

# STATE OF AFFAIRS OF LOGISTICS SERVICES IN GHANA'S AGRICULTURAL SUPPLY CHAINS



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## EXECUTIVE SUMMARY

Agriculture is a major sector of Ghana's economy that provides income for more than 70% of rural households and generated about 20% of GDP in 2021. Agricultural production in Ghana, just like other African countries, is dominated by smallholder farming families in rural areas that constitute about 60% of the farmer population.

Within the agricultural supply chain, logistics services are critical to bridging the gap between production and consumption. Access to high-quality logistics infrastructure and services is crucial for the development of the agricultural sector across the world because it enhances market competitiveness and enables the creation of efficient and inclusive value chains at local and international levels. These activities are as important as the cultivation of produce, especially given the high post-harvest losses often experienced in many African markets. This study examines the state of affairs of logistics services in Ghana's agricultural supply chains.

This report combines insights from existing materials and field data collected from rural farmers to examine the current nature and scope of logistics services and to explore major challenges and the extent of effectiveness of existing interventions in the sector. The report also discusses emerging issues in the logistics space, as well as the opportunities for improvement. The perspective of farmers is used to understand the current happenings in the sector and their implications for farmer groups, potential investors and policymakers.

Findings show that rural farmers have limited access to logistics services. Significant challenges exist in the handling, storage, and transportation of agricultural produce at the farm level. These challenges and the percentage of farmers in this study that reported facing them include lack of proper storage spaces (88%), poor drying methods (95%), unavailable cold chain equipment (100%), high transportation costs (89%), limited information sharing (55%) and underdeveloped transportation networks in farming communities (72%).

The results further suggest that post-harvest losses are high in Ghana's agricultural supply chains, and these challenges seem to contribute to deterioration of farmer economic well-being. Farmers reported instances where harvested farm produce perished before it could be sold due to unavailability of transportation, poor storage and poor drying conditions. Some farmers are forced to sell produce to buyers on the farm site (farm gate), or immediately after harvest due to a lack of storage spaces and an inability to arrange transportation to markets. The findings also show that cooperative societies and other major farmer groups do not provide support for members on logistics issues. When negotiating transport services, the predominantly smallholder farmers tend to possess limited power relative to the large transport service operators. Because smallholder farmers do not own equipment and also do not have large output that gives them negotiating power, they are often bullied by transport service providers during negotiations.

The report further discusses nine (9) trends and issues in the sector. These trends and issues include the rising costs of logistics and transport services, the increasing role of motorcycles/tricycles in the rural transportation system and the increasing frustration of farmers with the current agricultural setup. Other key issues discussed include the role of farmer-based cooperatives in dealing with the logistics and transport challenges, how farmers have been marginalized in the supply chain, and food safety concerns due to the current operational practices in logistics and transportation activities. Farmer-based cooperatives barely provide logistics and transportation support for their members. In view of these challenges, farmers are compelled to operate in-house logistics services, and farm-gate sales are likely to increase in the agricultural supply chains sector.

The implications of these findings for various stakeholder groups are provided. First, it is recommended that farmer groups and cooperatives begin to expand the scope of their operations to include support for the logistics and transportation activities for their members. Second, through collective bargaining, these groups can have better negotiation power than individual farmers, who have very little power in negotiations with larger service providers and buyers. Third, the groups will have better access to financing

to invest in improved storage and drying systems that will be useful to their members. Cooperative societies have better creditworthiness than individual farmers and can also obtain financing at competitive rates in comparison to the individuals. Institutional customers are recommended to support upstream farmers by tracing and investing in logistics infrastructure as part of their sustainability programs. Fifth, these customers should ensure that their intermediaries (if they use any) are also providing the necessary support to farmers in this regard. The current challenges pose a risk to the stability of materials supply and so institutional customers should support the supply chain to ensure continuity of supply from upstream to downstream.

The report outlines opportunities for investment in three areas. First, a truck management system would be useful to farmers and transport service providers to match the demand for transport services with the supply. Second, an investment in storage facilities such as warehouses and cold storage units would be useful in the supply chain as there is a limited supply of these even though farmers need their services. Third, potential investors can develop an electronic marketplace to support the marketing of agricultural produce. The investors could run the delivery service for the market, or work in hand with other delivery services.

For policymakers, the study recommends the provision of, and improvement in the, conditions of logistics infrastructure where required, with a roadmap for doing so. To support farmers, price control should be instituted for various crops, especially in peak seasons. Also, providing information systems support and an electronic trading hub will be useful to farmers and other supply chain members. More importantly, the national buffer stock company that is set up to collect excess produce in peak seasons should improve and expand its operations into all areas of the country. Policymakers should provide the needed funding to improve the company's strategy to deliver to expectations of its mandate for reducing post-harvest losses. Finally, the study recommends that policymakers develop standards for handling, transportation and storage of agricultural produce to deal with the rising food safety concerns.



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# INTRODUCTION

Logistics services are a vital part of agricultural supply chains as they help to package, store and move agricultural products over long distances. The cost, effectiveness and efficiency of these services determine producer income, market prices of commodities and the overall contribution of agriculture to economic development. As Africa looks for solutions to deal with a looming food crisis, there needs to be greater attention towards minimizing food waste, and the role of the logistics system cannot be overlooked. Improved transportation and storage infrastructure can help reduce post-harvest losses and mitigate price volatility<sup>1</sup>. The welfare of smallholder farmers in Ghana is largely determined by the state of logistics infrastructure and operations. Whereas an integrated and efficient logistics system makes agricultural producers and product handlers more effective, thereby improving the welfare of farmers, a disconnect between farmlands and consumer markets is likely to have significant negative effects on the income of farmers and the prices of commodities.

Concerns about food security have increased in Ghana and across the entire African continent due to the Russia-Ukraine conflict. Prices for several key commodities, including food and fertilizers, are rising in Ghana because a large portion of those commodities are usually sourced from Ukraine. While we focus on improving production levels, the level of post-harvest losses also requires significant attention. More than ever, the role of logistics services required to package, store and move agricultural products from the farm to market are stressed beyond capacity.

In Ghana, like other African countries, many farmers are based in rural areas which are far from the big cities where large food markets are based. The concentration of agricultural production in rural areas determines how buyers access the produce, the nature of transport services available, the ease with which farm produce can be moved, the costs of moving that produce and the quality of infrastructure. These rural areas often have major logistics infrastructure deficiencies.

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1. World Bank, Ghana : Agriculture Sector Policy Note, 2017.

Governments over the years have introduced several programs and policies that seek to improve the competitiveness of smallholder farmers and improve their household income. However, evidence suggests that there are differentials in income received, which is in part explained by the nature of access to, and quality of, transportation services available.<sup>2</sup>

This study seeks to develop a comprehensive report that provides relevant information on the nature, scope, challenges and emerging trends in logistics services in agricultural supply chains in Ghana. This profile provides a snapshot of current logistics and transportation issues in Ghana's agricultural supply chain to complement the wealth of market intelligence on the investment readiness of the country and provides data that will support policy development.

## 2. LITERATURE REVIEW

### 2.1 Agriculture in Ghana

The agricultural sector is significant to Ghana's economy, although recent reports suggest that it is not growing as quickly as other sectors, especially oil, gas and mining.<sup>3</sup> Ghana's agricultural sector contributes about a fifth of the country's GDP. The contribution declined from around 30% between 2007 and 2010 to 25.8% in 2011, 20.3% in 2015, 18.9% in 2016, and 18.3% in 2017.<sup>4</sup> This is evident in the rebased annual This is evident in the rebased annual GDP figures from Ghana Statistical Services between 2006 and 2019 shown in the figure below.

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2 Gideon Danso Abbeam, Dennis Sedem Ehiakpor, and Robert Aidoo, 'Agricultural Extension and Its Effects on Farm Productivity and Income: Insight from Northern Ghana', *Agriculture & Food Security*, 2018, 1-10 <<https://doi.org/10.1186/s40066-018-0225-x>>.

3 World Bank Group, *Third Ghana Economic Update: Agriculture as an Engine of Growth and Jobs Creation*, World Bank, 2018 <<http://documents.worldbank.org/curated/en/113921519661644757/Third-Ghana-Economic-Update-agriculture-as-an-engine-of-growth-and-jobs-creation>>.

4 MoFA, *Towards Open Data for Agricultural Transformation in Ghana*, 2019.

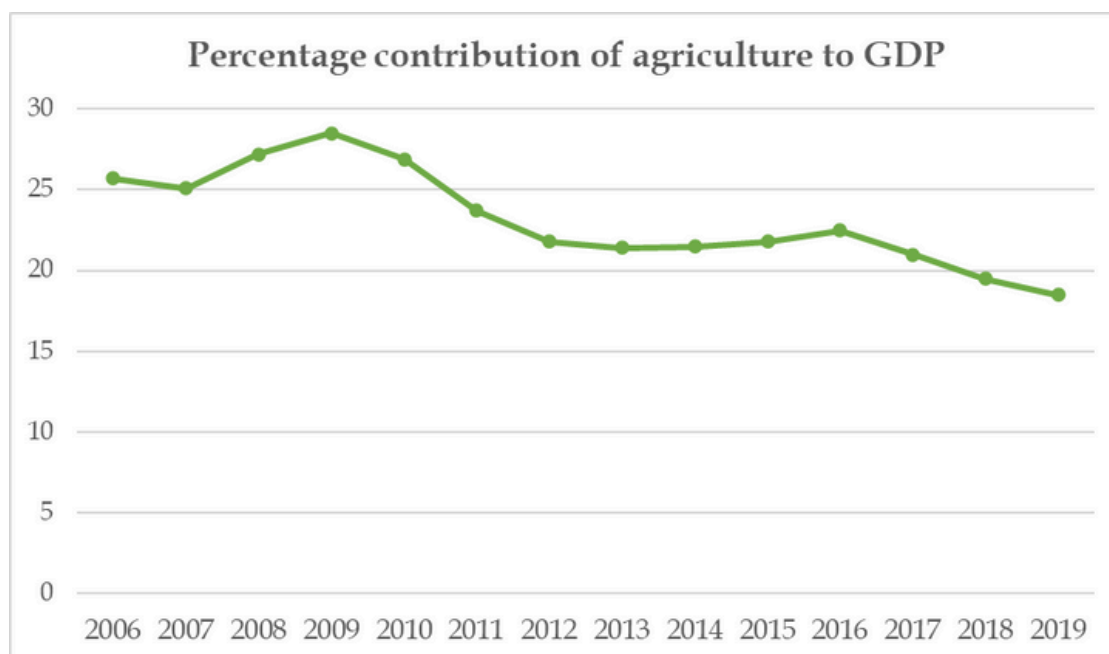


Figure 1: Agriculture's contribution to Ghana's GDP between 2006 and 2019

Source: Rebased GDP figures from Ghana Statistical Services (2020).

