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Mapping an Enabling Environment for the Adoption of Contract Farming: A Bottom-of-the-Pyramid Analysis of Factors Affecting Scaling in the Cotton Sector in Zambia

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ABSTRACT

In Zambia, cotton contract farming has faced significant hurdles in scaling, primarily due to the complexities involved in engaging with smallholder farmers at the Bottom of the Pyramid. Therefore, this study examined the determinants of contract farming adoption enabling scaling in the sector. A researcher-administered survey was employed, targeting distributors who are key stakeholders and serve as intermediaries between multinational corporations and smallholder farmers. Using binary logistic regression analysis, the results reveal that localization, focus groups, collaboration with NGOs, leveraging local networks, co-creation, capacity building, and cooperation with traditional leaders are significant predictors of the adoption of contract farming. The study's comprehensive analysis underscores the critical factors and enablers driving contract farming adoption and scaling in the cotton sector. These findings offer valuable insights and practical implications for broader use by policymakers, MNCs, NGOs, and other stakeholders involved in the cotton value chain, aiming to inform more inclusive and effective strategies for scaling contract farming in Zambia and the Sub-Saharan region.

1. Introduction

Zambia has a tropical climate with a separate rainy and dry season and soil characteristics mainly influenced by climatic conditions, parent material, and topography suitable for cotton production. Despite the suitability of the soil and climatic conditions, cotton production has had challenges inhibiting its growth to scale. The study aims to analyze the challenges in the sector from the perspective or lens of doing business at the bottom of the pyramid (BoP). The BoP lens aims to provide opportunities for growth and profitability for multinational corporations (MNCs) while simultaneously delivering solutions to some of the social and economic challenges of the poorest communities in the world. The BoP lens stems from pessimism in the late 1990s about the success of official development assistance (ODA), philanthropy, direct aid, and corporate social responsibility (CSR) as a means for poverty alleviation. As such, Prahalad and Hart (2002) offer a proposition of inclusive capitalism and mutual value considering these failures. The scholars raise interest in viewing the MNC as an avenue for poverty alleviation and offering inclusive business, a BoP concept aligned with profit maximization and value creation for local communities and other stakeholders.

Most participants in contract farming in the cotton value are smallholder farmers at the BoP and, as such, belong to two-thirds of the economic, human pyramid, which consists of communities living in abject poverty.

Therefore, any business model seeking scale at the BoP must not only exploit the massive growth potential and profitability that this market can provide but simultaneously employ strategies for mutual growth and poverty alleviation. The business models targeting the BoP must balance profitability with social impact. This can include leveraging trusted networks by utilizing local influencers and community leaders to build trust and drive the adoption of cotton production. The models can also invest in multilevel agent networks by developing local agents who educate and sell to smallholder farmers. In other instances, the business model can co-create solutions by engaging with the community to develop products or solutions that meet their needs.

Contract farming in the cotton value chain has undergone significant challenges. For instance, price fluctuations and volatility lead to contract breaches and financial instability for smallholder farmers. Other challenges include environmental impact, traceability and sustainability in the initial stages of cotton production, and integration and support. Poor integration within the cotton value chain and limited government support can hinder the effectiveness of contract farming. Therefore, this study aims to generate insights that will inform business models, policies, and regulations that can stimulate growth for the sector. The insights are significant in addressing the challenges through innovative business models, supportive policies, and effective regulation that can create a more resilient and sustainable cotton value chain.

2. Literature Review

2.1 Inclusive Business and The Bottom-of-the-Pyramid Theory

Inclusive business can be traced back to 2001 when strategy guru C.K Prahalad first pointed to business leaders about the fortune and opportunities at the bottom of the pyramid (BoP). The proposition by Prahalad and Hart (2002) to encourage corporations to enter the untapped market of 4 billion low-income consumers in the developing world triggered an intense discussion among academicians and, researchers and aroused the attention of numerous executives, development organizations, and non-governmental organizations (NGOs). This call led to concrete initiatives to explore the market, giving birth to strategies for BoP business and the concept of inclusive business. BoP business is a relatively new concept in business management literature. It has evolved over the last 20 years and focuses on the economically weaker and resource-constrained sections of the poorest population in the world.

The BoP as Consumers (BoP 1.0)

The first generation of the BoP businesses were attempts by MNCs to modify their value propositions and offer them at reduced prices to make them affordable to the BoP market. This was an attempt to eliminate the BoP penalty (Prahalad, 2008), a summation of various disadvantages suffered by the BoP due to deprivation of basic needs such as food and water, electricity, clothing, health, and sanitation. As such, the first generation of BoP businesses focused on modifying existing business models to create a fair market for people experiencing poverty. Therefore, models to eliminate the poverty penalty and achieve the 3As, i.e., accessibility, affordability, and availability (London & Hart, 2004: Prahalad, 2008), were applied with the view to raising the net income and standard of living of the BoP while opening opportunities for the MNC. By reducing prices and modifying value propositions, MNCs sought to make essential goods and services more accessible to the BoP. This included packaging, distribution, and product design innovations to lower costs while maintaining quality. Nonetheless, the common feature underlying the unsatisfactory performance of many of the BoP 1.0 ventures, as posited by Simanis and Hart (2008), is the outside-in initiatives that contain paternalistic attitudes and cultural imperialist elements, which discount the traditions and culture of host countries. By not fully under-

standing or integrating the local traditions, cultures, and needs, many BoP 1.0 efforts failed to resonate with the target communities.

