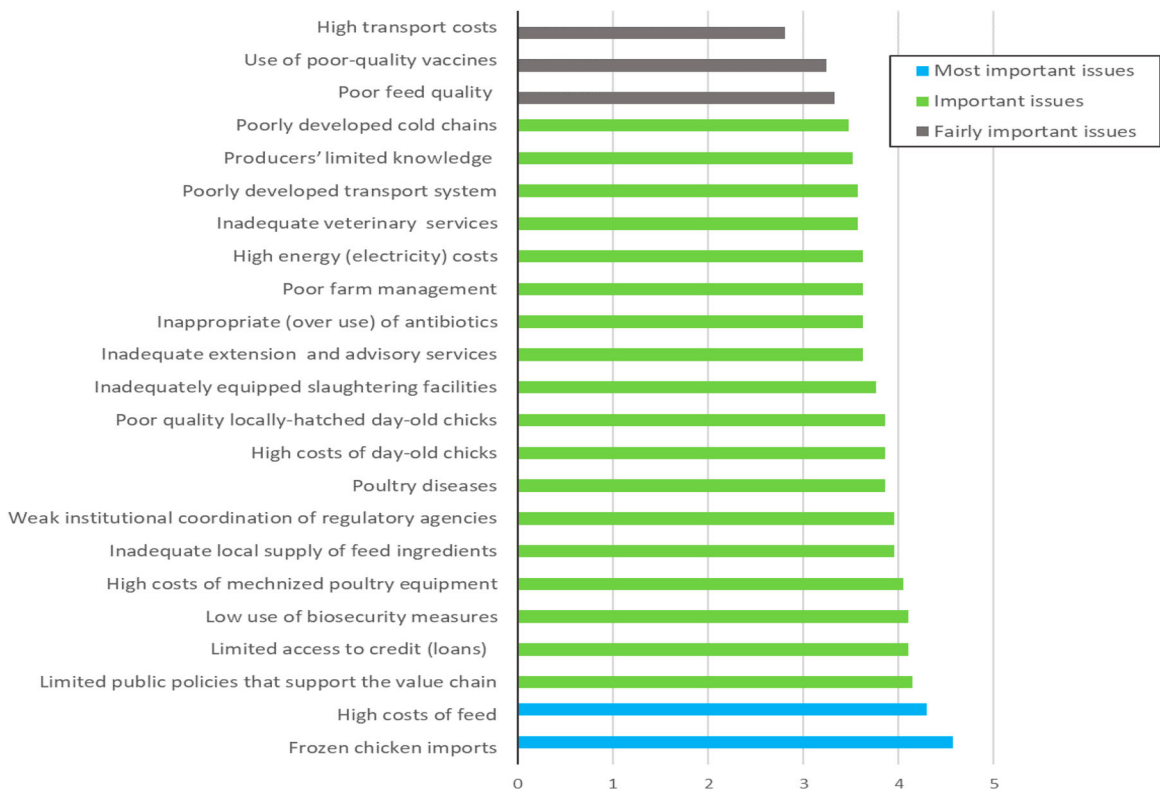


Figure 7. Ranking of challenges facing the Ghanaian chicken meat value chain. Source: Calculations based on own survey data, 2020.

variable costs of operation. Imports of day-old chicks are necessitated by the poor quality of locally-hatched day-old chicks owing to weak institutional coordination of regulatory agencies. This can be traced further to limited public policies that support the value chain. The semi-structured interviews and focus group discussions reveal that producers and hatchery operators import poultry feed ingredients such as maize, soybeans, and veterinary drugs. Nevertheless, the importation of production inputs comes at a cost due to the weakness of the Ghanaian currency to foreign currencies such as the dollar and the euro which in effect adds up to increase production costs. Moreover, weak institutional coordination of regulatory agencies is blamed for low biosecurity measures and poor farm management practices, the use of poor-quality vaccines and feed, and inappropriate use (or over-use) of antibiotics (Figure 7).