Agriculture provides almost half of Ghana's workforce and is a source of livelihood for most of Ghana's poorest households. Agricultural production in Ghana is dominated by smallholder farmers. Most farm sizes are below 2 hectares, although some farms and plantations exist. These large farms grow oil palm, rubber and coconuts. To a lesser extent, some large farms for rice, maize and pineapples also exist. The farming system is largely traditional and rudimentary, with very minimal use of mechanization.<sup>5</sup>

Several constraints exist in Ghana's agricultural production system, including poor road infrastructure, lack of irrigation facilities, poor farmer financing, low level of education, inadequate technology usage and complicated land tenure arrangements, among others. Agricultural yield in Ghana is also quite low for staple and cash crops.

The yield for most crops is way below their potential yield levels. Yield gaps between demonstrated potentials and the averages realized are estimated to be around 40% for cereals and 20% for legumes. For instance, compared to the West African regional yield of 2.0 t/ha, cereal yield in Ghana is estimated at 1.7t/ha although the potential yield is over 5.0t/ha.<sup>6</sup>

<sup>5</sup> MoFA, *Facts & Figures: Agriculture in Ghana, 2020* (Accra, 2021).

<sup>6</sup> World Bank.

## 2.2 State of Ghana's logistics infrastructure

Road transport accounts for about 90% of the vehicular and passenger transportation in Ghana. As of 2021, there has been an increase in the total road network from 71,401km in 2016 to 78,401 km. It is estimated that 41% of the current road network is in good condition, 33% is in fair condition and 26% is in poor condition.<sup>7</sup> The road network in rural areas where a significant portion of agricultural lands operate is generally underdeveloped. There is an inadequate human and logistical capacity in the transport system. Rehabilitation culture is poor and operational standards for transport operations are inadequate. The enforcement of road traffic regulations is weak and there are generally poor service delivery standards in the road transport sector.<sup>8</sup>

The rail network in Ghana is very limited. The Ghana Railway Company Limited operates only 139 km of the rail network, out of the existing 947 km. Out of this, passenger services are operated on two routes (Takoradi to Sekondi – 15 km – and Tema to Accra – 31km). The remaining 54 km is a freight service operated predominantly for the transport of manganese between Nsuta and Takoradi in the Western region of Ghana, which is noted for exploration of mineral resources. The rest of the railway lines are either under rehabilitation or have been abandoned.

In recent times, there have been several government policies and investment proposals for revamping the railway sector. Notwithstanding these interventions, the development of railways in Ghana is challenged by poor infrastructure, low integration with the road network, weak regulatory control, low quality and unreliable service provision, and limited implementation of the country's railway master plan.<sup>9</sup>

The inland water transport system is also underdeveloped. There is underutilization of Lake Volta's transportation potential; limited safety facilities; poor services on inland waterways; and insufficient institutional and logistics capacity to effectively regulate waterways.

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<sup>7</sup> Government of Ghana, National Medium-Term Development Policy Framework 2022 - 2025, 2021.

<sup>8</sup> Government of Ghana.

<sup>9</sup> Government of Ghana.





Ghana needs improvement in transportation infrastructure to complement its agricultural sector productivity. The country's expenditure on agriculture is declining and lags behind the 10% of GDP agreed as part of the "Maputo Declaration," where African leaders pledged to allocate 10% of national budget allocation to agricultural development at an African Union assembly in 2003.

Since 2011, the country's agricultural expenditure as a percentage of GDP has been in decline, reflecting the country's tight fiscal position. The 10% target for public sector investment, as set out in the Maputo/Malabo Declaration, is currently not being met.<sup>10</sup>

### **2.3 Rural connectivity in Ghana**

Although logistics infrastructure is important at all nodes in the agricultural value chain, its impact is larger on smallholder farmers in geographically dispersed areas.<sup>11</sup> Poor-quality infrastructure is an obstacle to getting inputs to the farm, and getting farm products to the market. Smallholder farmers with poor access to logistics services face higher costs, which limit their competitiveness to participate in the agricultural supply chains. The location of households has a significant effect on farmers' income. The income of farmers is negatively affected by distance to major market centers. Findings from a study in Ghana suggested that, while farmer extension programs increase productivity and enhance incomes, transportation could become a bigger challenge for farmers in remote communities.<sup>12</sup>

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<sup>9</sup> Government of Ghana.

<sup>10</sup> MoFA, Towards Open Data for Agricultural Transformation in Ghana.

<sup>11</sup> Delolw Wz, Sduwlfildwh Lq, and Djulfxowxudo Ydoxh, 'Transporting Agricultural Goods', 2015, 59-70.

<sup>12</sup> Abbeam, Ehiakpor, and Aidoo.

Physical connectivity is a major determinant of the standard of living of rural households. Connectivity is more critical for remote areas because remoteness affects the terms of trade and the availability of related industries and services.<sup>13</sup> Access to markets, healthcare and education is critical for rural folks in developing countries. The construction and maintenance of rural roads is key to socio-economic development.<sup>14</sup> Individual communities, households or farmers in remote areas may have difficulties in moving people, goods and services to major local agricultural market centers. Remoteness is, therefore, not only a function of distance but also the extent of the transport infrastructure's readiness and is reflected in higher unit transportation costs.<sup>15</sup> Most households in Ghana do not own any means of motorized transport and must depend on public transportation services, which are typically provided by the informal private sector.

Due to low freight and passenger volumes in rural areas, operators often use small vehicles such as sedan cars and mini-buses for inter-village movements. Given the poor nature of the roads, the cost of operating transport services is high and most operators tend to carry both passengers and freight. It is common in rural Ghana to see sedan cars (taxis) carrying six passengers instead of the vehicle's legal capacity of four passengers.

The central government of Ghana is focused on urban and inter-urban transport provision and is not as concerned about rural infrastructure. This is evidenced by the proposals for timetabled urban rapid transit times and a revamp of the intercity buses for the State Transportation Corporation. To date, there is no explicit strategy for rural transport services, which are dominated by small-scale private-sector providers. There is insufficient physical infrastructure, which increases transportation costs and acts as a market barrier. The situation also increases the gap between supplier and consumer prices while also increasing the loss of perishable products.<sup>16</sup>

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13 Denis Sautier and Dao The Anh, 'Vietnam: Rural Connectivity and Agriculture Logistics in Domestic Market Supply Chains Synthesis Report', January, 2014.

14 Francis Afukaar and others, 'Transport Services Indicators: Using a New Mixed-Methods Methodology to Inform Policy in Ghana', *Transportation Research Interdisciplinary Perspectives*, 3 (2019), 100074 <<https://doi.org/10.1016/j.trip.2019.100074>>

15 APSP, Situation analysis of agricultural marketing activities and related institutional arrangements in Ghana, 2017.

16 Elina Eskola, *Agricultural Marketing and Supply Chain Management in Tanzania: A Case Study* Elina Eskola, 2005.

Motorcycles and tricycles have become common in rural areas as a response to the increased demand for transport services and the fragmented nature of supply. These alternative services have become increasingly important transportation modes even on routes where some conventional vehicles are available. There are, however, significant regional differences, with motorcycles and motor tricycles representing over 90% of all registered vehicles in northern Ghana, and yet only about 15% of registered vehicles in southern Ghana.

## **2.4 Logistics service interventions in Ghana's agricultural supply chain**

Government interventions for logistics and transportation activities in agriculture in Ghana are several but largely fragmented and uncoordinated. The interventions are often captured under different programs and the actual impact of these interventions is not known beyond the estimations made at the beginning of implementation.

Under the national medium-term policy framework 2022–2025, the government of Ghana has outlined several proposed policies to be implemented to support logistics services in the agricultural sector. These “strategies to be implemented” include improving the post-harvest management protocols in the transportation, storage, packaging, processing and distribution of agricultural produce. Other strategies include incentivizing the private sector and local government authorities to invest in post-harvest activities as well as supporting small and medium-sized agro-processing businesses. Additional strategies to be pursued under this framework are the facilitation of the provision of district-level storage facilities with drying systems, as well as commodity trading centers in all districts with a focus on grains, vegetables and tubers.<sup>17</sup> Whereas most of the policy documents outline the plans, there are no clearly developed schemes for funding and implementing these policies. The framework does not provide a clear outline for when and how the government intends to achieve its goals in the sector.

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<sup>17</sup> Government of Ghana.



## **2.5 Logistics and transportation issues in Ghana's agricultural sector**

Several issues relating to logistics and transportation have been identified in Ghana's agricultural sector over the years. A major challenge is post-harvest losses, which itself resulted from the challenges existing in the sector. Poor transport and handling and poor storage conditions are known to be huge contributors to post-harvest losses.

Rural farmers cannot afford conventional storage systems, which has resulted in locally built structures that have limited protection for stored produce. Data from the Ministry of Food and Agriculture suggest that post-harvest losses of major staple crops are still as high as 30%, although recent years (using data between 2008 and 2015) have seen a decline in these levels.<sup>18</sup>

Another study identified poor marketing systems, poor storage and transportation systems, and inadequate pest/disease monitoring and surveillance systems as major logistics challenges in the sector.<sup>19</sup>

Overall, the major challenges outlined in the literature are as follows:

- Poor storage and transportation systems
- High cost of conventional storage solutions for smallholder farmers
- Poor food storage techniques
- Inadequate efforts to manage food maintenance systems
- Inadequate food safety practices
- High costs of transporting food farm to market
- Limited local and external markets for farm produce

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<sup>18</sup> MoFA, Towards Open Data for Agricultural Transformation in Ghana.  
<sup>19</sup> Government of Ghana.



