

# Poultry Meat Supply Chain in East Africa: Literature Review and a Proposed Framework for Future Research

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## Abstract

The purpose of this paper is to deliver a structured literature review of poultry meat supply chain (PMSC) in EAC and provide a platform for practitioners and researchers trying to identify the existing state of work, gaps in current research, and future directions. An in-depth analysis was carried out to determine the vital information from the literature. This paper has identified gaps to be explored about PMSC, which may be used by researchers to enrich theory construction, and practitioners may concentrate on establishing the extent and frontiers of the agro-supply chain. This research work is an attempt to make a critical literature review of available literature on agro SCM practices for developing countries. The research articles and other documents related to the PMSC were collected from online databases like Google Scholar, Scopus, and EBSCO for ten years (2010-2020). Findings and conclusion are provided based on the literature reviewed. Finally, the recommendations are provided for the development of the poultry sector in the region and the direction for future research.

**Keywords:** Literature review, Poultry Meat Supply chain, Agriculture, East Africa.

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## 1. Introduction

Poultry is defined as domestic fowls, including chickens, turkeys, geese and ducks, raised for the production of meat or eggs and the word is also used for the flesh of these birds used as food (Drowns, 2012). Poultry meat supply chain (PMSC) is the movement of poultry meat (i.e. chickens), information, and fund related to poultry from the original supplier via the processing points to the ultimate final consumer (Lavelli, 2013). PMSC is formed by upstream side involving the hatchery farmers, growing firms, and processing plant while downstream side involves the distributors to the local market and export market, value-adding retailers and final consumer (Preziosi, 2016; Viaene and Verbeke, 1998).

Despite remarkable progress in agro-supply chain strategies in facilitating regional and global market, little development has been made in the poultry meat supply chain (Michael Shaw, 2019). Linking with the importance of the livestock sector in East Africa, the poultry meat supply chain is a crucial vehicle to foster the growth of the industry through value-added activities in the upstream and downstream. In East Africa, many poultry farmers and processing units, especially in rural area, have been competed out due to low investment in logistics infrastructures and supply chain facilities that impede the on-time distribution of poultry products to the market (Alemayehu et al., 2018).

Besides, local markets for poultry meat are constrained by the in-adequate supportive and regulatory environment, lack of reliable supply of quality poultry feeds, high veterinary and poultry feed costs and lack of poultry processing industries (McDermott et al., 2010). This has generally translated into low productivity and competitiveness of the sector in contrast to significant livestock producing regions in Africa and global at large (Moyo and Swanepoel, 2010). In general, the poultry sector is suffering from the chaotic and un-organized distribution system and lack of third-party logistics cold chain for poultry and poultry products' movements from upstream (i.e. farmer) to downstream (i.e. consumers) (Mohamed et al., 2013).

Although there is a plethora of past studies that discuss the poultry meat supply chain in a global context (Manning and Baines, 2004; Manning et al., 2007; Manning et al., 2008), studies conducted in East Africa region are minimal. This study will bridge the gap by providing adequate literature on the discussion of poultry meat supply chain in EAC in contrast with global status. Therefore, this literature review attempt to answer the question of 'What is the status of poultry meat supply chain in EAC region and what are the prospects and challenges of poultry meat supply chain in EAC region?'. The rest of the paper is organized in three sections as follows. First, the review of literature related to poultry meat supply chain in a regional and global context, challenges and prospects of poultry meat supply chain; Second, is the discussion on the research methods. Finally, findings, the discussions and suggestions for future research directions.

## 2. Overview of Poultry Meat Supply Chain in East Africa

### 2.1 Industry Background and literature review

East Africa is an agro-based economy region with agriculture as one of the essential sectors offer employment opportunities to the majority of the population for their livelihood. The agricultural industry is estimated to contribute between 24% and 44% of GDP in the six states partner (Vernooij *et al.*, 2018). The anticipated

development of the region will go hand in hand with transformative changes in its agricultural sector to meet a spectacular increase in the demand for food, but also to satisfy the changing food preferences of an increasingly affluent and urbanized population. According to the United Nation World population prospects, the East Africa population is expected to reach 780 million peoples by 2050, with per capita mainly depend on agriculture (United Nations, 2019).