Policies implemented in the past to promote domestic production include the removal of customs duties on poultry inputs in the 1970s (Kusi et al., 2015, p. 476), and the provision of animal health services and the removal of a preferential lending rate (FAO, 2014b). In 1999, the government imposed a 20% special tax on poultry meat imports which was aimed at protecting the local industry (Naggujja et al., 2020). In January 2006, the government increased the import tariff from 20% to 40% but quickly lowered it back to 20% in just two months (Kusi et al., 2015, p. 479). Later, it adopted the 35% Common External Tariff (CET) of the Economic Community of West African States (ECOWAS) in 2016 to regulate imports (Andam et al., 2017, p. 11). Even so, the policies targeted at developing domestic production and regulating imports have not had any meaningful impact – neither on expanding domestic production nor on contracting import volumes, as illustrated in Figure 1. We identify that the sector lacks clear policies on production and imports.

More current policies include; the Ghana Broiler Revitalization Project (GHABROP) (2014), the Planting for Food and Jobs (PFJ) (2017–2020), and the Rearing for Food and Jobs (RFJ) (2019–2023) programmes. The Broiler Revitalization Programme for example was aimed at reducing the reliance on imported day-old chicks for the poultry industry as well as increasing production to reduce imports by 40% in 2016. However, the goals were not achieved as domestic production could not meet the 40% of demand. The objective for the poultry sector under the Planting

for Food and Jobs (PFJ) programme (2017–2020) was to increase the production of maize and soybean, which are both components in poultry feed (MoFA, 2017, p. 18). Nevertheless, poultry farmers still import these feed ingredients due to shortages in domestic supply while prices are soaring. A 130 kg bag of maize, for instance, sold at GH¢ 150 (US\$ 25.64) by November 2020, rose to GH¢ 250 (US\$ 42.73) in the first quarter of 2021, which makes a difference of 66.7% (Adu-Gyamrah, 2021; Berkhout, 2021). The hike in domestic input prices is not caused by frozen chicken imports. However, constituting about 60% of poultry feed in Ghana (Andam et al., 2017), the smallest increase in maize price will significantly increase the variable costs of production. Besides, the latest Rearing for Food and Jobs (RFJ) (2019–2023) programme has the goal to develop a competitive livestock industry to reduce imports of livestock products. Under this programme, 729 small-holder farmers were supplied with a total of 72,967 cockerels at a 50% subsidized price. For broilers, 25 poultry farmers were piloted and supplied with 43,183-day-old chicks also at a 50% subsidized price. These are steps in the right direction, yet we emphasize that the outcome of this policy may not differ from previous ones in the face of high production costs.

Taking product form into consideration, imported chicken is processed mainly into cut parts (thighs, wings, back, feet, etc.) in addition to whole-dressed chicken, sausages, and nuggets. However, due to the challenges of inadequately equipped slaughtering facilities and poorly developed cold chains, the domestic poultry market is dominated by the sale of live birds. Ghanaian consumers have a strong preference for domestic chickens because they are perceived as fresher, tastier, and healthier (Asante-addo & Weible, 2019), nevertheless, the all-year availability, cheapness, and convenience (i.e. processed in cut parts) of imported chicken attracts consumers to its purchase. Patronage of domestic chicken according to its traders is usually during festive seasons such as Christmas and Easter, a period when some consumers just want a change and are prepared to buy it at the prevailing market prices.

3.2.2. Governance in the poultry value chain

Adding to the aforementioned interlinked challenges is the issue of governance. A careful examination of the poultry value chain reveals a lack of coordination in the vertical linkages between the different actors as

well as a general weakness in the horizontal linkages amongst actors. Contract arrangements between producers and buyers (retailers, catering businesses, etc.) for instance are usually informal and therefore non-binding, thereby increasing the likelihood of moral hazards. Prices of live fowls and processed chicken are determined by individual producers instead of producer associations. Therefore, different buyers purchase fowls at different prices and depending on their bargaining power, they can get them at prices lower than those set by producers. Also, no form of standard exists for the processing and packaging of chicken meat in Ghana.

3.3. Improving performance

Based on the multiple qualitative research methods we used in this study, we revealed that actors broadly envision a value chain in which there is a readily available market for domestic chickens throughout the year. The actors believe that once production significantly increases, it will have knock-on effects on other parts of the value chain (hatcheries, feed mills, and slaughterhouses) to work at full capacity. However, this vision cannot be attained in isolation. In fact, the multi nature of the challenges confronting Ghana's poultry value chain requires cooperation among its actors and stakeholders (input dealers, farmers, agribusinesses, the government of Ghana, the private sector, civil society, etc.).