The informal agricultural marketing system is difficult, and the consequences are improper handling of produce on the farm site, poor storage and packaging, exposure to the elements and improper transportation, especially of fresh produce in the absence of cold chains. Retailers are more likely to sort produce into grades than actors upstream, because of the low incentives for grading. Ad hoc application of standards for products and the use of unstandardized measures for trading limit transparency and fairness, especially for smaller actors.<sup>20</sup>

Because of the production challenges, the markets at the farm gates have large numbers of farmers/sellers and fewer buyers. This has implications for the relative market power of actors, especially in pricing, as shown in the next section. However, there can also be more buyers than sellers at times of the year when produce is scarce. During these times, produce is held by speculators and not the small producers. Ghana's agricultural production is highly seasonal and therefore characterized by periods of glut and scarcity, worsened by the limited processing and storage infrastructure.<sup>21</sup>

There is generally low private sector investment in smallholder agriculture, which is mainly due to a lack of profitable opportunities; high business risks that cannot be mitigated cost-effectively; poor infrastructures such as bad roads that hinder effective transportation of produce from the rural areas to various markets, resulting in high post-harvest losses; inadequate macroeconomic policy environment; and poorly coordinated agricultural value chains, among other reasons.<sup>22</sup>

The quality of transport services is highly dependent on the status of roads, railways, airports and seaports. At the firm level, transport services are affected by the firm's capacity to invest in appropriate vehicles, maintenance services and personnel skilled in fleet management. Poor transport services can cause significant economic losses, particularly for firms dealing with perishable products such as fruits and vegetable.<sup>23</sup>

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<sup>20</sup> APSP

<sup>21</sup> APSP

<sup>22</sup> George Owusu Essegbey & Dilys Sefakor Maccarthy, Situational analysis study for the agriculture sector in Ghana, Climate Change, Agriculture and Food Security, 2020

<sup>23</sup> Girma Gebresenbet and Joseph Mpagalile, Firm-Level Logistics Systems for the Agri food Sector in Sub-Saharan Africa.



## 3. METHODOLOGY

### 3.1 Data used

This report combines a desk study with field data collected from rural farmers in the Ashanti region of Ghana. A literature review was conducted to understand the state of logistics infrastructure, policy and operations in Ghana, and its relationship with the agricultural sector. Published reports from the Ministry of Food and Agriculture and the Ministry of Finance in Ghana, and the World Bank group were reviewed together with scholarly articles published in academic journals such as ones relating to climate change, agriculture and food security. The field study was conducted by a team of researchers at Kwame Nkrumah University of Science and Technology (KNUST) between April and June 2022.

### 3.2 Study area

The primary data were obtained from farmers in seven (7) selected districts in the Ashanti region of Ghana. The Ashanti region is one of the largest farming regions in the country. The region is ranked in the top five regions for the production of many crops including maize, rice, cassava, yam and plantain<sup>24</sup> in Ghana. As of May 2022, there are 43 districts (including metropolitan and municipal areas) in the Ashanti region of Ghana. The selected districts are (1) Ejisu Municipal, (2) Sekyere Central district, (3) Ejura Sekyedumase district, (4) Ahafo-ano southwest district, (5) Mampong municipal, (6) Offinso municipal and (7) Sekyere east district. These districts are shown in yellow on the map below.

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<sup>24</sup> MoFA, Facts & Figures: Agriculture in Ghana, 2020.



Figure 2: Map of districts in the Ashanti region of Ghana  
Source: Local government service ([lgs.gov.gh](http://lgs.gov.gh)).

These districts were selected from the 43 districts and at least two farming towns in the districts were selected for the field study; and 279 farmers from 18 villages were interviewed. There is a significant presence of smallholder farmers in all the selected districts.

### (1) Ejisu Municipality

The Ejisu municipal area is a farming region that lies in the central part of the Ashanti region. Despite concerns about the reduction in urban agriculture in the area due to increasing urbanization and increased land use for other activities,<sup>25</sup> the district remains an important part of Ghana's agricultural system. The major crops cultivated in the area are maize plantain, cassava, rice, cocoyam and vegetables.

### (2) Sekyere Central District

Sekyere central district is in the northern part of the Ashanti region. The Ministry of Food and Agriculture considers Sekyere Central an agricultural district with 75% of its population

<sup>25</sup> MoFA, Facts & Figures: Agriculture in Ghana, 2020

### **(3) Ejura Sekyedumase district**

The Ejura Sekyedumase district was ranked 9th highest-performing district in maize yield in Ghana between 2018 and 2020. The district has a significant farming population and is a notable area for the production of maize and beans in the Ashanti region.

### **(4) Ahafo-ano southwest district**

The Ahafo-ano southwest district was ranked 5th highest district in Ghana for rice yield between 2018 and 2020. There is also significant cultivation of vegetables (especially pepper and tomato), plantain, maize, yam, cassava and cocoyam in the district.

### **(5) Mampong municipality**

Mampong municipality has a 58% rural population and farming is a significant activity in this district. The major staple crops in the municipality are maize, yam, cocoyam, plantain and cassava.

### **(6) Offinso municipality**

About 62% of the population in this municipality is engaged in agricultural production. Offinso was ranked the 7th highest in Ghana in terms of plantain yield between 2018 and 2020. Major crops include citrus, yam, cassava, plantain and maize.

### **(7) Sekyere east district**

Farming and trading in farm products are the major economic activities in this district. The Sekyere east district was ranked the highest-performing district for cassava yield in Ghana between 2018 and 2020.

## **3.3 Primary data collection**

The survey consisted of a wide range of open and closed-ended questions on logistics services. The areas included the availability and scope of logistics and transport services, logistics and transport challenges, infrastructure and operations ratings, and farmer demographics. The members of the research team administered the research instrument.



The data collection team gained access to communities by contacting local assembly members and unit committee members who helped to find prominent farmers in the communities. We interviewed the farmers individually.



*Photo 1: Field workers interacting with farmers.*

### **3.4 Respondent & farm characteristics**

Table 1 and Table 2 present information about the respondents and their farming activities. The respondent characteristics in Table 1 show that about two-thirds of the respondents are males. More than 70% of the respondents are above 40 years of age. This is not surprising because there are emerging concerns about young people moving away from agriculture across the country. This is one of the reasons why the government of Ghana launched the “Youth in Agriculture” program as a sectoral initiative to attract young people toward agriculture. As has often been documented, most rural farmers have not pursued higher education. The result indicates that over 70% of the respondents have achieved only up to primary-level education. Respondent farmers have been in this business for an average of 24 years. This suggests a very experienced respondent base that can provide valid responses that reflect the accurate state of affairs in the agricultural sector.



*Table 1: Respondent characteristics*

	<i>Frequency</i>	<i>Percentage</i>
<b>Gender of farmer</b>		
Male	183	65.6
Female	96	34.4
<b>Farmer's age group</b>		
20 to 29	19	6.8
30 to 39	59	21.1
40 to 49	81	29.0
50 or more	120	43.0
<b>Farmer's highest level of education</b>		
No formal education	82	29.4
Primary school	122	43.7
Secondary school/A/O' level	66	23.7
Diploma	5	1.8
Bachelor's degree	4	1.4
	<i>Mean</i>	<i>SD</i>
<b>Number of years in farming</b>	24.28	12.90

Land tenure is an important issue that affects agricultural access and productivity. Table 2 indicates that only a third of the respondents own the land for their farming operations. Close to a half of the respondents are tenants/sharecroppers. This is a major arrangement in rural agriculture in Ghana. The respondents included farmers who are producing different crop types, including vegetables, fruits and, staples, grains and legumes. Mixed cropping is common in Ghana and several farmers also engage in mono-cropping with a focus on different crop types at different times of the year. For instance, most farmers in the Ejura-sekyedumase district cultivate maize and beans at different times of the year. The results show that staples, grains and legumes, which are common food items for households in Ghana, are the major crop types grown by the respondents.





*Table 2: Farm characteristics*

	Frequency	Percentage
<b>Land tenure system</b>		
Own land	94	33.7
Family land	54	19.4
Tenant/sharecropper	131	47.0
<b>Crop type</b>		
Vegetables	70	
Fruits	17	
Grains & Legumes	253	
Staples (Cassava, yam, plantain, cocoyam)	189	
<b>Labor used in previous year's farming</b>		
	Mean	SD
Family	3.23	3.69
Permanent	0.46	1.55
Casual	4.90	5.30
Farm size (in acres)	8.55	10. 19

The average farm size is 8.55 acres with a standard deviation of 10.19 acres. The actual farm size ranges between 1 and 75 acres. About 209 farmers (representing 75%) operate on less than 10 acres of land. The respondents are largely smallholder farmers.

## 4. FINDINGS

This section of the report presents data obtained from interviews with 279 farmers in the selected districts in the Ashanti region of Ghana.

### 4.1 Availability and access to logistics services

Do you have access to the following services in your community?

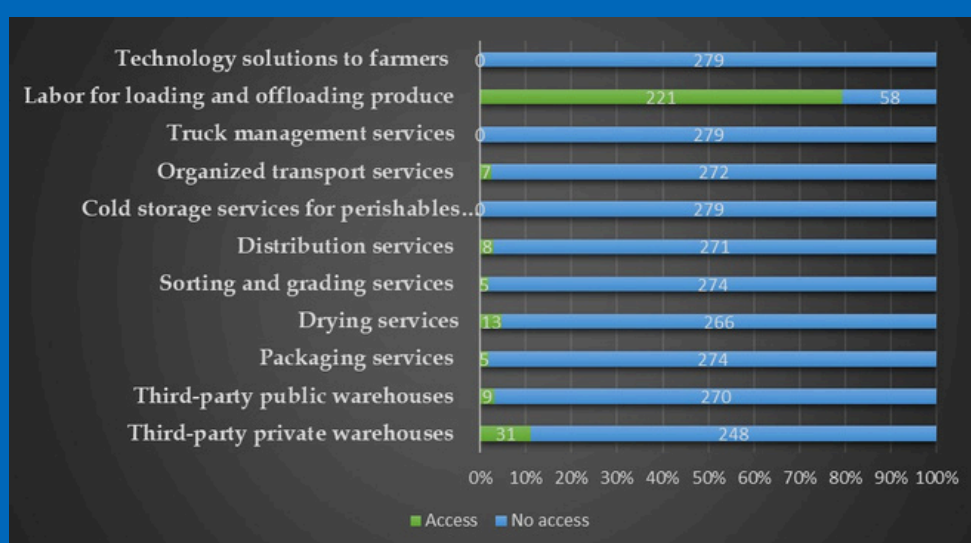


Figure 3: Access to logistics services

#### 4.1.1 Warehousing and storage

Only 11.1% and 3.2% of farmers reported they have access to third-party private warehouses and third-party public warehouses, respectively. Among those that reported having access, only a few of them have used any of these warehouses in the past. Farmers in the sample predominantly use several unconventional places as storage spaces, most of which do not provide good storage conditions for farm produce. These places include small store rooms in large roundhouses, wooden mats erected under a source of fire in kitchens, and verandas of farmers' rooms. The common storage structure in these communities is a wooden structure that is found in a lot of houses. These structures are often used to store yam and some grains. The storage conditions are poor, as there are often spaces between the wooden walls, and the floor is often not tarred,

thus leaving the structure open to insect manifestation. Some farmers also erect these units on their farms, while others use large tarpaulins to store their farm produce.