Livestock is one the agricultural sector which contributes massively to national GDPs and rural incomes of EAC. Livestock-related activities generate, on average almost a quarter of the overall rural incomes in the region. Livestock production provides income, employment and food not only to farmers and pastoralists but also, along the supply chain, to contract herders, animal handlers, plant processor, traders, suppliers of inputs, transporters, distributors and market owners. It is estimated that the sector is an essential source of livelihood for about 1.7 billion people globally. Furthermore, livestock also contributes to better nutrition for all household's members, particularly children (Moyo and Swanepoel, 2010).

Poultry meat is mentioned as one of the growing sectors over the past decade due to regional integration across with rapid urbanization, growth of the middle class, and rise in several quick services restaurants in urban areas. As a result, the poultry meat supply chain has gradually recognized as an essential engine to facilitate timely deliveries of the products to the final consumer (Bosona and Gebresenbet, 2013). Poultry production in the Eastern African countries has gradually grown over the past couple decades from a primary backyard keeping system to more professional and commercial poultry. This includes the establishment of incubators; feed input suppliers, housing equipment, veterinary services and slaughtering facilities. In some case, the growth has been strong only on, e.g. broilers while in other countries, both layers and broilers have shown comparable growth (Distefano and Haan, 2018).

## 2.2 Overview of Poultry Industry Status and Challenges in East Africa

### 2.2.1 The poultry sector in Tanzania

Tanzania is the third largest livestock production in Africa after Sudan and Ethiopia (Engida *et al.*, 2015). The current population of chickens in Tanzania is estimated to be 72 million, whereas 40 million are indigenous chicken and the remaining 32 million are exotic poultry (Vernooij *et al.*, 2018). The poultry production systems are categorized in three in Tanzania: First, the traditional indigenous. The traditional indigenous family subsystem is an extensive scavenging dual-purpose system, with an average of 50 eggs per year and 1.5 kg meat for mature chicken. Second, and improved family chicken. The enhanced family chicken subsystem (with improved local/imported tropical breeds) is a semi-intensive, semi-scavenging moderately high productivity with 150 eggs per year; and an average of 1.8 kg weight at maturity and third, the commercial specialized chicken system is an intensive layers and broilers system with high productivity an average of 2 kg weight at maturity and 270 eggs per year (Silva *et al.*, 2017).

The poultry meat supply chain is hindered due to several factors, including (1) Middlemen and intermediaries: Middlemen play a pivotal role in the poultry meat supply chain. The middlemen (aggregators) hinder the distribution of the inputs for poultry farmers and the sale of poultry products. (2) Inputs and chicken feed: In Tanzania, poultry farmers prepare their feeds using manual and tradition methods. The quality of feed is one of the significant challenges which affect the poultry meat supply chain. (3) Processing plant: Tanzania lack the processing plant for whole chicken and part. This stabling challenge hinders the effectiveness of the poultry meat supply chain due to the integration of upstream, producer and downstream market in the supply chain. (4) Market: The market for poultry meat is still at an infant level in Tanzania. The poultry meat is a luxury product in Tanzania consumed during the festival period only. This makes the market for poultry meat to be very uncertain and unreliable (Vernooij *et al.*, 2018).

### 2.2.2 Poultry Sector in Uganda

Poultry Sector is one of the sub-sector of livestock in Uganda that contribute to people's livelihoods by providing income, animal source foods, employment, transport, draft power, manure, savings, insurance, social status and other (Benson and Mugarura, 2013). The poultry sector contributes about 65 metric tons of meat in the market per year. Chickens are the most popular domesticated animal in Uganda and provide a regular source of meat and eggs to a large share of the population. The poultry population in Uganda, there are an estimated 40 and 50 million chickens (www.africa-uganda-business-travel-guide.com). The Second National Development Plan of 2015 to 2020 and the Agriculture Sector Strategic Plan of 2015 to 2020 of Uganda focus on beef and chicken as the priority commodities for commercial development in future. As part of the implementation Africa Sustainable Livestock 2050 (ASL2050) programme, the Ministry of Agriculture Animal Industry and Fisheries, the Ministry of Health and the Ministry of Water and Environment have paid more attention to improving the poultry meat production in the country.