The BoP as Co-Creators (BoP 2.0)

The modest successes of BoP 1.0 led to the next generation of BoP strategies that involved partnering with the poorest communities, which became known as BoP 2.0. The critical characteristic of BoP 2.0 is the radically new approach to co-creating products and other value propositions (Knizkov and Arlinghaus, 2019: Nahi, 2016; London et al., 2011), heralding a shift in perspective from selling to the poor to business co-venturing with the poor. While inclusive capitalism and mutual value remain the critical characteristics in the Bop 2.0 perspective, there is a stronger emphasis on co-creating value and a focus on addressing socially and environmentally related problems at the BoP. As such, the essential characteristics include inclusive capitalism, co-creation, addressing social and environmental issues, empowerment, and capacity building. This model emphasizes the co-creation of products and services, where businesses and local communities collaborate to develop solutions that are not only economically viable but are also socially and environmentally sustainable. However, BoP 2.0 has its problems and criticism. As with BoP 1.0, it encourages unsustainable consumption behavior (Prahalad & Hart, 2002), which it was expected to address according to Prahalad's proposition. Others like Smith and Pezeshkan (2013) argue that the segment is subject to exploitation. Without sufficient emphasis on the legal, regulatory, social mechanisms, and other institutional pressures, the BoP is not protected from the power of the MNCs.

The BoP as Part of the Business Ecosystem (BoP 3.0)

Against some of the deficits observed in BoP 1.0 and in addition to advances in BoP 2.0, BoP 3.0 was recently proposed by Cañeque and Hart (2017). It was observed that businesses needed to evolve further to effectively address the social challenges faced by the BoP while concurrently sustaining corporate profitability. As such, BoP 3.0 is the conceptualization of BoP strategies for MNCs where, in addition to the co-creation of products and services among MNCs, NGOs, and the BoP, the community entrepreneurial activities of the BoP have also become core to the strategy (Pansera & Martinez, 2017; Pedrozo, 2015). These recent developments have shaped academic literature in BoP 3.0, raising an avalanche of interest in new perspectives, such as innovation and entrepreneurship (Molina-Maturano et al., 2020), grassroots innovation (Agarwal et al., 2016), group and alliance formation (Reficco & Márquez, 2012), value chain inclusion (Khalid & Seuring, 2019; Rehman et al., 2020), positive social change (Stephan et al., 2016), social embeddedness (Clarysse et al., 2014), sustainable development (Du et al., 2021), and sustainability (Hasegawa, 2022).

Letaifa and Reynoso (2015) extend the concept and argue in favour of ecosystem development at the BoP. The scholars propose shifting from a top-down to a multi-actor approach where social embeddedness, co-creation for and with the local communities, and the application of multi-actor, multi-dimensional value creation at the BoP. This ecosystem perspective aligns well with the principles of BoP 3.0, which emphasize sustainability, inclusivity, and innovation. According to Clarysse et al. (2014), a business ecosystem is an economic community comprising many loosely interconnected participants. It includes various participants such as MNCs, NGOs, traditional leaders, technology and micro-finance institutions, supply chain players, and policymakers. This holistic approach aims to achieve sustainable development goals while addressing the immediate needs of the BoP communities through multi-dimensional value creation.

2.2 Challenges to Scaling Cotton Production in Sub-Saharan Africa

Institutional reforms in Sub-Saharan Africa in the early 1990s saw the abolition of these parastatal monopolies and the inclusion of privately held NMCs in most countries. Despite these reforms, cotton production and agriculture generally have remained lower in SSA compared to the rest of the world. Bjornlund et al. (2020) blame this phenomenon on the resource- and wealth-extraction policies that continue to inhibit economic development for Africans by Africans despite many years of independence. Others attribute low agricultural production in SSA to attributes inherent to Africa and its people, such as slavery, disease, soil quality, and climate change (Baltenweck et al., 2022; Ros-Tonen et al., 2019). Cotton, which is cultivated mainly rain-fed in Sub-Sahara, is one of the most significant cash crops grown in Africa, with the continent producing approximately 7% of the global cotton output and more than 9% of the world's exports (Cotton Made in Africa [CmiA], 2023). The historical legacy of slavery and colonialism has had a long-lasting impact on the social and economic structures in SSA, often leading to systemic inequalities and underdevelopment. For instance, Ros-Tonen et al. (2019) contend that some producer-company partnerships aggravate gender inequality and exclude people who, based on gender, age, and ethnicity, have less access to capital. While many MNCs commit to corporate action to tackle gender inequality and empower women within their ranks, among suppliers, distributors, and communities, a gender gap exists worldwide. Further, Kruijssen et al. (2018) highlight gender inequalities inscribed in formal institutions (e.g., laws, regulations, and standards) that inhibit women from participating in the value chains.

Nonetheless, cotton plays a significant role in the livelihoods of smallholder farmers in SSA, and it is one of the crops through which economically constrained smallholder farmers earn monetary income for consumption and investments in production. There are also several social attributes like providing a livelihood and sustenance for rural communities (Broadberry & Gardner, 2022), gender dynamics and women participation (Kabwe et al., 2018), and community bonds (Kabungo & Jenkins, 2016) accruing from cotton production.