Generally, farmers use these storage facilities due to a lack of proper storage units in local communities. However, even in communities where farmers reported they have access to third-party warehouses, most farmers bemoaned the cost of keeping their produce in these warehouses as significantly high and this has discouraged them from using their services. Also, the capacities of these warehouses are low, and the information flow between the warehouse operators and farmers is lacking. Some farmers recounted situations where they have transported produce to be stored in a warehouse only to be told there is not enough storage space. This suggests there is limited information exchange between the warehouse service providers and local farmers.



*Photo 2: Local storage structures.*

#### **4.1.2 Packaging services**

Only 1.8% of the farmers reported having access to packaging services. These services are primarily provided by a group of young people that have emerged to assist with the bagging of farm produce such as maize, onions and beans. These are not registered, well-organized services that have defined standards for service provision. The farmers report that most of these services are obtained via a hired labor contract, where these young people are hired to package the produce for sale to customers.



#### **4.1.3 Drying services**

Farm produce such as grains, cereals and some tubers require drying after harvesting to reduce moisture and protect them from spoilage and decay. Sun drying is the means available to most rural farmers in Ghana. Only 4.7% of farmers reported having access to drying services. Most farmers dry their produce in open spaces around their houses using large jute sacks and tarpaulins. Some others use the platform mounted for drying cocoa to dry other produce during the off-season for cocoa. Due to a lack of adequate spaces for drying, some cereal and grain farmers dry their produce along the roadside, on the shoulder of tarred roads. The farm produce is spread on the bare road, regardless of its susceptibility to dust, rodents and insects.

Generally, farmers use these storage facilities due to a lack of proper storage units in local communities. However, even in communities where farmers reported they have access to third-party warehouses, most farmers bemoaned the cost of keeping their produce in these warehouses as significantly high and this has discouraged them from using their services. Also, the capacities of these warehouses are low, and the information flow between the warehouse operators and farmers is lacking. Some farmers recounted situations where they have transported produce to be stored in a warehouse only to be told there is not enough storage space. This suggests there is limited information exchange between the warehouse service providers and local farmers.



► *Photo 3: Drying of grains in rural Ghana.*



#### **4.1.4 Sorting and grading services**

The results show that sorting and grading services, often used on root tubers and vegetables, are available to only 1.8% (five out of the 279 farmers). Just like the packaging services, there are no formally registered organizations in these communities that seek to provide sorting and grading services. These services are only available to 1.8% of the farmers in the form of labor support for sorting and grading produce before packaging and selling it to customers. Generally, farmers resort to family labor for assistance in sorting and grading.

#### **4.1.5 Distribution services**

Only 2.9% of farmers reported having access to distribution services that make products available to their customers. These services are generally provided by small-scale transport service providers informally. Farmers often contract known tricycle (aboboyaa) operators in their local communities to distribute their farm produce on their behalf. The services offered are often limited to a small quantity of produce that is distributed in local communities. About 97% of the farmers reported they have no access to distribution services, as there are no established firms that seek to assist farmers with produce distribution.

#### **4.1.6 Cold storage**

The results indicate that a cold storage service is not available in the communities considered in this study. Vegetable and fruit farmers have no access to means of cold storage and have to sell their produce shortly after harvesting so it will not perish. There are currently no cold storage vans available for storing and transporting perishable products.

#### **4.1.7 Registered transport services**

Registered transport services that focus on transporting farm produce are rarely available in local communities. Transport services are often obtained on a “what is available” basis. Only seven out of the 279 farmers reported that they have access to registered transport services. These “registered” transport services, when we probed further, are not specific agro-transportation services that target farmers. Instead, they are local driver groups that often collaborate with farmers. These driver groups, which include associations of tricycle,

taxi and tractor operators, are welfare and operational groups. For most farmers, access to transport services is via interaction with individual transport operators. There are no standard prices for these services and, depending on weather conditions and the state of demand for the services at the time, the cost of securing transportation could be very high for farmers. Due to a lack of standards, there is significant price and service variability across the different providers and farmers bear the consequences, especially in peak seasons.

#### **4.1.8 Truck management services**

Truck management services supply information on available means of transport, capacity and routing. None of the respondents reported access to truck management services. Information on availability, pricing and timing is directly exchanged between farmers and transporters.

#### **4.1.9 Labor services**

Labor for loading and unloading is the service that is most available to farmers; 79.2% of farmers reported that they have access to this service. This labor is mainly made up of young people who are hired to assist with the offloading process.

#### **4.1.10 Technological solutions**

None of the respondents indicated the presence of technological solutions that assist in tracking & tracing, and electronic marketplaces for the sale of farm produce. Despite the increasing role of technology in logistics and transportation, these rural farmers have yet to use any technological support in their transport, marketing and logistics services.

#### **4.2 Usage of accessible services**

Although earlier results suggest that there is limited availability of logistics services in the rural areas, this section examines if farmers patronize the logistics services that are available in their local communities. Among the farmers that responded that they have access to some services, this section seeks to find out if they engage the providers of these

services. The results as presented in Figure 4 suggest that, even for services that are available, there are some farmers who do not engage the providers.



Figure 4: Usage of available logistics services

The disparity in availability and usage of these services is due to several factors; key among them are cost, perceived service quality and perceived lack of need. In the case of warehouses, further probing reveals that a lot of smallholder farmers consider the price charges of these warehouses to be too high. In that regard, although the warehouses are operating and are accessible, some farmers are “priced out” and do not have the means to access the services. These “priced-out” farmers will continue to use their local storage facilities despite all the challenges and risks associated with doing so. The results show that labor is the most subscribed service, although a few farmers responded that they did not use labor services. These farmers either have very small capacity or sometimes have large family labor to support operations. The results here suggest that provision of these services is not enough; there should also be consideration of how the service fits within the needs and operational cost structure of the rural farmers.

### 4.3 Sales channels and responsibility for transport arrangement

In this section, farmers were asked to indicate the major sales channels for their farm produce, and which party (between the buyer and the seller) is responsible for making transport arrangements. Most farmers use multiple channels for their sales, often depending on several factors. These factors include the availability of buyers, pricing and the ease of transport arrangement. The outcome is shown in the table below.

*Table 3: Sales channels and responsibility for transport arrangement*

Channel	No. of users	Responsibility for transport arrangement		Main transport means (in order of frequent use)
		Buyer	Seller	
Direct sales to retailers in local (community) market	179 (64.1%)	47 (26.3%)	132 (73.7%)	1. Motor/tricycles 2. Small trucks 3. Head loading
Direct sales to retailers in the national/city market	42 (15%)	11 (26.2%)	31 (76.8%)	1. Small trucks 2. Motor/tricycle 3. Passenger vehicles
Sales to aggregators/intermediaries	101 (36.2%)	90 (89.1%)	11 (10.9%)	1. Small trucks 2. Cargo trucks 3. Motorcycles
Sales to food security and storage companies	6 (2.1%)	6 (100%)	–	1. Cargo trucks 2. Small trucks
Direct sales to individual customers at the farm gate	90 (32.2%)	59 (65.6%)	31 (34.4%)	1. Motor/tricycles 2. Head loading 3. Small trucks
Direct sales to individual customers in the local market	166 (59.4%)	44 (26.5%)	122 (73.5%)	1. Motor/tricycles 2. Small trucks 3. Head loading
Direct sales to individual customers in a city market	34 (12.1%)	11 (32.4%)	23 (67.6%)	1. Small trucks 2. Taxi cabs 3. Motor/tricycles
Door-to-door delivery to individual customers	51 (18.2%)	2 (4%)	49 (96%)	1. Head loading 2. Motor/tricycles
Direct sales to institutional customers	36 (12.9%)	32 (88.9%)	4 (11.1%)	1. Motor/tricycles 2. Small trucks 3. Taxi cabs
Direct sales via online channels	0	–	–	–

## **Responsibility for transport arrangement**

The responsibility for arranging transport is largely dependent on the sales channel. The report indicates that, for sales to local and city retailers, the responsibility lies with the sellers. Grain farmers report largely having to hire tractors to convey produce from their farms. Farm-gate sales are not very popular among this group. The responsibility for transport arrangement is often on the buyer when farmers sell to aggregators. Thus, aggregators seek to form a link between the farmers and the main markets.

### ***4.4 Transportation infrastructure, network, and information***

In this section, farmers rated, on a five-point scale, major issues in transportation operations, vehicles and infrastructure. The results from Table 4 show that about 73% of the respondents rate the road network in their communities as poor. This is usual in rural areas in Ghana. The results also show that the quality of services provided by the transport providers is not rated high by the majority of the respondents. Technology implementation in the transport of agricultural produce is very low, and so tracking and tracing is not a usual service available to farmers. The quality of transport vehicles in rural areas is also often very low, as many service providers are only able to afford very old trucks that have been used in cities. However, tricycles and motorcycles do not fall in this category as they require less investment and so local providers are able to afford either new or slightly used ones. The results also show that farm produce does not often reach the market in the expected time. Only 12.2% of respondents indicate that there is a high frequency of goods reaching the market on time. This is caused by the poor nature of the road network and the low quality of vehicles which causes frequent breakdowns and generally slow movement along the routes. Responses also show that the cost of transport services is high.

Table 4: State of the transport network and infrastructure

Kindly rate the following in your farming area	Not applicable	Very Low	Low	Moderate	High	Very high
1. Quality of road network	–	165 (59.1%)	39 (14.0%)	34 (12.2%)	19 (6.8%)	22 (7.9%)
2. Quality of transportation services available	–	67 (24.0%)	93 (33.3%)	64 (22.9%)	47 (16.8%)	8 (2.9%)
3. Quality of vehicles (physical condition of trucks, motorcycles, etc.)	–	41 (14.7%)	90 (32.3%)	98 (35.1%)	44 (15.1%)	6 (2.2%)
4. Ability to track and trace your consignment from farm to market/warehouse	123 (44.1%)	34 (12.2%)	71 (25.4%)	45 (16.1%)	6 (2.2%)	–
5. Quality of warehousing services (if available)	237 (84.9%)	14 (5.0%)	14 (5.0%)	5 (1.8%)	7 (2.5%)	2 (0.7%)
6. Quality of packaging services (if applicable)	270 (96.8%)	5 (1.8%)	1 (0.4%)	1 (0.4%)	2 (0.7%)	–
7. The frequency with which goods reach the market in the expected time	29 (10.4%)	12 (4.3%)	117 (41.9%)	87 (31.2%)	31 (11.1%)	3 (1.1%)
8. The cost of transportation services	8 (2.9%)	3 (1.1%)	2 (0.7%)	17 (6.1%)	79 (28.3%)	170 (60.9%)

Table 5 presents farmers' views on the ease or difficulty of transported-related operations. The result shows there is considerable difficulty in getting information on available transport service providers. There is no media, technology or other arrangements that provide such information to farmers. This also limits the ability of farmers to know the current market prices of transport services in the locality to support their individual negotiations. Beyond that, there is reported difficulty in arranging transportation for farm produce to be moved to buyers. The limited information available on available service providers is a major contributing factor to this difficulty. More than 50% of the respondents consider negotiating the cost of transportation as a difficult exercise. The usual lack of information on current market prices of transport services could contribute to this difficulty.



