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Agricultural Supply Chains: Challenges and Opportunities for Agribusiness in Afgoye, Lower Shabelle, Somalia

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Abstract

Somalia's largely agrarian economy relies heavily on agriculture. The agricultural sector faces significant challenges in agricultural supply chains, which can hinder its development and growth. Lack of infrastructure, insecurity, and poor linkage to the market are some of those challenges. This study investigates the agricultural supply chains in Afgoye, Lower Shabelle, Somalia, a region with unique challenges and opportunities for agribusiness. It also discusses the importance of technology in improving supply chain efficiency and the role that government and other stakeholders can play in supporting agribusinesses. Additionally, the paper examines the potential impact of improved agricultural supply chains on the Somali economy and provides valuable insights for policymakers, investors, and development practitioners seeking to support and promote agribusiness. The methodology used in this study involved survey questions. The survey questions utilized for this study were distributed through key stakeholders in Somalia's agricultural supply chains, including farmers, wholesalers, retailers, and processors. SPSS (version 20) is used to analyze the data collected from participants. According to the results, 57.5% of the respondents emphasized that investing in the agricultural sector is necessary and may improve the standard of life of the population. The technology can enhance Somalia's agricultural supply chain through access to information as well as market access and e-commerce, as indicated by 47.5% and 35%, respectively. Ultimately, this paper highlights the importance of addressing the challenges facing agricultural supply chains in Somalia and unlocking the opportunities that exist for agribusinesses to contribute to the country's economic development.

Keywords: Supply chain, agribusiness, Somalia, challenges, opportunities

1. Introduction

According to the definition of agribusiness in the Oxford Dictionary, agribusiness is the practice of agriculture conducted strictly on commercial principles, involving an organization engaged in agribusiness, and encompassing a group of industries dealing with agricultural produce and services required for farming. A supply chain consists of participants that produce and deliver products (including goods and services) from its earliest suppliers to its ultimate customers (Sjah and Zainuri, 2020). Agriculture dominates the key to broad-based economic growth, poverty reduction, and food security in Sub-Saharan Africa

(Jayne et al., 2010; Schaffnit-Chatterjee, 2014; Ssozi et al., 2019). This sector is an important contributor to the Somali economy, providing employment opportunities and generating income for many small-scale farmers. Salam Development Center (2020) concluded, in its July 2020 report on Somalia's agriculture and livestock, that agriculture (including livestock) is the backbone of the Somali economy. It contributes over 90% of the country's total exports, constitutes 70% of its GDP, and employs over 80% of its population (Heritage Institute., 2020; SOMINVEST, 2022). However, the sector faces significant challenges when it comes to agricultural supply chains, which reduce its growth and development.

The agricultural supply chain in the country has been weak since the collapse of the military government that dominated agricultural services including infrastructures of production since there (Mohamed et al., 2015). Most parts of Somalia regions have low supply chains. Floods or crises cause this. Additionally, merchants have purchased re-stocks to meet any expected increase in commodity demand. After the collapse of the government, agricultural exports were few because of the collapsed institutions in the agricultural sector, but most of the farm holders produce mainly cereals and fruits for household consumption where the surplus units are transported to the urban markets for cash exchanges (Ali, 2022; Gavin et al., 2019; Hastings et al., 2022). The sector also has been severely impacted by years of conflict, droughts, and poor infrastructure (Kullane et al., 2022; Said and Ibrahim, 2023). Despite these challenges, there have been efforts to revive and modernize the agricultural sector in Somalia through the promotion of agribusiness (FAO and Bank, 2018). This involves integrating agricultural production with value-added processing and marketing to create a more competitive and profitable industry. Overall, the development of agribusiness in Somalia has the potential to create employment opportunities, increase incomes, and contribute to food security. However, significant investment is needed in infrastructure, research and development, and market access to realize this potential. The rangelands in Somalia's north and center receive low rainfall and contain few permanent springs. Thus, one of the primary causes of conflict between agro-pastoralists and nomadic pastoralists has always been water. The conflict for land and water resources between pastoralists and settled farmers has been one of the main causes of the nearly three-decade-long civil war, even in the fertile southern Somali regions blessed with more frequent rains and river water (FAO and Bank, 2018). Ongoing conflicts and instability in Somalia have affected agricultural production and the ability of farmers to access markets. This has also resulted in the displacement of many people, which has negatively impacted agricultural productivity. Low access to finance for the farmers, climate change, limited technical expertise, and poor market access are also the challenges faced by agricultural supply chains in Somalia, which hinder the growth and development of agribusinesses in the country (Ahmed et al., 2023). This paper conducted an in-depth investigation of the challenges and opportunities for agribusiness in Somalia. We examined the challenges by gathering information from survey responses of individuals residing in Afgoye, lower Shabelle, Somalia. This research aims to explore the challenges faced by the agricultural supply chain and how they can be overcome to enhance their operations, contribute to economic growth, improve food security, and uplift rural communities in Somalia.