2.3 Mapping the Cotton Value Chain

Zambia is one of the few countries in SSA with a relatively balanced share of production factors, which include abundant land, skilled and educated labour, and an expanse of water resources. Based on this endowment, many stakeholders argue that the country has a vast potential to expand its agricultural production and linkages into other industries (Kalinda & Bwalya, 2014). Although the role of cotton production in the livelihoods of smallholder farmers has been appreciated, replacing a food crop (e.g., maize) with an export commodity like cotton is daunting for most farmers. This notion is supported by Kamoyo et al. (2015) in their study on agricultural export crop participation and contract farming in Zimbabwe. However, since the liberalization of the cotton industry in the 1990s, seed cotton production has remained volatile in the three decades after privatization. According to Baffes (2017), seed cotton production remained volatile, ranging from 45-75,000 tons per year in the early 2000s, moderated to 37,000 tons in 2011 before spiking to a record high of 275,000 tons in 2012. In the subsequent years until 2018, cotton production averaged around 100,000 tons per annum until dropping to an all-time low of 45,160 tons in 2023.

Given these dynamics, contract farming is the most convenient way to entice smallholder farmers to grow an export crop. As such, Zambia, like at least several other Sub-Saharan countries, has adopted contract farming as its model of cotton production and as the dominant institutional arrangement for buying cotton. This is echoed by White and Aylward (2016), who suggest that contract farming is the dominant formal production model in many export-commodity sectors in SSA. The scholars suggest that it represents an essential aspect of the for-

malization of smallholder agriculture, along with aspects of business registration, between smallholder farmers and NMCs in providing credit and access to higher-value markets. According to Kabwe et al. (2018), the contract model de-risks both the farmers and the agri-business' investment in production. That is, because farmers have access to inputs on credit and a secured market for cotton, they can invest in labour and land.

The Smallholder Farmer and Contract Farming

Unlike in Western countries like the USA, where cotton production is highly mechanized, cotton production in Zambia is rain-fed and labor-intensive. The entire national production is done by smallholder farmers who toil on small village plots or farms ranging from 1 to 5 hectares. At the peak of its production in 2012, the cotton industry employed 440,000 smallholder farmers, compared to 104,000 in 2022 (CBZ, 2024), which is still significant. The most significant characteristic is that they operate near subsistence (Kalinda & Bwalya, 2014) and are understandably risk-averse (Minot & Sawyer, 2016). Therefore, the general argument and agreement among various stakeholders is that smallholder farmers are constrained and cannot make profitable investments in crops that require expensive input requirements like cotton.

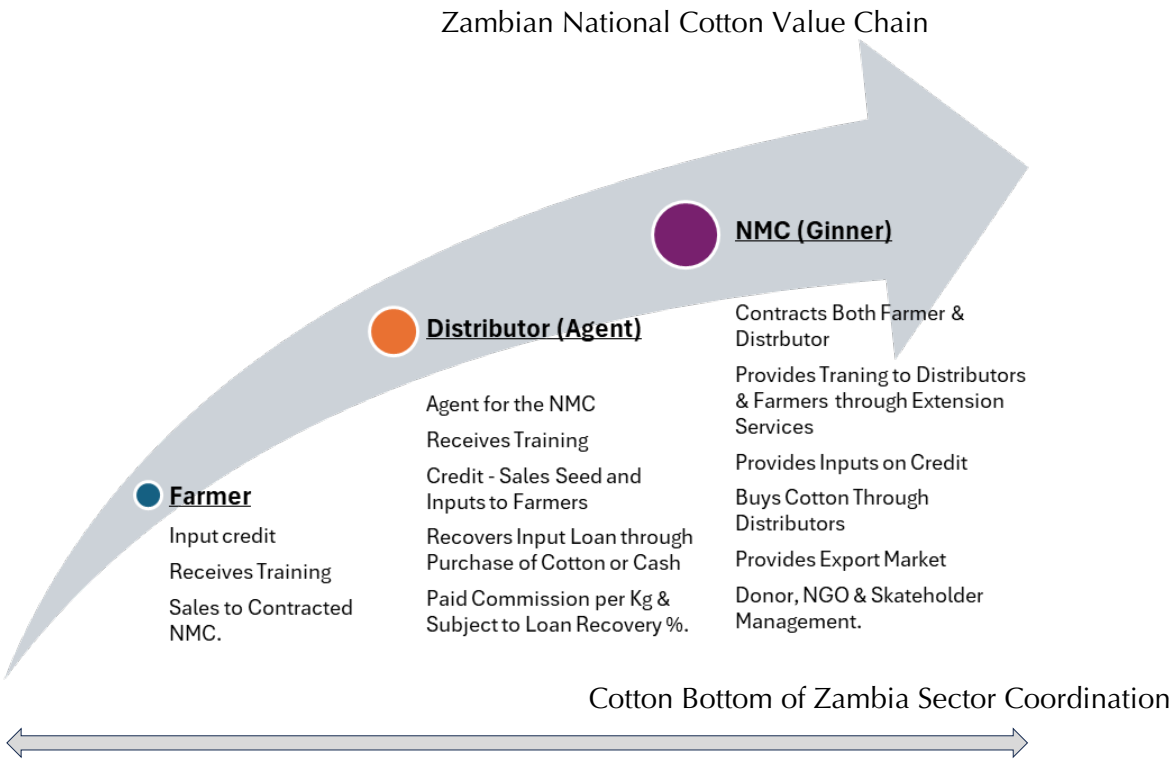

Figure 1: Zambian National Cotton Value Chain
Source: Author's compilation from secondary sources.