Despite effort taken by the respective organs, several factors affect the poultry meat supply chain in Uganda such as (1) Arable land for feed production: The poultry sector is facing the challenge of lacking adequate area for feeding. There is a competition for feeding other animals using the same land which hinders the growth of the

sector. (2) Power blackouts: Uganda is facing a consistent power cut off and reduce the source of energy for the poultry farmers. These challenges increase the expense to the farmers on the alternative source of energy. (3) Vaccines: The country lacks adequate plants for the production of vaccines. The non-availability leads the farmers to import the vaccines from abroad, which increase the price cost to the farmers. (4) Infrastructure: The road network to and from farms to major markets located in urban or rural areas are not fully tarmacked and not optimal. Therefore, access to markets or sources for inputs is difficult (Vernooij *et al.*, 2018).

### 2.2.3 *The poultry sector in Kenya*

Agriculture sector contributes about 25% of GDP in Kenya. The poultry is one of the major sub-sector in the country contributing 30% of the agricultural contribution to country GDP (Omondi, 2018). The poultry population in Kenya is estimated to 31 million birds where indigenous chicken representing of 75%, broilers representing 22%, layers representing 1% of breeding stock and other poultry species such as ducks, geese, turkeys, pigeons, ostriches, guinea fowls and quails representing 2 % of the poultry production. The indigenous chicken is mainly found in rural areas; broilers and layers are kept in urban regions (Magothe *et al.*, 2012). The commercial poultry sector is producing over one million chicks per week. The features of the commercial market are a growing urban population and growing retail sector such as fast food branches, supermarket branches and restaurants. This rise the need for effective management of PMSC to enhance right time deliveries to the market.

The poultry sectors are hindered by several challenges to facilitate the effective supply chain of the products from farmers to the markers. Some of the challenges include (1) Transportation and logistics: The transport infrastructure is disrupting the movement of products from the farmers in a rural area to the market. The quality of roads is poor, which hinder the development of commercial poultry and supply chain of poultry products from ensuring high quality and timely delivery. (2) Processing: Similarly, like in other East Africa countries, processing units is still a challenge to small farmers across the countries. Although some of the larger farmers possess their units, but the quality attributes of the processing are not impressing. (3) Marketing: The marketing for poultry meat is very stiff due to the existence of substitute products of chicken meats like beef and pork. Never the less, the access of smallholders to the market is fragile and tight which give a chance middle man to take the lead and reduce the prices for chicken at the farm gate and high prices at retail (Vernooij *et al.*, 2018).

### 2.2.4 *Poultry Sector in Rwanda*

The Poultry meat production in Rwanda has increased from 13,700 tonnes in 2010 to 45,000 tonnes in 2018. Currently, Rwanda has 15 large commercial poultry farmers and over 222 small commercial poultry farmers for growing layers. In contrast, there are ten large commercial farms, 25 medium farms, and 20 small farms for growing broilers. Rwanda's chicken population has increased from 3.5 million in 2010 to 7.6 million in 2018 (Mbuza *et al.*, 2017) ([www.newtimes.co.rw](http://www.newtimes.co.rw)). In Rwanda, the national government provide enormous support for the poultry sector for inputs provision and searching of the market in neighbouring countries like Uganda and Congo. This Significant and tremendous investment in the poultry sector has set and give Rwanda a competitive advantage as a foreseeable exporter of poultry products in the region (Miklyaev *et al.*, 2017).

Despite the effort taken to transform the poultry sector in Rwanda, there are several challenges which hinder the industry as well the supply chain and distribution system of poultry products such as meat and eggs. Those challenges include (1) Quality of the inputs. Currently, a majority of the small farmers prepare to mix their feeds. The quality of feed is also a big issue throughout the country which reduce the quality of the final products. (2) Technical knowhow: Predominantly at the producer level and for smallholder and medium-scale farmers, lack of knowledge and technical capacity that negatively affects their production capabilities. There are no practical poultry specific training institutions in Rwanda. Tertiary education institutions do not specifically offer training in poultry but general veterinary training in livestock. (3) Supply chain coordination. Small farmers in Rwanda like in any other country in the region lack the coordination due to the poor flow of information from the downstream to the upstream side. When the market is geographic dispersing and complex give a tough time for the suppliers in upstream to know the demand pattern (Vernooij *et al.*, 2018).