2. Challenges and Opportunities in Somalia's Agricultural Sector

2.1. Constraints of the agricultural supply chain in Somalia

Since the recurrence of droughts and floods, associated with climate change, has become a regular occurrence in the country, farming and agricultural production have declined (Pape and Wollburg, 2019; Said et al., 2023; Said and Hassan, 2024). Additionally, Somali people have

lacked opportunities and resources related to precious farming and never had before. The labor force and farm equipment are the biggest challenges that farmers face. Hand tools like hoes and old-version tractors are the only equipment that farmers use (Abdi-Soojeede, 2018). Somalia was in a civil war for years. This resulted in the mass destruction of infrastructure, and service areas as well as the availability of some resources to enhance production. Nevertheless, the knowledge and information on up-to-date farming practices are very short as well as there is a misuse of information about inputs, not only among farmers but also among traders and suppliers (FAO et al., 2014). The land tenure system in the country is also another challenging factor that the agricultural sector in the country is suffering. Farmers may not have been able to get these essential inputs since more and more vendors demand upfront cash payment (Ali et al., 2024; Heritage Institute., 2020). Farmers that were struggling financially were unable to obtain. Crop loss or damage during the growing season (locust, fall armyworm, dry spells, disasters other than plant disease): Lower Shabelle, Togdheer, Sanaag, and Bakool had a relatively greater proportion of households reporting this as a challenge than other regions. Dry spells and an early cessation of the Gu rainy season also illustrated crop losses and declined income from agriculture (NET, 2022).

2.2. Opportunities in Agribusiness in Somalia

According to the Sominvestment of the Ministry of Planning in the Somali Federal government, Legislation has been established by the agricultural regulatory agency known as SARIS. This legislation promotes agrarian trade in the international market. The institution's tasks are implementing the Somali Agrochemical Policy; the Seeds and Varieties Act; the Plant Protection and Quarantine Law; the National Fertilizer Policy; and the National Pesticide Policy. With the challenges of climate change on agriculture, the Federal government established a greenfield program that focuses on climate change adaptation and effect mitigation (SOMINVEST, 2022). Considering the significance of this sector, the Somali government is implementing transformational farming to modernize traditional farming practices that back holds agricultural production in the country. The ministry is also improving business-enabling environment and climate mitigation regulatory and cropping processing substitutes.

Investment opportunities in agriculture in the country are widely bare. Somalia has large and fertile land that suits for farming throughout the year. Drought recurrence and accumulated obstacles have caused a lack of investment and an absence of interest in foreign and local investment. Since the challenges are going to end, the agribusiness industry is a crude opportunity that everyone can cultivate and take advantage of it. To create a suitable investment environment for agriculture, key factors include research & development of agricultural inputs, inspection & certification of their quality, potential creation of private or public insurance systems, efficient agri-input distribution, local manufacturing of affordable farm equipment, establishment of regional supply chains, and private seed certification techniques. Farmers may be another factor that can ensure foreign and local investment.