*Table 5: Ease/difficulty of transport-related operations*

How would you rate the ease/difficulty of the following?	Not applicable	Very difficult	Difficult	Neither easy nor difficult	Easy	Very easy
1. Getting information on available transport service providers	29 (10.4%)	17 (6.1%)	136 (48.7%)	46 (16.5%)	47 (16.8%)	4 (1.4%)
2. Arranging transportation service to move your products to buyers	4 (1.4%)	27 (9.7%)	129 (46.2%)	52 (18.6%)	64 (22.9%)	3 (1.1%)
3. Negotiating the cost of transportation services	–	72 (25.8%)	163 (58.4%)	33 (11.8%)	10 (3.6%)	1 (0.4%)

## **4.5 Major transportation and distribution challenges**

Farmers were asked to detail the major challenges they face in transporting their farm produce. The key transportation challenges identified are discussed in the following subsections.

### **4.5.1 High transportation cost**

Transportation costs are on the rise in Ghana, and most farmers consider this a huge challenge in their operations. The increasing fuel prices and the low bargaining power of these farmers relative to the transport service providers have compounded the issue. Transport cost has been a major part of food inflation in Ghana. Since January 2022, fuel prices have increased by over 100%. The price of diesel in January 2022 averaged GHS 6.90 per liter and, as of October 2022, the price had increased to GHS 14.48 at the pump. This directly affected the cost of transportation. Passenger transport fares, which are controlled by transport unions, were reviewed upwards several times within the year. The situation is more critical for freight prices in rural areas and is left to negotiation between buyers and sellers. Some farmers reported that, when they cannot afford the cost of transporting their produce from the farm to their local storage at home, or to the local market, they are forced to sell at the farm-gate for very low prices. Unfortunately for them, the cost of transportation in Ghana is always on the rise and farmers have to deal with the consequences that arise.



#### **4.5.2 Poor road condition**

Poor road condition is a common phenomenon in the surveyed farming communities, and across most rural farming areas in Ghana. Even in communities along major road stretches that are tarred, the inner roads in the community are often very poor. Again, roads that farmers use to access their farms are often in a poor state as a lot of them are untarred and there is no road maintenance schedule, making a lot of them unmotorable in the rainy season. Some farmers reported instances where bridges across rivers have been destroyed and are thus unusable, even by motorcycles, forcing farmers to use head loading (where farmers carry produce on their head) as the only means of moving farm produce. In some farming communities, motor tricycles are the most cost-effective means of transporting produce from the farm. However, it is difficult to use this vehicle when the roads deteriorate due to the rains, and farmers must seek the services of tractors, which are not easily accessible and are also very expensive to hire. Farmers report that there are instances where transport service providers refuse to provide their services when the service providers declare the road unmotorable, and thus farmers have to watch their produce (especially vegetables and fruits) perish at the farm site.

#### **4.5.3 Limited service access and availability**

Another key transportation challenge for farmers is access to the service and availability. The findings indicate that the transport service providers are not properly organized, and farmers are not organized either. Even during the peak harvest seasons, there is no information available to farmers on the transport service providers available to offer their services. Most farmers have not established any contacts with long-term service providers. Thus, especially in peak seasons, access to transport services is difficult. Most farmers report that they struggle to secure trucks to transport their produce from the farm during peak seasons. Whereas most of them believe this is due to the limited capacity of the current service providers, others have noticed that not knowing which truck is “free” is

also a major challenge for farmers seeking transportation services. This challenge is less pronounced for farmers that use the services of tricycles, as they have generally increased in number in rural Ghana. However, this happens more for farmers that have a high capacity and use tractor services for transporting their produce from the farm. Being able to locate a transport service provider and agreeing on the time to move products to farms could be daunting tasks for farmers sometimes.

#### **4.5.4 Mix-up of stock in group transportation**

A few farmers reported having collaborated with others who farm along the same route to arrange transport services. This is a good practice to save on transport costs, and also maximize the capacity of the transport service providers for the overall community. However, this practice has yet to put down roots among the majority of farmers. One of the key challenges farmers have with this system is a mix-up of produce in transit, which has led to disagreements in the past. While group transport offers a means for farmers to reduce their transportation costs, the potential mix-up of farm produce and the ensuing conflicts have become a major challenge.

### **4.6 Major storage challenges**

#### **4.6.1 High costs of third-party warehouses**

Farmers in communities with third-party warehouses (both public and private) report that the cost of using these warehouses is too high, forcing farmers to instead store produce using their own means. Most farmers agree that storage in the warehouse is best for product quality and significantly reduces the risk of in-storage product damage, but the cost of keeping farm produce in the warehouse is prohibitive. For instance, in the Ejura-sekyedumase district where a majority of farmers are into large and medium-scale maize and beans production (the district had one of the highest maize yields in Ghana between 2018 and 2020), there are two warehouses which are accessible to farmers in the local communities that were included in the study. However, most farmers have not utilized the services of these warehouses because they believe the prices are too high. Some farmers recount that, on a cost-benefit analysis, keeping products in the warehouse for a

long period can cost up to 50% of the value of the produce.

#### ***4.6.2 No special/suitable storage for perishables (vegetables)***

Vegetable and fruit farmers especially have no access to cold storage facilities in the communities. Because these items are perishable in the short run, keeping them under the same conditions as other farm produce does little to enhance their preservation. Thus, farmers are in a hurry to sell off these products to prevent them from perishing.

#### ***4.6.3 No access to storage warehouses***

Many of the farmers have no access to storage warehouses within their communities and nearby. Out of the seven farming districts visited for this study, only the communities in the Ejura-Sekyedumase district reported having access to third-party warehouses in their community. Even for these communities, farmers reported that warehouse capacity is low and that, despite low patronage by farmers due to the high price, there are still instances where the warehouse is full, and some farmers seeking space are turned away.

#### ***4.6.4 Poor condition of farmer-owned storage locations.***

Many of the farmer-owned storage structures are wooden structures that are prone to rainfall, product damage and pest infestation. These structures are built with no standards in mind, and there is no consideration for the temperatures at which products will be stored. There are no regulations that govern storage at the farm. Many of these structures have porous roofs and walls, as well as earth floors. Farmers recount high pest infestation and product damages for goods stored in this type of location.

#### ***4.6.5 Low access to storage chemicals***

The results show that farmers have difficulty accessing chemicals used to deal with pest infestation. This, coupled with the insect-prone nature of the local storage structures, increases the risk of insect infestation for stored produce.



## 4.7 Post-harvest losses

Logistics challenges are major causal factors of post-harvest losses in agricultural supply chains. This study asked farmers to rate, on a scale of “never” to “always”, events in the past few years relating to post-harvest losses that arise due to transport and storage challenges. The results are provided in the table below:

*Table 6: Experience with post-harvest losses*

How often have you encountered the following during the harvest season, in the past few years?	Not applicable	Never	Rarely	Sometime	Many times	Always
1. Your farm products perished because you did not have access to transport.	2 (0.7%)	86 (30.8%)	35 (12.5%)	82 (29.4%)	67 (24.0%)	7 (2.5%)
2. Produce quality is reduced because of transportation delays	–	77 (27.6%)	45 (16.1%)	113 (40.5%)	44 (15.8%)	–
3. You had difficulty accessing a suitable storage space for your produce	14 (5.0%)	19 (6.8%)	39 (14.0%)	63 (22.6%)	121 (43.4%)	23 (8.2%)
4. Pests damaged produce in storage	2 (0.7%)	46 (16.5%)	51 (18.3%)	95 (34.1%)	81 (29.0%)	4 (1.4%)

When farmers were asked to recount their experience with post-harvest losses, many indicated that it was a familiar situation. Post-harvest losses take many forms, such as heavy rains penetrating storage structures and destroying produce, flooding of storage structures, food going bad due to lack of buyers, insect infestation, the product left to rot on the farm site and animals attacking storage structures to destroy produce. The key causal factors of these losses are challenges with access to transport services to move produce from farm to storage locations, low access to chemicals for preservation, poor road network to farms, low market access, and limited storage capacity in peak seasons. These losses significantly reduce product quality, and farmers are forced to take very low prices for salvaged items. The main logistics and transport related drivers of post-harvest losses are shown in the figure below.

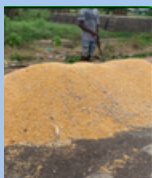


## Transportation



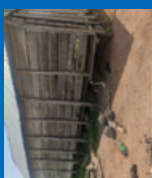
- Unmotorable roads in rainy season
- No available service providers
- Low capacity of existing providers in peak seasons

## Drying



- Heavy rains
- Animal attacks
- Insect infestation

## Storage



- Poor conditions for perishables
- Heavy rains, flooding
- Animal Attacks
- Limited access to preservation chemicals