Research and breeding centres must be adequately equipped to develop improved breeds and other associated technologies (e.g. feed) that meet international standards to reduce the costs involved with imports of primary inputs. In addition to this, training and technical support should be offered simultaneously to producers by the government and other financial institutions if the goals of increasing productivity and efficiency are to be realized from improved breeds and technologies. For example, lower prices of chicken meat from Europe, the United States, and Brazil are attributed in part to high efficiency and lower costs of production (Carvalho et al., 2015; Thies et al., 2019). Instead of producers taking on the full costs of veterinary services, a cost-sharing approach between the government and farmers can be adopted.

Both public and private financial institutions should be encouraged to design packages of loans at low-interest rates, tailored at meeting the needs of actors in the value chain, especially at the stages of

production and processing. These loans can aid farmers to expand on the domestic supply of maize and soybean, the main inputs in feed formulation. For poultry producers and processors, these loans will aid them in the process of upgrading. Producers could expand their scale of production while processors could improve upon processing through the acquisition of modern machines. In doing so, processors could offer consumers products such as cut chicken parts and more value-added products including sausages and nuggets. Financially endowed processors could as well finance small-scale producers in the purchase of inputs. In this way, they are assured of a timely and constant supply of birds for processing. Furthermore, smallholder producer associations could purchase inputs as a group to reduce costs through discounts on large purchases.

Poultry producer associations at the national level must be strengthened to set prices of products above the average costs of production to ensure profits for all producers. For this, a production system that integrates small farmers and large poultry companies should be encouraged. As demonstrated in Brazil, progress in production chain coordination increased the competitiveness of its poultry industry (Carvalho et al., 2015). Moreover, effective vertical integration in the value chain is the main element of success. According to Figueiredo (2006), this allows poultry farmers to reduce both capital investments and risks in production. Associations at district and regional levels should take on the role of aggregation and supply of birds to processors, especially from small-scale producers. Also, formal contract agreements should be signed between producers/associations and buyers to legally bind each party to the arrangements. A breach of contract by one of the two parties should therefore lead to a juridical prosecution.

Institutions such as the Animal Production Directorate of the Ministry of Food and Agriculture must regularly monitor farms to ensure that workers comply with the use of protective equipment and apparel. The workers should be frequently trained to properly perform their tasks. This training should include a strong safety message and a culture of observing safe working practices.

There is no waste in nature. Instead of causing harm to the environment, in this era of industrial symbiosis or circular economy, waste generated by poultry farms and processing plants can be sold to biofertilizer manufacturers to create additional income.⁵ Another way of effectively managing

wastes is to integrate crop farming with poultry production. In this way, the wastes would be used on the crop farms leading to a reduction in the use of chemical fertilizers. A study by Mosnier et al. (2022) which analysed the Global Warming Potential (GWP) of mixed livestock farms found livestock-crop farms to have the lowest GWP in addition to a significant reduction in the use of chemical fertilizers. Moreover, the Environmental Protection Agency must step up to monitor the activities of actors (e.g. feed manufacturers, poultry producers, and processors) in the value chain to ensure that all operations comply with environmental standards in addition to contributing to improving the state of the environment. Farms that do not comply with environmental, health, and safety standards must be punished by law. In addition to the surveillance system, a certificate of compliance with environmental standards should be instituted. Producers and processors who meet these standards should have labels on the packages of processed chicken meat pointing to environmental compliance. Civil society groups could champion campaigns to sensitize consumers to opt for chicken products with these greenlabels. In this regard, producers and processors will be motivated to comply with environmental standards which will contribute towards the attainment of the SDGs on production and consumption (Mungkung et al., 2022).

An upgrade of the scale of production and other activities such as processing and packaging will create more jobs in the poultry value chain. In particular women, and the youth who constitute 57% of Ghana's population could work in the poultry processing, packaging, and distribution units across the entire country under decent conditions by receiving fair wages. In this case, the livelihoods and standards of living of many people will be improved contributing to food security and poverty alleviation. An upgrade in the value chain will likewise lead to consumers benefiting from convenient and high-quality domestic chicken meat while taking the opportunity to consume preferred chicken parts instead of purchasing life chickens. Also, domestic chicken meat will be accessible to the poorer segment of Ghanaians who could then have the chance to buy smaller portions instead of a whole chicken which costs more.