3. Problem Statement

The agricultural sector in Somalia faces numerous challenges and opportunities within its supply chains, posing significant obstacles for agribusinesses operating in the country. These challenges stem from a combination of factors, including political instability, limited infrastructure, climate change, and inadequate access to markets and financing. As a result, the agribusiness sector struggles to achieve its full potential, hindering economic growth, food security, and rural development in Somalia. One major challenge in agricultural supply chains

in Somalia is the lack of reliable infrastructure. Insufficient road networks, storage facilities, and transportation systems make it difficult to move agricultural produce from rural areas to markets, leading to high post-harvest losses and increased costs. This not only affects the profitability of agribusinesses but also limits the availability of food in local and regional markets. Political instability and insecurity also pose significant challenges to agricultural supply chains in Somalia. Frequent conflicts and the presence of armed groups disrupt farming activities, making it difficult for agribusinesses to operate safely and consistently. This instability further hampers investments in agriculture, discouraging both domestic and foreign investors from engaging in agribusiness activities.

Climate change is another pressing issue affecting agricultural supply chains in Somalia. Changing weather patterns, including irregular rainfall, droughts, and floods, impact crop production and livestock rearing (Said et al., 2023). Farmers and agribusinesses face challenges in adapting to these changing conditions, resulting in decreased productivity, increased vulnerability, and reduced incomes. Furthermore, limited access to markets and financial services constrains the growth and profitability of agribusinesses in Somalia.

Many farmers and agribusinesses struggle to find reliable buyers and obtain fair prices for their products. Additionally, the lack of access to affordable credit and financial services limits their ability to invest in modern farming techniques, machinery, and inputs, hindering productivity and expansion.

Addressing these challenges presents significant opportunities for agribusinesses in Somalia. By improving infrastructure, such as roads, storage facilities, and transportation systems, the efficiency of agricultural supply chains can be enhanced, reducing post-harvest losses, and improving market access. Promoting stability and security in the country will attract domestic and foreign investments, fostering the growth of agribusinesses and the overall agricultural sector. Additionally, implementing climate-smart agriculture practices and providing farmers with relevant information and resources can help them adapt to climate change and build resilience.

In conclusion, the challenges faced by agricultural supply chains in Somalia, including inadequate infrastructure, political instability, climate change, and limited market access and financing, hinder the growth and development of agribusinesses in the country. However, addressing these challenges presents significant opportunities for agribusinesses to enhance their operations, contribute to economic growth, improve food security, and uplift rural communities in Somalia.

4. Material and Method

4.1. Study Area

Afgoye is a town in the Lower Shabelle region of Somalia, situated about 30 kilometers (18 miles) west of Mogadishu, the capital of Somalia (see Figure 1). It lies at an altitude of 83 meters (272 feet) with a latitude of 2° 13'N and 45° 15'E. The study area's climate is semi-arid which is well known for both the Shebelle River, which flows through the town's center, and its alluvial soil (Muchiri, 2007).

4.2. Research Methodology

The methodology used in this study involved survey questions. The survey questions utilized for this study were distributed and collected through key stakeholders in Somalia's agricultural supply chains, including farmers, wholesalers, retailers, and processors in the

Afgoye district of lower Shabelle Region, Somalia in 2023. The total of questionnaires distributed for the study constituted Demographic Information and 10 other questions in which all participants were asked similarly. These questions provided valuable insights into the challenges and opportunities facing agribusinesses in the country and helped to inform the recommendations provided in the paper.

Figure 1. Study area

The target of the research population was 100 people. The sample size of 80 respondents was selected by using Slovene's formula given in Eq. (1).

$$n = \frac{N}{1 + N(e)^2}, \tag{1}$$

where, N is the estimated target population, n is the required sample size, and e is the margin error, also known as the level of significance, which is commonly set at 0.05 or 5%. Given that N = 100 for this investigation, the sample size was determined as follows:

$$n = \frac{100}{1 + 100(0.05)^2} = 80.$$

The obtained data from surveys were statistically evaluated using Statistical Package for Social Sciences (SPSS version 20) software to generate descriptive statistics, conduct correlation analysis, and explore patterns or trends.