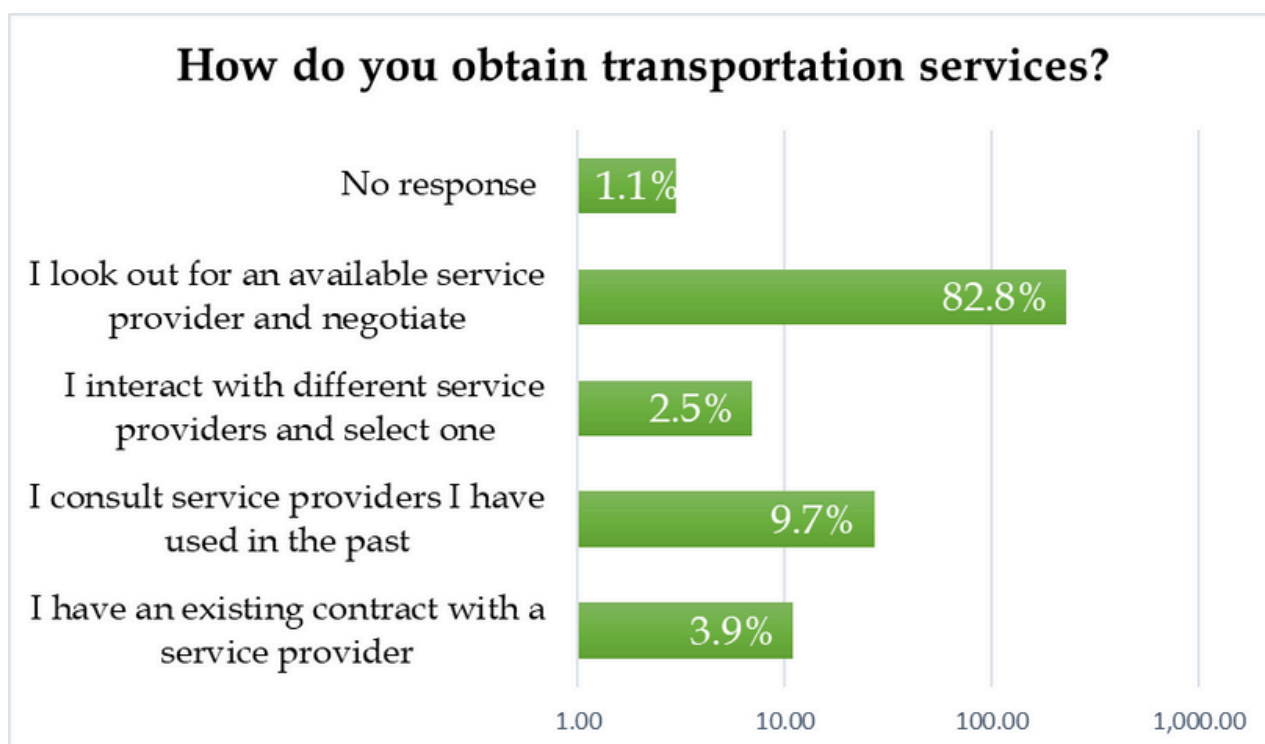
*Figure 5: Logistics and transport-related drivers of post-harvest losses*

### 4.8 Access to transport service and price negotiations

In this section, farmers were asked to indicate the means they often use to access transport services. The focus here is to understand how farmers contact service providers and the power dimension in the price negotiation process.

#### 4.8.1 How do you mainly access transport services?

The results indicate that most farmers do not have pre-harvest season arrangements with transport service providers. Arrangement for the transportation of produce is done on an “as and when required” basis, most often with any service provider that is available at the time of need.

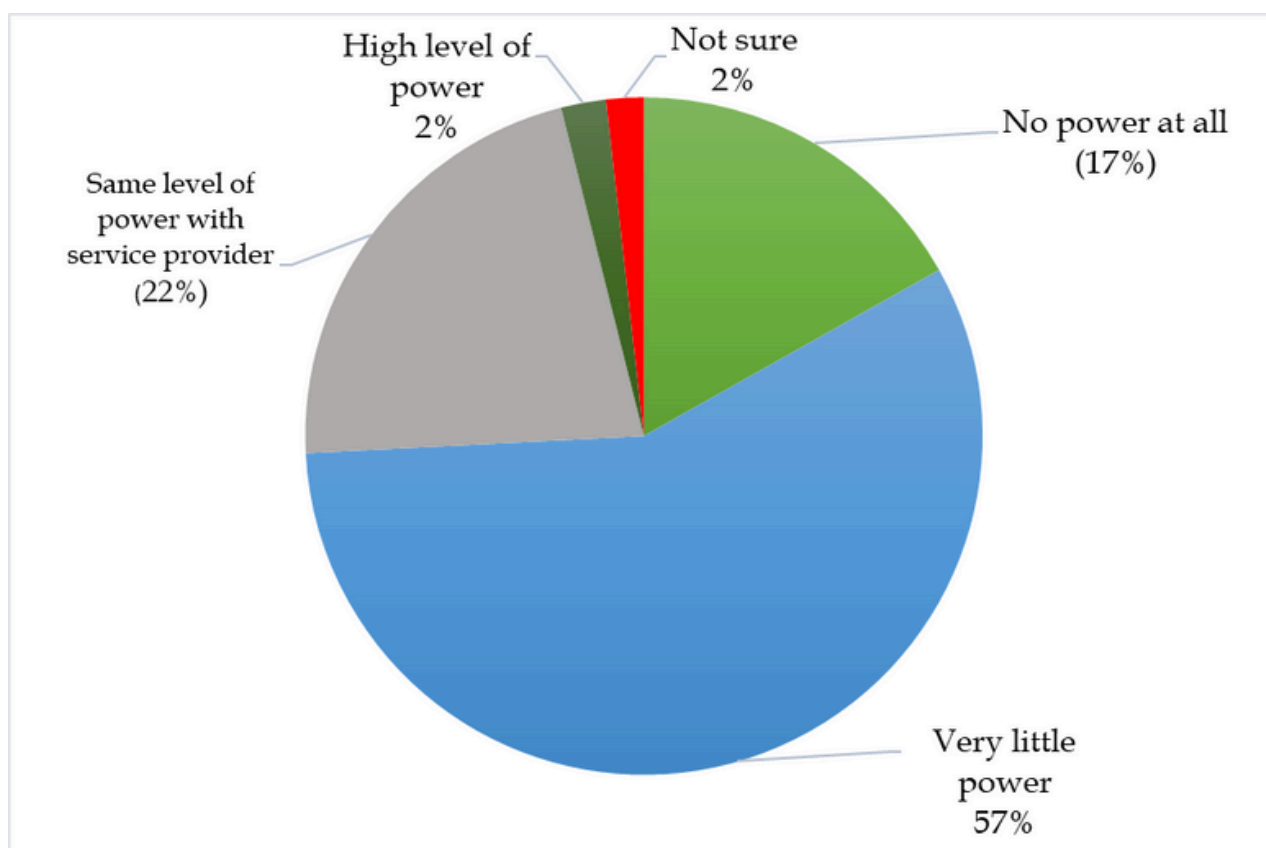


*Figure 6: Means of accessing transport services*

Given that above 82% of farmers report searching for available service providers, the role of information about available service providers is valuable to these farmers. Only 3.9% of the farmers have existing contracts with a service provider. This suggests that most farmers maintain only a transactional relationship with the transport service providers. Perhaps this is reasonable, because farmers need these services only for specific periods in the year; however, on the other hand, since this need is expected to continue into the unforeseeable future, collaborative relationships could be useful to farmers.

#### ***4.8.2 How much power/control do you have, relative to your transport service provider during price negotiations?***

Most farmers report they have very little negotiating power relative to the transport service providers. This could be due to several reasons. First, there is limited transport capacity in most rural areas, and so farmers compete for the attention of the available service providers, especially in harvest seasons. Second, the nature of the relationship between farmers and transport service providers is often transactional, and, since farmers are often in need, there is a power shift in favor of the service providers.



*Figure 7: Power dimension in transport negotiations*

Third, farmers often have limited information on the available transport service providers in their area at any time, and so they have no idea when, for instance, the supply of transport services exceeds demand, and as such power shifts from service providers to farmers. Fourth, leaving harvested produce on the farm for long periods is risky, as there is the potential for perishability, insect infestation, theft, or even animal attacks. This puts pressure on farmers to secure a means of transportation in the shortest possible period, and thus makes them the desperate party. Most transport service providers know this situation and may seek to use it to their advantage, especially in peak harvest seasons.

#### ***4.9 The role of agricultural cooperatives***

Only 11.8% (33 out of the 279 farmers) reported belonging to a cooperative society/farmers group. Most of these cooperative societies are reported to be ineffective and provide no real support to farmers. Only six farmers reported having obtained financial assistance from their cooperative society, and one reported access to seedlings for planting through the cooperative society. However, all respondents indicated that there is no support or collective cooperative action on logistics services. All the farmers reported that they have received “no assistance” or have “not yet” received support from their cooperative societies in obtaining logistics services. This suggests that most cooperative societies are focused on facilitating the receipt and distribution of inputs, as well as operating micro-credit schemes. The current results indicate that arranging and supporting individual farmers to access transport and other logistics services may not be a priority for most of these societies. Despite the potential bargaining power of the collective cooperative society, individual farmers are left to arrange and deal with all issues relating to transportation, storage and other logistics issues.

#### ***4.10 What logistics services do farmers need?***

We asked farmers to indicate if they required any of the 11 logistics services listed in the questionnaire, but were not available in their communities, and also to indicate how useful these services would be to them. Only two farmers reported being content with the current services, citing their small capacity and cost issues as reasons they are not enthused about the emergence of any third-party logistics service provider; 272 farmers agreed that, for the unavailable logistics services, at least one of them would be useful in their operations. The four major services that farmers indicated they would find useful are storage, drying, truck management and registered transport services.

The key reasons regarding why these services would be useful are outlined below:

a. Better storage conditions and preservation of produce: access to modern storage systems will protect farm produce from harsh weather conditions and pest infestation. Providing better storage conditions will help to minimize post-harvest losses that are due to unfavorable weather conditions. The majority of the farmers call for investment in storage facilities to aid their process: for most of these farmers, the storage facilities should be moderately priced to ensure affordability. Fruit and vegetable farmers need access to cold storage facilities to keep their produce fresh, and vans to transport their farm produce over long distances without reducing the quality.

b. Market access (access to customers): farmers envisage that electronic market technologies will improve access to customers. Increasing the availability and quality of transport services and infrastructure will also be useful to enable farm produce to reach the market in real time, and losses along the supply chain due to transportation will be reduced.

c. Farmers can have better access to markets with an improvement in logistics and transportation services: improved transport services will reduce time to market to farmers, and also increase accessibility.

d. Drying services for maize farmers will improve quality and safety: the current drying methods expose farm produce to unfavorable weather conditions, and insect and other animal infestations. Better drying facilities will be useful to avoid wastage and maintain the high quality of the produce.

e. Less stressful work: most farmers consider the difficulty in accessing logistics services a major stress factor in their operations. Products perishing due to poor storage conditions or difficulty in arranging transportation to market, as well as being forced to sell produce at very low prices for the fear of perishing, are sources of stress for most of these rural farmers.



f. Better prices: most farmers have become price takers in peak seasons. Farmers will be able to negotiate better prices when they have access to good storage systems and they are not panicking because they need to quickly sell their produce. Having access to reliable transportation services could give them the confidence that they will reach the markets in time, and also help them to better negotiate with potential customers.

g. Profitability improvement: the profit from farming is reduced drastically when the level of output or the quality drops due to logistical challenges. Storage problems could increase the potential for damage and insect infestation significantly. Transportation problems could cause damage and perishability to in-transit produce. The current drying mechanisms are prone to being affected by the rains, and farmers lose significant profits and even make losses when these things happen.

h. Reduce the cost of production: logistics services form a significant part of agricultural production in rural Ghana. Transport costs are significant, and access to better transport services could help farmers obtain more productive services. For instance, truck management services could help farmers access information on available transport services and be able to make an informed choice regarding service providers.

i. Motivate increased production: importantly, the bottlenecks in logistics services are demotivating to most farmers. Thus, dealing with these issues is potentially motivating. Some farmers have reported not being willing to increase production because of challenges with storage and transportation.