Because of these constraints, cotton production is mainly executed through contract farming, which is done according to a pre-planting agreement in which the smallholder farmer commits to producing the raw seed cotton in a particular manner, and the buyer (NMC) commits to purchasing it. As such, some see contract farming as a way to combine the advantages of large-scale production, i.e., improved access to credit, better production methods, and tolerance of risk (Kalinda & Bwalya, 2014; White & Aylward, 2016), coupled with

the strengths of smallholder production which include lower implicit labour costs and improved incentives (Minot & Sawyer, 2016). However, to fully realize these benefits, addressing the challenges inherent in contract farming is crucial. This includes ensuring fair contract terms, providing adequate support and training to farmers, and creating mechanisms for dispute resolution. Additionally, fostering a more balanced power dynamic between farmers and MNCs can assist in making these arrangements more equitable and sustainable. Scholars like Kamoyo et al. (2015) and Kabwe et al. (2018) contend that, in some instances, the integration of smallholder farmers into global value chains has produced negative trends, leading to indebtedness, higher risk, and income inequality. While contract farming and integration into global markets can provide opportunities for access to markets and scaling, they can also expose farmers to market volatility and unfavorable market terms.

Nonetheless, Minot and Sawyer (2016) argue that the weight of evidence suggests that successful contract farming schemes generally raise the incomes of the farmers participating in them. Improvement in livelihoods is also illustrated by the employment of the less-educated members of the community (Kaur et al., 2021; Meemken & Bellemare, 2020) and through the increased appreciation of good agricultural and agronomic practices adopted by the farmers (Mazwi et al., 2018; Mukucha & Chari, 2024; Shonhe & Scoones, 2022). Contract farming can create jobs for the less educated communities at the BoP, providing them with stable income sources and reducing unemployment rates. Further, farmers involved in contract farming often gain access to training and resources that help them adopt good agricultural practices. Mukucha and Chari (2022) also argue that contract farming improves smallholder farmers' livelihoods and ensures supply chain resilience for agro-processing companies.

The Distributor in the Cotton Value Chain

All markets require matching supply and demand between different participants in the value chain, requiring some form of vertical coordination. For instance, in the cotton value chain, thousands of farmers must coordinate and manage their cotton production and match the requirements of a few participating MNCs. However, when dealing with the economics of vertical coordination of such a vast population of farmers, transaction costs economics or theory predicts that four main problems exacerbate the cost of completing a transaction. These include imperfect information, limited ability to process information, dishonesty, and asset specificity (Grosh, 1994; Williamson, 2000). The contracting parties can never fully trust each other and may violate the terms of the agreement because each party has some incentive to misrepresent the truth in the short run. In contract farming, side selling is the most common agreement violation or misrepresentation of the truth. This is where the farmer sells the cotton to another party other than the one contracted (Mukucha et al., 2024). This is usually done by smallholder farmers to avoid loan deductions, especially when farmers are offered low prices or when the yields are low due to various other reasons, e.g., drought.

To mitigate these challenges, the Zambian national cotton value chain adopted the "Dunavant distributor model" (Sall et al., 2023, p. 93). In this model, an agent known as a distributor is contracted by the NMC, usually on a part-time and commission basis, to manage and coordinate the farmers in a specific area. As such, even though the farmer is directly contracted to the NMC, the distributor is also contracted to sell seeds, fertilizers, and pesticides to the farmer on credit. The distributor, therefore, assumes the credit risk, which will be deducted during post-harvest purchases. It is common for unsuspecting distributors to fail to achieve their targets and fail to earn a commission. This is the case because the cotton industry has a very high default rate on the input loan, as seen in CBZ (2024), where the loan recovery rate in 2023 is sixty percent. Nonetheless,

formal and informal economic institutions are in place designed to address these challenges by facilitating the dissemination of information, establishing communication, developing trust, and punishing dishonest behavior.

2.4 Factors that Influence the Adoption of Contract Farming

Complex behavioral patterns characterize rural smallholder households and are, by nature, classified as subsistence or semi-commercialized. Some households are characterized by differential access to productive assets, agricultural inputs, and export markets (Sukume, 2012; Moyo, 2011), while some are characterized by partial engagement in disconnected, sporadic, and often incomplete or imperfect markets. As a result, many smallholder farmers engage in diverse markets and non-market activities to complement their agricultural food, making their crop income unfocused and low, leading to a perpetual poverty trap. They are also involved in pastoralism, fishing, crafts, and gathering firewood fruits or firewood for cash, among other non-farm activities (Moyo, 2011). Several studies have established the factors influencing the decision to participate in contract farming and export crop production. While the motivation for the smallholder farmer is access to credit, extension services and training, and access to markets, other socioeconomic and demographic factors determine the adoption of contract farming. For example, Musara et al. (2011) find that age, gender, education, farm size, family size, family labour supply, and farmer group size influence the adoption of contract farming.

In addition to these factors, others also find that wage income from the household head (Kamoyo et al., 2015), the household dependency ratio (Sukume, 2012), and remittances from family members outside the household (Ma et al., 2024), determine whether the household will engage in contract farming. Further, Ma et al. (2024) make a compelling case that allowing smallholder farmers full market participation, a transparent pricing mechanism, and addressing their preferences influence the farmers' decision to commercialize. In another study, Rubhara and Mudhara (2019) find that the age of the household head, number of cattle owned, off-farm income, and communal landholding are negatively associated with contract farming. Older household heads are less inclined to engage in contract farming due to risk aversion or contract farming. Concerning gender, Tsvuura et al. (2021) find a very high negative association between female gender and contract farming, which they attribute to high illiteracy rates among females in smallholder farms. This suggests that women are less likely to engage in contract farming than men. Several factors contribute to this disparity, including limited access to resources, lower levels of education, and societal norms that restrict women's participation in agricultural decision-making.