Furthermore, an upgrade of and growth in the poultry value chain of Ghana would mean that more agribusinesses could contribute to government revenue generation through the payment of taxes.

4. Conclusions

The present study assesses Ghana's poultry sector by applying the Sustainable Food Value Chain Framework developed by the Food and Agriculture Organization of the United Nations (FAO). Our study was motivated by the many criticisms directed mainly at the EU and its exports of frozen chicken products as the cause of the underdevelopment of the poultry sectors of developing nations. The value chain actors and experts interviewed in our study also mentioned imports as the most important challenge of the poultry industry. This study is not the first to analyse poultry value chains. However, it is the first that applies the SFVC concept to comprehensively assess the poultry sector which has not been done by previous studies and in this way, our study aims at contributing to a better understanding of the state of the Ghanaian poultry sector. We found numerous inter-linked challenges and poor governance in the value chain as the principal factors that explain the situation of the domestic poultry sector and not frozen chicken imports. Our results show that implementing an extreme form of protectionist policy - 'a ban on imports' - will markedly harm Ghanaian consumers with notable consequences for food security bearing in mind the comparatively high prices of alternative meat products and fish. Already, as estimated in 2020, 47.7% of the population is experiencing moderate to severe food insecurity while 9.5% are food insecure (Ghana Statistical Service (GSS), 2021).

For efficiency, growth and sustainability, Ghana's poultry value chain requires commitment and support from the government and other stakeholders as well as coordination of all actors in the value chain. Effective vertical relationships (e.g. trust and communication) will play a vital role in the process of upgrading the poultry value chain by spurring conditions that support investments. This could lead to the creation of jobs that provide better salaries for workers and thus contribute to poverty alleviation. Also, effective cooperation in the horizontal linkages, for example among producer associations (especially for the many small-scale producers) would contribute to reducing their production costs while facilitating their access to buyers and processors. In addition, competitive improvements would result in more value-added domestic chicken products that cater to the growing demands of Ghanaian consumers at lower prices.

Although the mixed-methods approach used in our analysis generated a diverse and comprehensive body

of results from which we draw the above-described conclusions, the findings from this study are specific to Ghana and should not be generalized. Conducting a similar study on the poultry value chain in other developing countries that import huge volumes of poultry products will shed more light on the root causes of the underdevelopment of the domestic poultry sectors. Further, our analysis may have underestimated the current environmental impact of poultry farming in Ghana considering the qualitative nature of the methods employed in this study and the limited sample size. We recommend that future researchers take up epidemiological studies on environmental pollution by poultry farms. Additionally, future studies may also examine the economic sustainability of poultry farms that combine egg and broiler production, since broiler production is seasonal and egg production is profitable all year-round. Last but not least, future studies could identify additional agricultural lands for cultivating feed for a growing poultry industry, and should investigate whether this usage would compete with agricultural lands needed to grow food for humans.

Notes

1. Actors are those individuals, businesses and firms directly involved in value chain activities. Actors directly control their own activities and are directly or indirectly controlled by other actors. Typically, in this study they are input dealers, hatchery operators, producers, processors, distributors, and retailers. Stakeholders are those who can influence the activities of actors and include frozen chicken importers and traders, policy makers, researchers, veterinary and extension services providers, NGOs and Civil Society Organisations.
2. Short-term profitability = Total returns – Cash costs.
3. Medium-term profitability = Total returns – Cash costs – Depreciation costs.
4. Long-term profitability = Total returns – Cash costs – Depreciation costs – Opportunity costs.
5. Contaminated poultry waste has the potential of bioaccumulation in the food chain which can affect the health of plants, animals, humans, as well as life in aquatic environments. However, biofertilizer manufacturers in Ghana have quality control laboratories to test waste products before use. They also have the capacity to treat possible contaminants in waste products. The biofertilizers produced by these companies therefore meet both local and international standards for use in food and ornamental crop production and in landscaping.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by Bundesministerium für Ernährung und Landwirtschaft [grant number 28N1800017].

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