#### ***4.11 Farmer well-being and satisfaction with life***

We sought to find out how the current challenges in logistics affect farmers' well-being, and the farmers' level of satisfaction with their lives as farmers.



#### **4.11.1 Have the logistics challenges affected farmer well-being?**

Farmers responded to how their overall well-being has been affected by the logistics and transport challenges they experience in their operations. About 95% of the respondents expressed frustration with the current logistics systems and indicated that they negatively impact farmers' well-being. Key factors contributing to the reduction in farmers' general well-being are reducing revenue from farms, increasing costs of production, stressful operations and panic selling (due to lack of storage spaces and fears of produce perishing). These factors are “demotivating” a lot of these farmers, and most of them are not willing to increase production capacity despite the availability of land. Some farmers recount that, despite significant efforts every year, the farming communities continue to wallow in poverty due to these constraints. The rural farmers visited have generally very low standards of living, with most of them barely able to afford anything beyond the necessities of life.

#### **4.11.2 How satisfied are you with life as a farmer?**

The outcomes of this question sum up the challenges rural farmers in Ghana face. Forty-seven percent of the farmers reported being satisfied with their life as a farmer. For these farmers, farming provides a good source of income that helps them to meet their personal and family needs. In contrast, 46% of the farmers indicated they are not satisfied with life as a farmer. Several reasons were given for their dissatisfaction, key among them is that most of them feel farming does not help them to generate wealth. Most of the people in this group are into farming because they do not have other options, lack formal education to search for other employment forms, or have simply followed a “family path” by becoming farmers. Many of them feel, however, that farming helps them at least to obtain their basic necessities, while others feel that, because they have no formal education, farming is the only option available. The remaining 7% of the respondents are “just okay” with their lives as farmers.

#### **4.11.3 How are farmers coping with the situation?**

The farmers revealed diverse means of coping with the situation. This ranged from those who have accepted the current challenges as part of the normal course of operations, to those who take steps to venture into other business ventures aside from farming. The key themes that emerged are:

##### **a. No real alternative**

A few of the farmers have decided to live with the situation. These farmers have accepted their fate, and recognize that in some seasons the business could be profitable, and in others there could be significant losses.

##### **b. Diversification**

However, many others responded that they have had to reduce their concentration on farming to pursue additional businesses. The diversification has led to a reduction in the focus and channeling of all productive capacity into farming. This group of farmers have added other ventures, most often trading, to their farming activities. To them, while such diversification has reduced their focus on farming, it is a good way to minimize the risk of losses and the negative economic impact of post-harvest losses from farming.

##### **c. Reduce production levels**

Other farmers have decided to reduce their level of production to avoid the challenges encountered in finding suitable storage and markets for their produce. These farmers have learned from their experience over the years to ensure that they do not cultivate larger farm lands than they have storage for, and can be assured of customers for.

##### **d. Quick sales**

The final group of customers have resorted to “quick selling” of their produce to avoid any potential storage issues. For these farmers, immediately selling off the produce after harvest is a good way of avoiding the challenges of storage and distribution. Thus,

although the prices at the time of the fresh harvest may be unfavorable, storing the produce could attract more losses due to potential product damage, insect infestation and perishability.

## **5. SECTORAL TRENDS AND ISSUES**

In this section, the emerging trends and issues regarding logistics and transportation services in rural farming areas are described. These trends and issues represent current and potential happenings in the sector and other notable issues.

### ***5.1 Rising costs of logistics and transport services***

With rising fuel prices across the country, the cost of transportation in Ghana continues to increase. The activities of smallholder farmers in rural areas will largely be affected by these rising costs, and food prices will continue to rise. Farmers will hope to have good prices for farm produce that can offset the transport costs and ensure a surplus.

### ***5.2 Motor bicycles and tricycles to the rescue***

The emergence of motor tricycles has been very useful to the agricultural setup in rural Ghana. Today, these tricycles have become a key transport vehicle for inputs to farms and produce from farms. Often operated by young men in the communities, these tricycles offer flexible, low-cost means of transporting low-volume farm produce. Because of their small size, the tricycles can move through narrow routes that tractors and other vehicles cannot readily access. Where it is necessary to use larger vehicles to carry output from farms, there are instances where the tricycles are required to move the produce from the farm to a location that is accessible to the tractor. Indeed, significant risks exist for the usage of these tricycles on main roads, and the usage of motor bicycles has been a subject of debate in Ghana, especially in regard to passenger transport. However, the contribution of these tricycles to the agricultural system cannot in any way

be overemphasized. Although transport challenges still exist in the supply chain of rural farmers, the emergence of “aboboyaa” as it is locally referred to, has been of great relevance.

### **5.3 Increasing farmer frustration, reducing motivation and well-being**

Many farmers are frustrated with the current logistics processes in their operations. Getting good storage, drying and transport services is a key challenge for rural farmers. Some farmers report that they are not willing to increase their productive capacity due to these constraints in the post-harvest periods. For these farmers, the situation seems to be worsening instead of improving, and their calls for support from the authorities over the years have yielded few results. This is demotivating to a lot of these farmers, and there is no desire to increase production capacity. The general well-being of rural farmers continues to fall as they struggle to overcome the bottlenecks in transportation and storage.

### **5.4 Farm-gate sales could be the future**

Most rural farmers consider drying, transportation and storage heinous tasks in their operations. An increasing number of farmers have indicated their preference for “quick sales”, which involves selling produce at the farm-gate and passing off the responsibility of arranging transport, drying and storage to the buyer. Using this channel, farmers eliminate the numerous challenges they face in transport access and costs, storage spaces and perishability. How huge farm-gate sales can become in the future is also dependent on how other supply chain actors organize themselves.

Currently, some of the aggregators in the supply chain offer to buy at the farm-gate. However, some farmers believe that farm-gate prices are sometimes very low, and so they prefer to transport their produce to their local storage spaces before it is sold. The preference for a specific sales channel is often dependent on the farming area, the infrastructure conditions and other reasons. Because most rural farmers are smallholders, the emergence of large-scale aggregation companies could be useful to them, especially if the aggregators seek to collaborate with them in the production, and offer what can be

considered a fair price for the produce. From the interviews we had with farmers, most of them would like to pass up the responsibility of drying, transportation and storage to other members of the supply chain. Thus, farm-gate sales could increase in the future, but that depends also on the emergence of partners that can integrate with farmers.

### **5.5 Farmers have a sense of neglect by the government and other authorities**

After years of calling for, and expecting support from, government and local authorities to deal with the logistics issues in their supply chain, the farmers seem to have accepted their fate, and there is little belief that they will receive any support from the authorities. One part of the interview asked farmers, “What kind of support do you need in dealing with the logistics challenges you have raised?” Most farmers outlined their needs but ended with statements that suggested that they have been pushing for these support systems over the years, but they have not received any from the authorities. Some were visibly very frustrated when talking about these issues in the interviews. “All these things that I’m telling you, the government people know but they don’t care” was one such statement made by one of them. This kind of mistrust between farmers and local authorities does not augur well for the country’s food production goals, and some things need to change.

### **5.6 Farmers have marginal benefits in the supply chain**

The farmers have very little bargaining power in the supply chain. Most farmers do not trust the intermediaries (such as the aggregators) in the supply chain, as they believe they are being exploited. Most rural farmers are price takers with very little access to actual consumer markets. Especially for perishable items, farmers are at the mercy of aggregators when determining the price of the produce. Because most farmers have small capacity and there is little collaboration among community farmers on issues of transportation, storage and sales to markets, the individual smallholder farmers have little power in dealing with transport service providers and aggregators. A lot of the farmers believe they are being ripped off by aggregators, but there is not much option for these



farmers as they do not have the capacity to organize their own transportation to the main markets, and they do not have the requisite facilities to store the produce. The farmers seem to be the least-paid actors in the supply chain. The current storage system is a contributory factor to this, as farmers are in a hurry to sell their farm produce due to the fear of perishability. Producers of yam and maize could potentially avoid this problem as they could store for some time, but, because of potential insect infestation and weather conditions, they are also forced into the same condition.

### **5.7 Cooperative societies are not tackling logistics and transportation**

Rural farmer cooperatives are currently focused on organizing inputs and training to improve production. A few others operate micro-credit schemes that seek to support financing for members' operations. Despite the importance of transportation, storage and marketing in the supply chain, cooperative societies hardly support farmers in this area. About 95% of the interviewed farmers who are members of cooperative societies indicated that they receive no support from these societies. Given the marginal bargaining power of individual smallholder farmers, it is surprising that cooperatives that seemingly could have a stronger stance on these issues have neglected such key issues in the supply chain. Most cooperative societies are not vibrant and are merely ad-hoc groups that come alive only when there is a government intervention that requires the group to receive some farm input or training. This must change in the future, as farmers will have to rely more on group support schemes to deal with the issues of logistics in the supply chain.

### **5.8 Food safety is at risk**

There is no doubt that rural farmers have infrastructure challenges in their operations and need external support to deal with these challenges. However, it is worth also noting that the current storage and handling systems are prone to several food safety breaches. The current storage structure in most rural areas is simply very poor, and so prone to insect infestations and weather conditions. Current drying methods are also poor, and this sometimes includes humans using their legs to spread grains on tarpaulins. Some



farmers pour grains on tarred roads to dry without thinking about dirt, insects or other unwanted materials. The drying of rice is not different either. These processes need some controls to minimize the potential threat to food safety.

### **5.9 Farmers need more than infrastructure**

When asked about the logistics and transportation support they need, most farmers are quick to mention infrastructure. There is no doubt that good roads, warehouses and drying facilities will be useful to these farmers. However, farmers need a lot more than infrastructure. This is supported by the fact that, in the few areas where there are public warehouses available, some farmers have raised concerns about the cost of storage services, and most have decided to continue using their local structures. First, farmers need to be educated to understand the supply chain they work in, their role in the supply chain, and how their logistics and transport operations affect the entire supply chain. Again, these farmers need to have standards and controls to guide their operations, as well as planning support. Even in the absence of government-provided infrastructure, farmers need support to provide local solutions to deal with their logistics challenges. Information technology platforms, for instance, could be useful to assist with planning group transportation, and assessing available transport service providers. An electronic marketplace (operated by a delivery service provider) could provide a useful connection between farmers and potential buyer groups.