5. Results and Discussion

Figure 2 outlines the demographic characteristics of the respondents. Within the sample size of 80 respondents, 51 (63.7%) of the respondents were males, while 29 (36.3%) of the respondents were females. Additionally, the study showed that respondents 34 (42.5%) and 19 (23.8%) were non-formal, and in secondary education respectively, while 14 (17.5%) were in graduate education, and 13 (16.3%) were in primary education. About the marital status of the respondents, the study found that most of the respondents, 43 (53.8%), were married. On the other hand, 29 (36.3%) were single and 8 (10.0%) were divorced. This highlights that the percentage of married respondents is high. According to the age distribution of respondents, 23 (28.7%) were aged 31-40, 19 (23.8%) were aged 20-30, 18 (22.5%) were aged 41-50, 16 (20.0%) were aged 51-60, and 4 (5.0%) were above 60 years old.

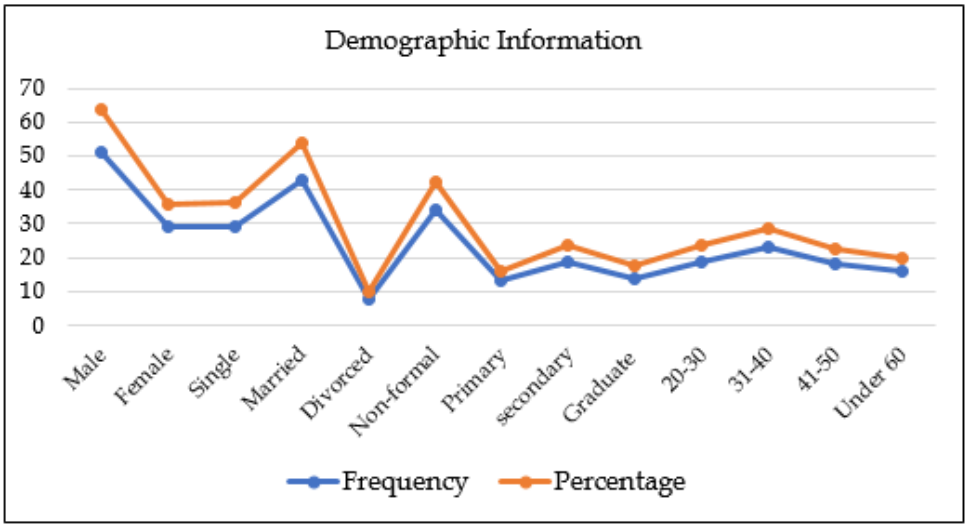

Figure 2. Demographic information of the respondents

In the study, 75% of the respondents were farm owners, while 25% of the respondents were farm employees which indicates that farm owners are a larger number than farm employees. Additionally, years of experience in agribusiness and some related jobs were among the survey questions and 65% of the research participants suggested that they had 1-2 years of experience in agribusiness and related agricultural enterprises, while 17.5% of them had experience in 3-5 years of experience in agribusiness, and the remaining in more than 6 years of agribusiness as shown in Table 1.

Table 1. Work experience of the respondents

Variables	n	%
Do you have a farm or work?		
Yes	60	75.0
No	20	25.0
Total	**80**	**100.0**
Experience in agribusiness and some related jobs		
1-2 years	52	65.0
3-5 years	14	17.5
More than 6 years	14	17.5
Total	**80**	**100.0**