### 2.2.5 *Poultry Sector in Burundi*

The production of poultry meat for Burundi was 6,980 tons in 2018. In contrast, the production of poultry meat in Burundi has increased from 2,700 tons in 1969 to 6,980 tons in 2018 with a growth rate of 2.02% ([www.knoema.com](http://www.knoema.com)). According to FAO, the socio-political crisis in Burundi has plummeted the growth of the poultry activities in the country over the past decade. Furthermore, the poultry sector was hit by the outbreak of avian influenza in the 2000s, which affect the growth of the sector for a decade severely now due to poor control of the virus by the government. It is estimated that the influenza virus affects 80% of chickens in Burundi and lead to an unquantifiable loss (Hosny, 2006). Several challenges hinder the sector as well the growth and supply chain system of poultry products including the social-political crisis, poor transportation infrastructure in rural regions, quality problems of the incoming inputs for poultry farmers, lack of adequate poultry processing units, and weak distribution system of poultry products (Chauvin *et al.*, 2012).

### 2.2.6 *The poultry sector in South Sudan*

The agriculture sector accounting for about 80 percent of employment in Southern Sudan's economy as the

majority of the population depends on the agriculture sector. The livestock in South Sudan contributes significantly to meeting the food and income needs of peoples through the consumption of meat, milk and other products. The poultry meat remained stable in South Sudan production is around 20,000 tons in 2018 (World Bank, 2019). However, South Sudan is the lagging behind in development and growth of the poultry sector due to repeated bouts of violence in the country since 2013. The industry is constrained by livestock disease outbreaks; low productivity exacerbated by chronic droughts and insecurity; a lack of adequate marketing infrastructure; and poorly organized and informed herders and traders (FAO, 2019).

### 2.3 Global review on Poultry Meat Supply Chain

In the global level, PMSC has been hailed across several countries as one of the pervasive strategies to boost the poultry sector and agriculture at large due to globalization (Manning and Baines, 2004). According to Manning *et al.* (2007), The supply chain includes both inter and intra organizational trade in poultry meat. Supply chain organizations that are involved in poultry production include producers and processors, e.g. farms, hatcheries and processing factories. Also, suppliers of goods and services, e.g. feed supplements, medication, veterinary advice, transportation and distribution, waste disposal, technical support, import/export agency and insurance. Furthermore, in downstream it includes purchasers of poultry meat, e.g. retailers, food service, poultry fertilizer, pet food. Table 2. Stipulate the global literature review of studies on PMSC.

Table 1. Global literature review on PMSC

Reference	Objective	Method	Contribution
Manning and Baines (2004)	Globalization: a study of the poultry-meat supply chain.	Desk research	The paper discusses the influence of globalization on poultry-meat supply chain. Factors that affect current and future developments in food globalization include the relative strength of currencies; the speed of technology transfers to developing countries; tax and regulatory burden in nation-states or trading groups; the cost of capital and labour and its effect on competitiveness; continuing production specialization and greater differentiation between domestic and international meat trade; production methods, food safety and hygiene standards.
Manning <i>et al.</i> (2008)	Benchmarking the poultry meat supply chain.	Desk research	The purpose of this paper is to analyze how a pre-requisite programme and key performance indicators can be developed within an information management system to manage food safety, animal welfare and business performance criteria effectively in the poultry meat supply chain and seek to deliver continuous improvement.
Manning <i>et al.</i> (2007)	Trends in the global poultry meat supply chain.	Desk research	The purpose of this paper was to analyze the current status of the poultry meat supply chain. The study revealed that a poultry meat supply chain has more significant influence on the financial stability of the organization.
Djekic <i>et al.</i> (2018)	Transformation of quality aspects throughout the chicken meat supply chain.	Filed Research	The purpose of this paper is to analyze perceptions of quality in the chicken meat supply chain. The quality aspect in processing units is among the impeding factors that hinder chicken meat supply chain.
Vo and Thiel (2011)	Economic simulation of a poultry supply chain facing a sanitary crisis.	Simulation model	The study provides the model that can be used as a decision system support which aims to minimize the costs due to stock level increases as demand decreases as well as exceptional external purchasing sparked by the lack of available poultry products.
Mohamed <i>et al.</i> (2013)	Measuring competition along the supply chain of the Malaysian poultry industry	Field Research	The study provides critical analysis on the competitive market environment within which firms in poultry industry operates. Several factors should be considered such as number and size distribution of buyers and sellers (market concentration), barriers to entry, the shape of cost curves, the extent to which firms are vertically integrated or diversified and the price and information transmission process among vertically or spatially integrated markets.