In summary, the impact of contract farming at the BoP is still debatable, if not contentious. The leading proponents, the stakeholder theorists, view contract farming as a solution to the challenges of market risk, information asymmetry, and credit risk faced by smallholder farmers in the commercial production of cotton. From this lens, contract farming is viewed as facilitating the integration of smallholder farmers into commercial agriculture and high-value supply chains, leading to income growth, improved livelihoods, and poverty reduction at the BoP. Conversely, according to critics and resource-based theorists, contract farming is argued to be a way for large firms, especially MNCs, to take advantage of the land and poverty of smallholder farmers by paying them below the market price and effectively taking control of their small holdings. Therefore, this study aims to explore the factors that enable the adoption of contract farming and scaling of cotton production to narrow the gap between the two opposing theories.

3. Methodology

This study's research design was quantitative, providing the blueprint for collecting, measuring, and analyzing the data. That said, the method of data collection was a survey, a communication-based approach, where the researcher questioned the respondents and collected their responses using a face-to-face questionnaire administered by the researcher. The methodology was adapted from Kamoyo et al. (2015) in their study on agricultural export crop participation and contract farming in the Rushinga district of Zimbabwe.

3.1 Study Site

The Cotton Board of Zambia (CBZ) is a statutory board established under the Cotton Act No. 21 of 2005 of the Laws of Zambia, which falls under the Ministry of Agriculture and Livestock in Zambia. Its headquarters are at Crop Serve Stand, Showgrounds, Lusaka, Zambia. It is located at precisely 15.3980° S and 28.3127° E in Lusaka, the capital city of Zambia. In the Eastern province of Zambia, the CBZ operates in all the major cotton production areas, manned by regional cotton inspectors, which include Chama, Lundazi, Chipata, Katete, Petauke, and Mambwe districts. The precise location was in the Mambwe district, in the Eastern province.

3.2 Study Population

The target population was the distributors in the cotton value chains in the sheds in Mambwe. Besides being cotton farmers, distributors have a unique position in the cotton value chain because they distribute farming inputs to the farmers and are responsible for buying the cotton from them during the marketing season. The total population of distributors under the CBZ in the Mambwe district is 406.

3.3 Sample Size

When it is impossible to study the entire population, but the population is known, a smaller sample can be taken using a random sampling technique. Therefore, Slovin's formula was used to determine the sample size, and a confidence level of 95% (giving an error margin of 0.05) was deemed accurate for this study. This is supported by Krejcie and Morgan (1970), who recommend using 5% to estimate the population proportion to maximize variance, which will also produce the maximum sample size. As such, given this desired degree of accuracy and Slovin's formula (Adam, 2020), the sample size was determined as 201.

3.4 Sampling Technique and Data Collection

A detailed Excel sheet of all the 406 registered distributors representing the sampling frame was also obtained from CBZ, and a systematic sampling technique was applied to select the study's respondents. Systematic sampling is a probability sampling method in which researchers select population members at a regular interval (or *k*) determined in advance (Taherdoost, 2022). This technique was beneficial in this context because it offers many benefits of random sampling, such as reducing bias and ensuring that every element had an equal chance of being selected. By selecting every (*k*)-th element from the sampling frame, systematic sampling was more practical and easier to implement, considering that the research was dealing with a large population.

A questionnaire, with a mixture of dichotomous and closed questions, was used as the data collection instrument to gather primary data. Further, the questionnaire, which applied a Likert-type scale, was the preferred choice for data collection because it measured the sentiments and perceptions of the target population in a structured manner. Joshi et al. (2015) also argue that when measuring the respondent's preferences or degree of agreement, the Likert scale is most convenient because it makes qualitative attributes amenable to quantitative transformation.

3.5 Data Analysis

The measure of associations to determine the relationship between the variables was done through descriptive and associative analysis using SPSS 28. Descriptive analysis focused on summarizing and scribing the main features of the dataset without necessarily examining the relationships between the variables. Therefore, binary logistic regression was applied to analyze the second and third objectives of the study. In a binary logistic regression, a single dependent categorical variable (two categories) is predicted from one or more independent variables, which can be metric or non-metric (Sreejesh et al., 2014). Specifically, binary logistic regression was used to model the relationship between the adoption of contract farming (scaling) and one or more independent variables. The formulated logistic regression model is illustrated in equation (3.1) below.

$$y_i = \beta_0 + \beta_1 age_i + \beta_2 farmergroups_i + \beta_3 localization_i + \beta_4 collaboration_i + \beta_5 training_i + \beta_6 localnetworks_i + \beta_7 cocreation_i + \beta_8 capacitybuilding_i + \beta_9 traditionalleaders_i + \varepsilon_i \quad (3.1)$$

Where:

y_i is the contract farming status, a binary choice variable for i^{th} farmer. It assumes a value of 1 if the farmer will participate in contract farming and 0 otherwise.

B_0 is the intercept term

$\beta_1, \beta_2, \ldots\ldots, \beta_k$ are the coefficients of the predictors.