Table 2 presents the current state of agricultural supply chains in the country has lots of concerns related to lack of infrastructure, and insecurity. 45% of the research participants stated that agricultural supply chains in the country are poor, 35% of the participants had an idea of the moderate state of agricultural supply chains, and 20% of the study respondents answered the very poor state of the agricultural supply chain. Previous studies have declared that the agricultural supply chain faces various challenges, and the agribusiness sector in Somalia is in a very poor state (Ali, 2022; Waris, 2018). Some of the main challenges that agribusinesses face in agricultural supply chains in Somalia are apparent, including poor market linkage, insecurity, lack of infrastructure, and others (Gaal and Afrah, 2017; Gardner and El-Bushra, 2017; Little, 1996; Mifsud, 2007). In this study, 42.5% of the respondents highlighted that the lack of infrastructure is the major challenge facing Somali agribusinesses. Furthermore, 30% identified poor market linkage as a significant hurdle. Lastly, 27.5% concluded that insecurity, one of the most detrimental factors impeding numerous developmental projects in the country, is an obstacle faced by agribusinesses in Somalia.

Table 2. Current state and technological impacts related to agribusiness in Somalia

Variables	n	%
The current state of agricultural supply chains		
Very poor	16	20.0
Poor	36	45.0
Moderate	28	35.0
Total	**80**	**100.0**
Major challenges that Somali agribusinesses face		
Insecurity	22	27.5
Lack of infrastructure	34	42.5
Poor linkage to the market	24	30.0
Total	**80**	**100.0**
How does technology enhance Somali agricultural supply chains?		
Access to information	38	47.5
Market access and e-commerce	28	35.0
Data-driven decision-making	14	17.5
Total	**80**	**100.0**
Opportunities agribusinesses could take advantage of in Somalia's agricultural supply chain		
Yes	72	90.0
No	8	10.0
Total	**80**	**100.0**

In the contemporary global landscape, technology dominates virtually every sector and profoundly influences the lives of the population (Papa, 2017; Singh, 2014). Somalia, as a developing country, is increasingly adopting and integrating modern technology across various sectors (Hilowle, 2024). The research reveals that access to information and communication are significant factors contributing to the improvement of the agricultural supply chain in the country, as indicated by 47.5% of the survey participants. Market access and e-commerce are very vital to agribusiness, and technology continues to advance day by day. The respondents of the study pointed out that access to the market and digitalization of commerce can take part a key role in the improvement of agribusiness, with 35% of them expressing this view. Additionally, 17.5% of respondents emphasized that data-driven decision-making can enhance the agricultural supply chain and agribusiness. Regarding the potential impact on the country's economy, the outlook for agribusiness is positive. A substantial 90% of respondents believe that if developed, agribusiness can significantly contribute to the country's economic growth. The remaining respondents (10%) expressed uncertainty, suggesting a lack of awareness regarding the potential economic contributions of agribusiness.

Investment, technical and support services are the primary need for Somali farmers. According to Abdullahi and Arısoy (2022), traditional practices and inadequate technical and support services from the government and other institutions are the reasons why Somali farmers fail to produce sufficient products for the entire country (Abdullahi and Arısoy, 2022). 57.5% of the research participants responded that investing in the agricultural sector is necessary and may improve the standard of living and the development of the country. Additionally, 25% of them stated that a secure environment is the most critical factor in agriculture and agribusiness in Somalia. Finally, 17.5% of the research participants believe that promoting access to markets is the key requirement for farmers and should be addressed promptly. Government and policymakers should play in improving agricultural supply chains in Somalia.

The private sector is another influencing factor that can have an impact on improving the economy of the country and the standard of living for the people (Fuglie, 2016). In Table 3, the study shows that 37.5% of the respondents answered that knowledge sharing and capacity building can improve the agricultural supply chain. Additionally, 32.5% of them indicated that public-private partnerships (PPPs) contribute to this point, and value chain development and market linkages are considered important, as stated by 22.5% of the respondents. Finally, 7.5% of the respondents mentioned that dialogues and policies could be beneficial for improving the agricultural supply chain. 37.5% of the participants concluded that the most important steps that can improve agribusiness in the agricultural supply chain in the country are collaborating with stakeholders and facilitating market access, while 25% of them stated that technology and innovation are the most important steps that could improve agribusiness.