### 3. Research Methods

This study used a desk research review method. To achieve the objective of this study, the author conducted an intensive review of documentary information relevant to the poultry sector in East Africa countries and global at large. The researcher reviews the regional poultry development for eastern Africa, countries poultry sector review, agricultural strategic plans, FAO reports on country poultry status, and research reports conducted by researcher and institutions in respective countries concerning poultry meat supply chain. The journal articles and paper reviewed in this study was those who published between 2010 to 2020.

#### 3.1 Research Gap

After scrutiny of the empirical literature on the agro-supply chain, the research found that existing of literature in East Africa region exist in poultry studies. However, there are limited studies which focused on Poultry meat supply chain. Never the less majority of those studies are not published in a reputable journal. In bottom line, it shall be significantly essential to conduct research work on exploring the poultry meat supply chain in East Africa region to understand the status and encountered challenges to arrive at a concrete solution to assuage this severe problem in the region.

### 4. Results

Based on the literature review on the published journal articles for ten (10) years in East Africa, the content analysis revealed there is lack of empirical literature concerning poultry meat supply chain (PMSC) in East Africa. Table 2 indicates the journal articles reviewed that was published in a reputable journal between 2010 and 2020 conducted in EA member states. Majority of the study concerning the poultry meat sector was published in Kenya while studies in other state partners are not impressing. Never the less, there were any studies found using google scholar engine that was conducted in Burundi based on the categories of search used. This indicates that Burundi is lag behind in the development of the poultry meat sector in the region followed with South Sudan. This has concurred with world bank report of 2018 on addressing the fragility and demographic challenges to reduce poverty and boost sustainable growth who revealed that the social-political crisis in Burundi and South Sudan had plummeted the development of the agricultural sector in the country and region at large.

Table 2. Reviewed published articles (2010 – 2020)

Different categories	Poultry meat production	Poultry Meat market	Poultry Meat supply chain	Country
Queenan <i>et al.</i> (2016)	X	X		Tanzania
Bett <i>et al.</i> (2012)	X	X		Kenya
Carron <i>et al.</i> (2017)	X	X		Kenya
Nakkazi <i>et al.</i> (2014)		X		Uganda
Mbuza <i>et al.</i> (2017)	X		X	Rwanda
Magothe <i>et al.</i> (2012)	X	X		Kenya
Shibia <i>et al.</i> (2017)		X		Kenya
Kingori <i>et al.</i> (2010)	X			Kenya
Olwande <i>et al.</i> (2010)	X			Kenya
Guni and Katule (2013)	X			Tanzania
Okeno <i>et al.</i> (2012)	X			Kenya
Vincent <i>et al.</i> (2010)	X			Kenya
Emuron <i>et al.</i> (2010)		X		Uganda
Njoroge <i>et al.</i> (2015)	X			Kenya
Omondi (2019)	X	X		Kenya
Miklyaev <i>et al.</i> (2017)	X	X		Rwanda
Aryemo <i>et al.</i> (2019)	X	X		Uganda
Msoffe and Ngulube (2017)		X		Tanzania
Ali <i>et al.</i> (2012)		X		South Sudan
Nyapendi <i>et al.</i> (2010)		X		Uganda