ε_i is the base of the natural logarithm.

4. Results and Discussion

4.1 Age and Gender Distribution

It was deemed essential to determine the age range and gender distribution of the respondents because studies in behavioral finance and economics, e.g., Fisher and Yao (2017), have shown that risk tolerance varies with age and gender. Their study found that risk tolerance tends to decrease with age, meaning younger individuals are generally more willing to take financial risks than older individuals who prefer stability. Therefore, age and gender may impact the respondent's perception of the risks associated with contract farming and affect their ability to recruit farmers and scale the business.

The age range is wide, with a mean age of 40.2 years and a standard deviation of 4.849. As such, the age is normally distributed with the lowest range of 25 – 29 years old (0.5%), 30 – 24 years (12.9%), 35 – 39 years (29.9%), 40 – 44 years (38.3%), 45 – 49 years (14.4%), and 50 – 55 years (4%). Most respondents fall within the 35 – 44 age range, which constitutes 68.2% of the total sample, indicative of a middle-aged class. Given that risk tolerance tends to decrease with age, the predominance of respondents in the 35 – 44 age range might indicate a moderate level of risk tolerance and a good chance that they are willing to scale contract farming.

Table 1: Gender and Age Distribution of the Respondents

		Frequency	Valid %	Cumulative
Gender	Male	157	78.1%	78.1%
	Female	44	21.9%	100.0%
Total		201	100%	

		Frequency	Valid %	Cumulative
Age	25 - 29	1	0.5%	0.5%
	30 - 34	26	12.9%	13.4%
	35 - 39	60	29.9%	43.3%
	40 - 44	77	38.3%	81.6%
	45 - 49	29	14.4%	96.0%
	50 - 55	8	4.0%	100.0%
Total		201	100%	

Source: Study Results (2024)

The data clearly shows that male respondents dominated the study. This underrepresentation could result from socio-cultural factors, access to resources, and support systems. In many societies, traditional gender roles may limit women's participation in certain economic activities, including agriculture and distribution. This lopsided gender distribution suggests the need for gender-specific strategies to encourage more female participants into contract farming and the cotton value chain.

4.2 Logistic Regression Results

Before the regression analysis, Cronbach's Alpha was assessed to check whether the test questions intended to measure the same general construct produced similar scores. An interpretation of Cronbach's Alpha (α) posited by Taber (2018) suggested that overall, $\alpha \geq .7$ is considered acceptable. Table 4.2 shows that the internal consistency tests' outcome indicates favorable results with $\alpha = .759$. A higher Cronbach's Alpha indicates that the items in the test are more consistent and likely to measure the same underlying concept. The goodness-of-fit of the logistic regression model was assessed using the Hosmer-Lemeshow test, which indicated a good fit, χ^2 (8, $N = 201$) = 52.24, $p = .347$, suggesting a good fit. In addition, the logistic regression model was statistically significant, χ^2 (10, $N = 201$) = 175.5.89, $p < .001$. Further, Table 4.3 shows that the model explained 90.2% (Nagelkerke $R^2 = 0.902$) of the variance in contract farming and correctly classified 98.0% of cases.

Table 2: Cronbach Alpha for Enablers for Business Model Scaling

Reliability Statistics	
Cronbach's Alpha	N of Items
0.759	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Farmer Groups	28.40	12.292	.555	.717
Localization	28.47	11.420	.527	.719
Collaboration with NGOs	28.47	11.450	.555	.713
Training	28.34	12.685	.509	.726
Local Networks	28.48	12.371	.440	.736
Co-creation	28.42	12.294	.433	.738
Capacity Building	28.32	13.538	.286	.761
Cooperating with Traditional Leaders	28.31	13.424	.355	.749

Source: Study Results (2024)

Table 3: Goodness-of-fit Test Results

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	175.504	10	.000
	Block	175.504	10	.000
	Model	175.504	10	.000

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	33.182[a]	.582	.902

a. Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	52.245	8	.347

Source: Study Results (2024)

Age

Age was included in the analysis to examine whether younger or older farmers or older farmers are more likely to adopt contract farming. The study results show that most of the respondents are middle-aged, within a range of 35 to 44 years (M = 40.2, SD = 4.849), indicative of a moderate level of risk tolerance to adopting and scaling contract farming. The logistic regression analysis indicated that age was not a significant predictor (B = -0.218, SE = 0.149, p = 0.143) of contract farming in the current model. The beta coefficient value suggests a negative relation between age and contract farming. This is supported by Musara et al. (2011), who suggest a negative relationship between age and the adoption decision, and Rubhara and Mudhara (2019), who posit that the age of the household head is negatively associated with contract farming and commercialization. This indicates that younger farmers were more willing to adopt contract farming than their older counterparts.

Table 4: Logistic Regression Results

								95% C.I. for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Age	- 0.218	.149	2.149	1	.143	1.243	.929	1.664
	Farmer Groups	1.527	1.081	1.997	1	.040	4.605	.554	38.29
	Localization	2.401	.995	5.822	1	.016	11.04	1.569	17.76
	Collaboration with NGOs	2.194	1.008	4.733	1	.030	8.970	1.243	16.47
	Training	.716	.730	.960	1	.033	0.489	.117	2.046
	Local Networks	1.459	1.025	1.400	1	.027	1.583	1.382	6.560
	Co-creation	2.685	.772	2.788	1	.031	3.984	1.437	9.002
	Capacity Building	3.488	1.213	8.269	1	.004	4.572	3.036	8.527
	Cooperating with Traditional Leaders	3.253	1.339	5.905	1	.015	4.286	1.876	9.565
	Constant	-57.5	15.51	13.75	1	.000	0.000		

a. Variable(s) entered on step 1: Age, Farmer Groups, Localization, Collaboration with NGOs, Training, Local Networks, Co-creation, Capacity Building, Cooperating with Traditional Leaders.