Table 3. Government, private sector, and improvement strategies in Somalia's agricultural supply chain (ASC)

Variables	n	%
What is your opinion on the government and policymakers' roles in improving Somalia's ASC?		
Creating a secure environment	20	25.0
Investing agricultural sector	46	57.5
Promoting market access	14	17.5
Total	**80**	**100.0**
How can the private sector collaborate with the government in enhancing Somalia's ASC?		
Policy advocacy and dialogue	6	7.5
Public-private partnerships (PPPs)	26	32.5
Market linkages and value chain development	18	22.5
Knowledge sharing and capacity building	30	37.5
Total	**80**	**100.0**
For improved performance in Somali ASC, which is most crucial?		
Stakeholder collaboration	30	37.5
Market linkage facilitation	30	37.5
Technology and innovation adoption	20	25.0
Total	**80**	**100.0**
How can support be provided to Somali farmers for improvement in ASC?		
Supporting their farming system	34	42.5
Infrastructural development	16	20.0
Introducing technology-based farming	22	27.5
Incentivizing small-scale farmers	8	10.0
Total	**80**	**100.0**

Somali farmers are in a low-income state, and they need support similar to that provided by the Chinese and US governments to smallholder farmers, including strong extension services, subsidies, a solid manufacturing sector, and infrastructure development that prioritizes the smallholder sector (Carlisle et al., 2019; Sims and Kienzle, 2016). This survey found that supporting farmers' farming system is the most important factor that can improve their participation in agribusiness and the agricultural supply chain, with 42.5% of them agreeing. Introducing technology-based farming is crucial for the farmers, as 27.5% of them responded. Infrastructural development and incentivizing small-scale farmers are two important points that can be developed to contribute to agribusiness, at 20% and 10% respectively.

Table 4. Pearson's correlation of agricultural supply chains

	Technology improvement	Role of government and policymakers
Pearson's Correlation	0.315**	0.315**
Sig.(2-tailed)	0.004	0.004

According to Table 4, there is a highly significant correlation between technology improvement and the role of the government and policy makers for agricultural supply chains (r=0.315**, P=0.004).

6. Conclusions

The survey conducted in the Afgoye district of the lower Shabelle region, Somalia, highlighted significant challenges facing the agricultural supply chain and agribusiness, including security issues, inadequate infrastructure, and limited access to markets. The research underscores the urgent need for financial support in farming, with over half (57.5%) identifying it as crucial for enhancing living standards. Despite the hurdles faced, Somalia's agriculture sector has significant growth potential, offering opportunities for agribusinesses to play central roles in the distribution process. However, realizing these opportunities depends on addressing major challenges, including weak infrastructure, limited funding sources, and a fragmented market. Additionally, the study highlights the importance of collaborative efforts among stakeholders to establish a more reliable and effective agricultural supply chain system. Investment in infrastructure, improved access to financing, and the implementation of policies encouraging collaboration and coordination are identified as essential steps.

The agricultural sector in Somalia has the potential to become an important driver of economic growth and development with the appropriate strategic approach and coordinated efforts. This change would be extremely beneficial to the nation's general prosperity in addition to opening doors for agribusinesses to succeed. We recommend focusing on research, development, reproduction, and processing of agricultural inputs, along with inspection and certification of agricultural input quality. Establishing private or public insurance systems could further enhance the investment environment. Strengthening local manufacturing of agri-inputs, ensuring the supply of affordable farm equipment, and creating regional supply chains are crucial techniques. Additionally, private certification of seeds and farmer involvement can encourage both foreign and local investment. Finally, strong market linkages among producers, processors, and markets are emphasized to enhance coordination and reduce sector fragmentation. It is crucial to establish and enforce quality standards to ensure Somali products meet global market demands and enhance their reputation. These steps are essential for fostering sustainable growth and competitiveness in Somalia's agricultural sector.

Author Statement

Both authors contributed substantially to the research design, searching literature review, data collection, data analysis, write-up, and editing of the manuscript. All authors reviewed the results and approved the final version of the manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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