### 5. Conclusion, policy implications and future direction

This paper has addressed the gaps and issues in the poultry meat supply chain (PMSC). Although scrutiny of literature indicates that few studies have been conducted that persuaded the supply chain context in the poultry sector in East Africa. Still, some studies exist which discuss the productions of poultry meat, distribution of poultry meat, storages process, processing units, delivery and supplying activities. The empirical literature suggests that the East Africa member state suffer seriously, which several challenges which impede the development of effective supply chain network in poultry meat. Some of the challenges and problems include selfish traders and middlemen,



fragmented agricultural supply chain, poor marketing infrastructure installed for poultry products, weak transportation infrastructure, imperfect market conditions for poultry products, ineffective warehousing and storing facilities, lack of effective packaging, lack of branding and certification for poultry meat produced in local markets, lack of adequate market information about poultry products, low productivity for small scale farmers yield resulting in the truncated quantum of quantity, difficulty in accessing finance for small scale farmers, inadequate safety and security of poultry meat, lack of sophisticated technology reducing production capacity of poultry meat, inadequate availability of power in the countries.

For the transformation and development of the agricultural sector in East Africa region and specifically the poultry meat supply chain, variety of measures may be taken by the region and partner states: Supply chain is an engine of economic growth worldwide, the poultry meat sector in East Africa region is fragmented and work in isolation despite the existence of the regional integration and mutual trade between state partners. The development of the poultry meat sector will be determined through the integration of the supply chain downstream and upstream of the spectrum. The coordination of the supply chain from the original suppliers who are the small scale farmers are indispensable to enhance the sufficient flow of the products to the other side of the supply chain. The transformation in the poultry sector should incorporate the bigger picture of the supply chain and not only subpart of the value chain. The value chain is a subset of the supply chain which should be integrated with other units to enhance the development of the sector. Farmers in poultry should be encouraged to join association and cooperatives, which give them more power and influence of the country and regional level. The agricultural policies should have emphasized on contract farming as one the critical aspect of the supply chain. Contract farming is a good development towards this direction.

Furthermore, although at a regional level, there are framework and policies that govern the poultry sector. A review should be done on time due to globalization to meet the standards and speed of the global market in providing competitive pressure. In a nutshell, if the regional member work collectively, the poultry sector is a strategic sector for the regional development in the future. The EA member state should resolve the tariffs and non-tariff barriers in the transportation of the poultry and agriculture products at large. Based on the studies conducted by Okute (2017), tariffs barriers and non-tariff barriers (TNTB) is a major problem in the region the hinder the development of effective supply chain of the agricultural sector and particularly poultry products.

More studies need to be conducted on the side of the supply chain of poultry products. For instance, future study might focus on the impact of logistic infrastructures on the development of a supply chain of poultry products in the region. This will enable us to understand the impact of the infrastructure as one of the main barriers for the timely transportation of the poultry products from small scale farmers who are farming in rural areas. Due to advancement of technologies, it will be interested in the future study would be conducted to determine the effect of technology (i.e. information sharing, traceability technology etc.) on the development of supply chain of poultry products in the region.

## References

- Alemayehu, T., Bruno, J., Getachew, F., and Dessie, T. (2018), "Socio-economic, marketing and gender aspects of village chicken production in the tropics: A review of literature".
- Ali, S. A., Bakheet, M. A., and ElNazeer, A. E. (2012), "Rural Poultry Keeping in South Gezira, Sudan", *Pertanika Journal of Tropical Agricultural Science*, Vol. 35 No.3.
- Aryemo, I. P., Akite, I., Kule, E. K., Kugonza, D. R., Okot, M. W., and Mugonola, B. (2019), "Drivers of commercialization: A case of indigenous chicken production in northern Uganda", *African Journal of Science, Technology, Innovation and Development*, Vol. 11 No.6, pp. 739-748.
- Benson, T., and Mugarura, S. (2013), "Livestock development planning in Uganda: Identification of areas of opportunity and challenge", *Land use policy*, Vol. 35, pp. 131-139.
- Bett, H., Musyoka, M., Peters, K., and Bokelmann, W. (2012), "Demand for meat in the rural and urban areas of Kenya: a focus on the indigenous chicken", *Economics Research International*, Vol. 2012.
- Bosona, T., and Gebresenbet, G. (2013), "Food traceability as an integral part of logistics management in food and agricultural supply chain", *Food control*, Vol. 33 No.1, pp. 32-48.
- Carron, M., Alarcon, P., Karani, M., Muinde, P., Akoko, J., Onono, J., . . . Rushton, J. (2017), "The broiler meat system in Nairobi, Kenya: Using a value chain framework to understand animal and product flows, governance and sanitary risks", *Preventive veterinary medicine*, Vol. 147, pp. 90-99.
- Chauvin, N. D., Mulangu, F., and Porto, G. (2012), "Food production and consumption trends in sub-Saharan Africa: Prospects for the transformation of the agricultural sector", *UNDP Regional Bureau for Africa: New York, NY, USA*, Vol.
- Distefano, F., and Haan, N. C. d. (2018), "Report of the FAO training "Gender and Livestock Development in East Africa", Nairobi, Kenya, 28-30 May 2018".
- Djekic, I., Skunca, D., Nastasijevic, I., Tomovic, V., and Tomasevic, I. (2018), "Transformation of quality aspects throughout the chicken meat supply chain", *British Food Journal*.