Farmer Groups

Farmer groups has a positive beta value (B = 1,517, SE = 1.081, p = .145, OR = 4.605), and its interaction as a predictor for contract farming is statistically significant. Farmer groups are supported by Van Tulder et al. (2011) in their study, classifying three forms of collaborations that contribute to the success of inclusive business: partnerships, networks, and business ecosystems. It is also supported by Reficco and Márquez (2012) when discussing alliance formations and how they induce resource complementarity. As such, recognizing the context-specific nature of farmer groups, it is essential to tailor approaches to fit local content. This might involve engaging with traditional leaders who hold significant influence when forming farmer groups. Further, farmer groups encourage resource complementarity, leading to more efficient use of scarce resources at the BoP. By pooling resources together, e.g., sharing farming equipment, traditional knowledge, or technical expertise, the group can create a supportive environment for low-income farmers.

Localization

Localization is a significant predictor of contract farming (*B* = 2.401, *SE* = 0.995, *p* = .016, *OR* = 11.04). It is the key foundation on which BoP theory is premised. In support of these findings, Hammond (2011) finds that for the BoP initiative to scale, it must combine global and local dimensions in its foundation. This means involving local stakeholders in developing and implementing contract farming practices, ensuring their insights and needs are central to the process. Similar sentiments are echoed by London and Hart (2011), who believe in collaborating with local communities to co-create value instead of merely extracting value from BoP markets. In further support, Schuster and Holtbrügge (2014) emphasize paying attention to local market-specific needs. By understanding each market's unique demands and conditions, contract farming schemes can be better designed to meet these requirements, leading to improved outcomes for farmers and MNCs. Reficco and Márquez (2012) encourage the adoption of local knowledge and the use of local distribution networks for scaling to be successful. Therefore, by understanding and incorporating the local context, culture, and needs of smallholder cotton farmers, stakeholders can develop contract farming solutions that are not only effective but also sustainable and scalable.

Collaborating with NGOs

Descriptive data is supported by the results from the regression model, which indicate that collaboration with NGOs is a significant predictor of contract farming (*B* = 2.994, *SE* = 1.008, *p* = .016, *OR* = 8. 970). This implies that the odds of contract farming occurring increase by 8.970 (95% CI [1.243, 16.47]). This very high odds likelihood ratio emphasizes the importance that smallholder farmers place on NGO collaboration. The findings resonate with Clarysse et al. (2014), who argue that NGOs are an essential component of a BoP business ecosystem comprising MNCs, traditional leaders, technology and micro-finance institutions, supply chain players, and policymakers. Kalinda and Bwalya (2014) and White and Aylward (2016) discuss the benefits of NGOs in supporting both large-scale and small-scale production, reducing implicit labour costs, and enhancing overall productivity. Sall et al. (2023) emphasize that NGOs contribute to improved yields and effective input distribution, which are essential for the success of contract farming.

Rubhara and Mudhara (2019) also support the findings, stressing that NGOs play a critical role in providing training and resources, which significantly boost the adoption of cotton contract farming.

Distributor and Farmer Training

Training is a vital component of contract farming, and the regression model found that it is a significant predictor of contract farming (*B* = 0.716, *SE* = 0.730, *p* = .033, *OR* = 0.489). Although the beta coefficient is low, the odds of contract farming occurring increase by 0.489 (95% CI [0.117, 2.046]) for a unit increase in training. This suggests that training plays a critical role in the overall ecosystem. This argument is supported by Meemken and Bellemare (2020), who illustrate the improvements in the livelihoods of the less-educated members of the communities because of training. Livelihoods are also improved through the increased appreciation of good agricultural and agronomic practices adopted by the farmers (Mukucha & Chari, 2024; Shonhe & Scoones, 2022; Mazwi et al., 2018). These studies collectively illustrate the positive impact of training on the appreciation and adoption of good agricultural and agronomic practices. For instance, Mukucha and Chari (2024) focus on how training programs tailored to local needs enhance farmers' productivity and sustainability. Shonhe and Scoones (2022) discuss the transformative effects of training on community engagement and ag-

ricultural innovation. Lastly, Mazwi et al. (2018) provide evidence on how training facilitates the adoption of modern farming techniques, leading to improved cotton yields and farmer income. These results demonstrate the broader positive impact of training on contract farming, community development, agricultural practices, and economic resilience.

Leveraging Local Networks

The results show that the respondents appreciate the value of leveraging local networks. With the majority agreeing on the benefits, enhancing collaborations with local networks would be strategic. Against this background, the results show that leveraging local networks significantly predicts contract farming (B = 1.459, SE = 0.725, p = .027, OR = 1.583). From these results, we conclude that the odds likelihood of contract farming occurring increased by 1.583 (95% CI [1.384, 6.560]) for a unit improvement in leveraging local networks. As such, leveraging local networks positively affects contract farming. This is supported by Reficco and Márquez (2012), who stress the importance of utilizing local knowledge and distribution networks. These local resources provide valuable insights into efficient farming practices, market trends, and consumer preferences, augmenting the effectiveness of contract farming. Schuster and Holtbrügge (2014) also stress how such local networks can enhance the scalability and sustainability of BoP initiate. They underscore the advantages of local networks, emphasizing their role in resource mobilization, fostering innovation, ensuring sustainability, and enhancing scalability.