## 6. IMPLICATIONS

This research has examined the logistics services in the “farm to market” section of Ghana’s agricultural supply chain. Based on the interviews with farmers and the review of secondary data on these issues, the study has implications for farmers and their community groups, potential investors and policy.

### 6.1 Implication for farmers & farmer groups

#### 6.1.1 Cooperative societies should be interested in logistics & transport services

Cooperative societies and other farmer groups need to switch their focus to logistics services. The focus of the cooperative societies could be twofold. First, cooperative societies can provide a unified front for negotiating transportation and storage services, as individual farmers have little bargaining power. Such arrangements could enable better access to service providers and reduced prices. The groups can have better bargaining power and standard prices for logistics services. Second, the societies can begin the provision of these services to members and other farmers. This will require raising group capital to invest in these services. It is easier for the group to raise capital (through member contribution or access to credit) than it is for individual farmers to do so. Cooperative societies should consider investing in developed storage facilities in these rural areas. The cooperative societies can ensure the sustainability of these activities by charging moderate user fees.

#### 6.1.2 Collaborative transportation is the way to go

With rising transport prices, farmers should consider means of optimizing transport capacity to reduce prices. Community farmers should consider group transportation among farmers along the same farming routes. With group transportation, farmers can have a better negotiating capacity and better rates of transport. There will also be higher utilization of transport capacity, especially in peak seasons where demand for transport utilization is high. Only 20.4% of the farmers interviewed in this study reported that





collaborative arrangement of transportation is a usual practice for them; 38.4% reported that they have made such arrangements in the past but it is not a regular occurrence; whereas the remaining 41.2% are hardly involved in any collaborative agreement.

### **6.1.3 Local solutions to storage and drying challenges**

Farmers and farmer groups should consider developing local solutions to the drying and storage problems in the communities. Instead of expecting government investment in huge projects, farmers should consider developing local solutions to their problems in the medium term at least. These include collaborating to think about improving the construction of their local storage systems and drying methods. The local solutions should include developing best practices for drying, storage and other logistics practices that help farmers to maximize returns from these operations.

### **6.1.4 Forming trade blocs**

Beyond collaborating in transport and getting cooperatives to invest in logistics and transport services, community farmers should consider forming trade blocs to improve their bargaining power, and also improve access to logistics services. By establishing an oversight group that aggregates its own members' produce to deal with potential buyers as a single selling organization, the trade bloc will have enormous power due to the large volume of farm produce it has to offer. This will make it easier to obtain competitive prices for logistics and also to have better access to these services. The trade blocs will ensure that farmers in a community or a local area, for example, decide to pull their produce together and access the market as a single unit. While forming these blocs could be challenging due to concerns about management, trust and integration, such a united front could be crucial to dealing with the logistics challenges farmers face currently.

## **6.2 Implication for institutional customers**

Logistics challenges at the farming level threaten the sustainability of food supply chains in Ghana. Individual customers may have little insight into what is happening, but institutional customers such as restaurants, universities and other business entities have the capacity to support rural farmers in dealing with these challenges.

### **6.2.1 Supply chain tracing & upstream support**

Institutional customers, such as hotels, restaurants, schools, processing plants and other large-scale users of farm produce, should support rural farmers upstream. These organizations should invest in sustainability programs that aim at supporting the local farmers to improve their operations. Because logistics and transportation challenges are demotivating rural farmers such that some farmers deliberately reduce capacity due to these challenges, it is important that supporting these operations is a key part of the sustainability programs. The support can be in the form of supporting infrastructural development in the production areas, training on best practices in storage and drying methods, etc.

### **6.2.2 Standards for intermediaries**

Most of these institutional customers work with intermediaries who aggregate produce from individual farmers. These institutional customers need to ensure that intermediaries treat farmers well, and provide the necessary logistics and transport support to these rural farmers. For concerns about food safety, it is important for the institutional customers and the intermediaries acting as their agents to ensure they have in place at least basic standards for food storage among their supplier farmers. The intermediaries should be charged with the responsibility of ensuring this happens, and the buying institutions should develop monitoring systems for this.



## **6.3 Implications for potential investors**

### **6.3.1 Truck management system will be useful for rural farmers**

There is limited information available to farmers about the status and availability of trucks for transporting their farm produce at any point in time. On the side of transport service providers, there is limited information on farmers seeking transport services at any point in time. A transport management system can match farmers' demand for transport services with the supply by truck owners. This will be very useful for rural farmers because farming clusters are often dispersed and there can be so many villages close to each other where transport service providers can provide shared services, but there is no information on the service needs of clients in other communities. Investment in a truck management system could improve transport capacity in rural areas by matching supply with demand and helping to deal with the challenges farmers face with accessing transportation. The truck management service provider can collect a fee from the transport service provider as a source of revenue, and also invest in transportation themselves. The service would bring together vehicle owners seeking clients and clients seeking service providers, to ease the transportation challenges in the farm-to-market agricultural supply chain.

### **6.3.2 Farmers could use partnerships to deal with transport & logistics challenges**

Many farmers have limited capacity to invest in transport and storage facilities. Investment in these facilities will be useful in the supply chain and increase total farmer productivity. There is a reason to believe that food production will increase when farmers have good logistics systems. To date, there is limited access to logistics and transportation services in rural areas. Cold storage facilities are non-existent, as vegetable and fruit farmers struggle to keep their produce fresh for the market. Partnering with farmers and farmer groups to provide this infrastructure will be useful to farmers, and also beneficial to the investors.

### **6.3.3 Farmers will be interested in electronic marketplaces for marketing their produce**

Connecting rural farmers to institutional and individual consumers can be a great investment in the supply chain. This will not only help farmers reach a wide audience, it will also help to improve their power position during bargaining and also help to raise incomes for more investment into the supply chain. A key consideration here is the entity that will provide the storage and logistics service in this marketplace. The company investing in the electronic platform can double to offer the transport and storage processes in the supply chain. This is a huge opportunity to create a large distribution network that works based on optimized transport routes and an integrated system. Because many of the farmers may not have the level of education required for online sales, the investors could work with other partners/employees to collect farmer offers for uploading onto the system. Based on the interviews with farmers, most of them are willing to deal with online customers through a recognized, controlled service organization. Investing in such a technology and adding complementary operations is a new area that can be utilized to provide in the agricultural system.

## **6.4 Implications for policy**

The policy implications of the study are outlined in the sub-sections below.

### ***6.4.1 Infrastructure provision***

The logistics infrastructures in the areas studied, and in most rural areas are often very poor. Road networks are terrible, and some parts are unmotorable in rainy seasons. Most farming communities lack proper storage structures and drying mechanisms. This infrastructural deficiency affects the productivity of farmers and contributes significantly to post-harvest losses. The central and local government authorities should have a roadmap for investing in infrastructural development for rural farmers. The Ministry of Food and Agriculture together with the Ministry of Transportation should develop a specific program for improving road networks to farming areas to facilitate movement of agricultural produce.



These programs should be implemented in partnership with local district and municipal assemblies. Public-private partnership schemes can be explored to support the financing of these infrastructural development.

#### **6.4.2 Price control**

Farmers have become price takers in the supply chain, with very little control over the prices due to transportation and storage challenges. Especially during peak seasons, farmers are forced to sell their produce at very low prices as they do not have any proper means of storing the surplus and cannot also afford to transport it to other markets where demand could be higher. The Ministry of Food and Agriculture should consider implementing price control mechanisms to assist farmers to obtain reasonable prices for their produce, even in peak seasons. An important development in this direction has been the Ghana Commodity Exchange (GCX) platform, which provides a trading platform for buyers and sellers of agricultural commodities, among other related services. However, a very limited number of farmers have access to this platform and over 90% of the rural farmers interviewed indicated they do not have knowledge of how the platform works. The scope of this platform should be extended to cover all parts of the country, and there should be intensive education and support for rural smallholder farmers to access the service, and other similar ones.

### **6.4.3 Information systems support & electronic trading hub**

There is high information asymmetry in the current supply chain setup. Farmers have very limited information on transport service providers and fair prices for these services. Depending on their location, most farmers must comply with the demands of aggregators and other intermediaries without knowing the actual market value of their produce. The government can support these farmers with information systems support that provides them with reliable information on available buyers, current fair market prices for their produce and access to transport service operators. Such a system should be introduced by the Ministry of Agriculture, or under the Ministry of Special Development Initiatives to support rural farmers to access larger markets for farm produce. These systems can be operated by locally assigned teams that will manage the demand and supply of these services within localities. An electronic trading hub will be useful for farmer groups especially, where they can aggregate quantities from their members and deal with intermediaries, institutional buyers or end consumers as a group but not individual farmers. This could help to obtain better prices as well as negotiate better deals with transport service providers. The localization of these platforms will be crucial to attracting and sustaining farmer interest by matching the offers of these systems to the unique local requirements of smallholder farmers. Thus, the oversight agency should have local teams that will work closely to educate and support farmers on how to benefit from these systems.

### **6.4.4 Improve the effectiveness of the National Food Buffer Stock Company**

The National Food Buffer Stock Company was instituted to support the agricultural supply chain by “mopping up” excess produce, providing storage and releasing the farm produce to the market when there is demand for it. Currently, the company is not very effective and does not have nationwide coverage. As of 20th February 2023, the company had been described as “struggling” by Bryan Acheampong, the minister designate for agriculture in Ghana.

Given that minimizing post-harvest losses is a key goal for Ghana's agricultural supply chain, the buffer stock company should be revamped and its presence should be in all farming districts. The company should also have proper integration with local farmers to permit the flow of information at all times; 97.8% of the farmers interviewed in this study revealed that they had not dealt with any food security organization. An improvement in the operations of the buffer stock company would be useful to rural farmers to pass on the excess stock of produce in peak harvest seasons.

#### **6.4.5 Operational standards for agro-logistics services**

The current drying and storage practices in the agricultural supply chain make the food produce prone to insect infestation and product damage. To protect against food security breaches and consumer interest, the Ministry of Agriculture should work in collaboration with the local inspection and quality control agencies to establish operational standards for these processes in the supply chain. These standards should set up the minimum environmental conditions and operational practices required to store farm produce and the mechanisms for drying the produce. Food packaging should also have these standards that define the nature of packages, weights and handling conditions. There is also the need for standards for the transportation of the farm produce, which will include loading mechanisms, vehicle condition requirements, offloading mechanisms and general best practices for transporting agricultural items. These standards will not only assist in ensuring food safety; they can also contribute to reducing food losses in the supply chain.





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