- Drowns, G. (2012). "Storey's Guide to Raising Poultry: Chickens, Turkeys, Ducks, Geese, Guineas, Game Birds", Storey Publishing.
- Emuron, N., Magala, H., Kyazze, F. B., Kugonza, D. R., and Kyarisiima, C. C. (2010), "Factors influencing the trade of local chickens in Kampala city markets", *Livestock Research for Rural Development*, Vol. 22 No.4, pp. 1-14.
- Engida, E., Guthiga, P., and Karugia, J. (2015). The role of livestock in the Tanzanian economy: Policy analysis using a dynamic computable general equilibrium model for Tanzania.
- FAO. (2019), "South Sudan Resilience Strategy (2019–2021)", *Food and Agriculture Organization of the United Nations Rome, 2019*, Vol.
- Guni, F., and Katule, A. (2013), "Characterization of local chickens in selected districts of the Southern Highlands of Tanzania: I. Qualitative characters", *Livestock Research for Rural Development*, Vol. 25 No.9.
- Hosny, F. (2006), "Poultry sector country review", *FAO animal production and health division. Emergency centre for transboundary animal diseases socio economics, production and biodiversity unit*, Vol.
- Kingori, A., Wachira, A., and Tuitoek, J. (2010), "Indigenous chicken production in Kenya: A review", *International Journal of Poultry Science*, Vol. 9 No.4, pp. 309-316.
- Lavelli, V. (2013), "High-warranty traceability system in the poultry meat supply chain: A medium-sized enterprise case study", *Food control*, Vol. 33 No.1, pp. 148-156.
- Magothe, T., Okeno, T., Muhuyi, W., and Kahi, A. (2012), "Indigenous chicken production in Kenya: I. Current status", *World's Poultry Science Journal*, Vol. 68 No.1, pp. 119-132.
- Manning, L., and Baines, R. (2004), "Globalization: a study of the poultry-meat supply chain", *British Food Journal*.
- Manning, L., Baines, R., and Chadd, S. (2007), "Trends in the global poultry meat supply chain", *British Food Journal*.
- Manning, L., Baines, R., and Chadd, S. (2008), "Benchmarking the poultry meat supply chain", *Benchmarking: An International Journal*, Vol.
- Mbuza, F., Manishimwe, R., Mahoro, J., Simbankabo, T., and Nishimwe, K. (2017), "Characterization of broiler poultry production system in Rwanda", *Tropical animal health and production*, Vol. 49 No.1, pp. 71-77.
- McDermott, J., Rich, K., Gebremedhin, B., and Burrow, H. (2010), "Value Chains and Innovation", *The role of livestock in developing communities: Enhancing multifunctionality*, Vol., pp. 151.
- Michael Shaw, H. N. a. M. R. (2019), "Poultry Sector Study", *Department for International Development*, Vol.
- Miklyaev, M., Afra, S., and Hashemi, M. (2017), "Cost-benefit Analysis of Rwanda's Poultry Value Chains", *Development Discussion Paper 2017*, Vol. 5.
- Mohamed, Z., Shamsudin, M. N., Latif, I. A., and Mu'azu, A. U. (2013). *Measuring competition along the supply chain of the Malaysian poultry industry*. Paper presented at the International Conference on Social Science Research.
- Moyo, S., and Swanepoel, F. (2010), "Multifunctionality of livestock in developing communities", *The role of livestock in developing communities: Enhancing multifunctionality*, Vol. 3, pp. 69.
- Msoffe, G. E., and Ngulube, P. (2017), "Information sources preference of poultry farmers in selected rural areas of Tanzania", *Journal of Librarianship and Information Science*, Vol. 49 No.1, pp. 82-90.
- Nakkazi, C., Kayitesi, A., Mulindwa, H., Kugonza, D., and Okot, M. (2014), "The status of local chicken (*Gallus domesticus*) production in Northern Uganda", *Livestock Research for Rural Development*, Vol. 26 No.11, pp. 1-9.
- Njoroge, S., Bett, E., and Njehia, B. (2015), "Impact of poultry feed price and price variability on commercial poultry production in Murang' a County, Kenya", *IOSR Journal of Economics and Finance (IOSR-JEF) e-ISSN*, Vol., pp. 2321-5933.
- Nyapendi, R., Best, R., Ferris, S., and Jagwe, J. (2010). "Identifying market opportunities for urban and peri-urban farmers in Kampala" *African Urban Harvest* (pp. 139-165): Springer.
- Okeno, T. O., Magothe, T. M., Kahi, A. K., and Peters, K. J. (2012), "Application of risk-rated profit model functions in estimation of economic values for indigenous chicken breeding", *Tropical animal health and production*, Vol. 44 No.6, pp. 1279-1287.
- Okute, A. M. (2017). *Non-Tariff Barriers to Trade in East Africa Community: A Case of Exporters in Kenya*. United States International University-Africa.
- Olwande, P. O., Ogara, W. O., Okuthe, S. O., Muchemi, G., Okoth, E., Odindo, M. O., and Adhiambo, R. F. (2010), "Assessing the productivity of indigenous chickens in an extensive management system in southern Nyanza, Kenya", *Tropical animal health and production*, Vol. 42 No.2, pp. 283-288.
- Omondi, S. O. (2018), "Economic analysis of small-scale poultry production in Kenyan medium-sized cities of Kisumu and Thika".
- Omondi, S. O. (2019), "Small-scale poultry enterprises in Kenyan medium-sized cities", *Journal of Agribusiness in Developing and Emerging Economies*.