Co-creation

Co-creation is central to the BoP theory, and it is a dynamic and collaborative process that involves multiple stakeholders working together to create value. According to the result, co-creation significantly predicts contract farming (B = 2.685, SE = 0.772, p = .031, OR = 3.984). This conclusively means that the odds of contract farming occurring increase by 3.984 (95% CI [1.437, 9.002]) for every unit increase in co-creation. Co-creations involve a diverse range of stakeholders, fostering innovation and creative problem-solving. Local communities and entrepreneurs bring unique insights and ideas that can lead to the development of more effective sustainable solutions. This is supported by Letaifa and Reynoso (2015), who propose value creation by shifting from top-down solutions to a multi-actor approach where co-creation and embeddedness are central to community engagement. It is also supported by Knizkov and Arlinghaus (2019) as they provide an empirical exploration of co-creation patterns, practices, and outcomes in bottom-of-the-pyramid markets. As such, co-creation taps into local knowledge, resources, and networks, making mobilizing the necessary assets for successful project implementation easier. This approach ensures that solutions are well-adapted to the local context and needs.

Capacity Building

Capacity building addresses multiple aspects of farming, from production to cotton marketing. Notwithstanding, the results from the regression model indicate that building local capacity is a significant predictor of contract farming (B = 3.488, SE = 1.213, p = .004, OR = 4.572). This implies that the odds of contract farming occurring increase by 4.572 (95% CI [3.036, 8.527]) for a unit increase in capacity building. This high odds ratio indicates how important capacity building is for adopting contract farming. Capacity building encourages innovation by exposing farmers to new ideas, technologies, and practices. As farmers become more aware of the benefits, they are more likely to adopt them, leading to increased efficiency, productivity, and scale. This is supported by Nahi (2016), Linna (2013), and Rehman et al. (2020), who collectively argue that successful BoP

strategies often involve co-creating with local communities and building local capacity. Capacity building ensures resilience and equips farmers with the tools and knowledge to cope with various challenges, such as climate change, pests, and market fluctuations.

Cooperating with Traditional Leaders

Traditional leaders, such as chiefs, hold cultural authority and are deeply respected in their communities. Therefore, their support lends credibility and legitimacy to BoP initiatives and contract farming, making community members more receptive to new ideas and practices. The results from the regression model are aligned with this and show that traditional significantly predicts contract farming (B = 3.253, SE = 1.339, p = .015, OR = 4.286). From these results, we can conclude that the odds of contract farming occurring increase by 4.286 (95% CI [1.876, 9.565]) for every unit increase in cooperating with traditional leaders. The high odds ratio signifies the importance of traditional leadership in adopting and scaling contract farming. Traditional leaders can mobilize community resources, including labour and land, which are essential for the success of contract farming. Their endorsement can encourage community members to participate and actively contribute to the initiative. This sentiment is also shared by the findings of Schuster and Holtbrügge (2014). Van Tulder et al. (2011) also stress how leveraging the influence and knowledge of traditional leaders can assist in navigating institutional voids, building trust, and achieving long-term success. In many BoP markets, formal institutions are usually weak or absent. Therefore, traditional leaders help fill these gaps by providing governance, support, and local knowledge that are essential for the effective implementation of initiatives.

5. Conclusion

The study applied a logistic regression model to determine the predictive power of several enabling variables on the adoption of contracting farming at the BoP. The model results show that farmer groups, localization, collaboration with NGOs, training, leveraging local networks, co-creation with the community, capacity building, and cooperating with traditional leaders are significant predictors of the adoption of cotton farming. These factors are crucial in creating a supportive environment that fosters the successful implementation and scaling of contract farming. Through targeted interventions and collaborative efforts to address these variables, stakeholders can significantly improve the adoption of contract farming, ultimately benefitting the smallholder farmers, the national agriculture sector, and the Sub-Saharan region.

6. Implications of the Study

The study identifies two practical implications and areas of focus: Enhanced farmer adoption and community engagement and empowerment.

1) *Enhanced farmer adoption*. Implementing targeted training and capacity-building programs that equip farmers with the necessary skills and knowledge, making them more likely to adopt contract farming. Also, ensuring transparent and fair pricing mechanisms will make contract farming more attractive to farmers by providing financial stability and predictability.

2) *Community engagement and empowerment.* Engaging traditional leaders and local networks that will foster trust and encourage community participation, enhancing the acceptance and success of contract farming. In addition, partnerships with NGOs will provide additional resources, training, and support, helping smallholder farmers navigate the complexities of contract farming.

It also suggests two policy implications and areas of focus: Supportive regulatory framework and inclusive policies.

1) *Supportive regulatory framework*. Policies should incentivize farmers to adopt contract farming, such as subsidies for inputs, access to credit, and tax breaks for MNCs. The government should subsidize inputs on cotton through the Farmer Input Support Program (FISP) in the same way it subsidizes maize and soya. This will reduce the risk borne by the MNCs.
2) *Inclusive policies*. Implementing gender-specific strategies and support policies to empower female farmers and distributors, promoting greater gender equality in agriculture.

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