- Preziosi, M. (2016), "The impact of traceability in the agri-food industries: the case of the Italian poultry supply chain", Vol.
- Queenan, K., Alders, R., Maulaga, W., Lumbwe, H., Rukambile, E., Zulu, E., . . . Rushton, J. (2016), "An appraisal of the indigenous chicken market in Tanzania and Zambia. Are the markets ready for improved outputs from village production systems?", *Livestock Research for Rural Development*, Vol. 28 No.10.
- Shibia, M., Rahman, S., and Chidmi, B. (2017). Consumer demand for meat in Kenya: an examination of the linear approximate almost ideal demand system.
- Silva, M. d., Desta, S., and Stapleton, J. (2017), "Development of the chicken sector in the Tanzanian livestock master plan".
- United Nations, U. (2019), "World population prospects 2019".
- Vernooij, A., Masaki, M. N., and Meijer-Willems, D. (2018). Regionalisation in poultry developmen in Eastern Africa: Wageningen Livestock Research.
- Viaene, J., and Verbeke, W. (1998), "Traceability as a key instrument towards supply chain and quality management in the Belgian poultry meat chain", *Supply Chain Management: An International Journal*.
- Vincent, N. e., Lagat, B., Korir, M., Ngeno, E., and Kipsat, M. J. (2010). Resource use efficiency in poultry production in Bureti District, Kenya.
- Vo, T. L. H., and Thiel, D. (2011), "Economic simulation of a poultry supply chain facing a sanitary crisis", *British Food Journal*.
- World Bank, W. B. (2019), "South Sudan: Linking the Agriculture and Food Sector to the Job Creation Agenda", *Agriculture Global Practice*, Vol. GFA1.