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ARTICLE

Enhancing Agribusiness Performance and Livelihood Outcomes in Fragile Contexts: A Case Study of Somalia's Agricultural Value Chains

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ABSTRACT

This study investigates the relationship between agribusiness performance and livelihood outcomes in fragile contexts, with a particular focus on the agricultural value chains of Somalia. By adopting a holistic framework that combines Porter's Value Chain with the Sustainable Livelihoods Framework (SLF), this research highlights the importance of different livelihood assets—human, social, natural, physical, and financial capital—in mediating this relationship. Applying structural equation modeling to data from 400 respondents in the agribusiness value chain, the results indicate that improved agribusiness performance significantly raises incomes, food security, and resilience. The findings indicate that agricultural performance exerts a direct and substantial beneficial influence on livelihood outcomes ($\beta = 0.396$, $p < 0.001$), especially in enhancing income, food security, and resilience. It markedly improves livelihood assets ($\beta = 0.714$, $p < 0.001$), including human, social, natural, physical, and financial capital. These assets significantly affect livelihood outcomes ($\beta = 0.495$, $p < 0.001$) and partially mediate the association between agribusiness success and enhanced livelihoods (indirect impact $\beta = 0.353$, $p < 0.001$). The model demonstrates substantial explanatory power ($R^2 = 0.682$ for outcomes), hence supporting the employed frameworks. Based on these findings,, policymakers should focus enhancing agriculture performance and livelihood assets. Targeted initiatives encompass the expansion of Sharia-compliant microfinance, investment in rural infrastructure and irrigation, enhancement of extension services, and fortification of market connections. The advancement of social capital via inclusive involvement in value chains,

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particularly for women and youth, is crucial. Climate-resilient techniques, like soil conservation and drought-resistant crops, must be integrated into mainstream approaches. These measures are essential for attaining inclusive and sustained rural development in Somalia.

Keywords: Agribusiness Performance; Livelihood Outcomes; Agricultural Value Chains; Livelihood Assets; Food Security

1. Introduction

Agribusinesses in underdeveloped nations like Somalia face multiple challenges, including inadequate infrastructure, limited financial access, and political instability. In spite of the given issues, the agricultural industry does not cease to be an essential part of the economic and social well-being of people in rural areas. Value chains of agribusiness are very important to facilitate sustainable development, enhance productivity, and improve livelihoods [1]. The value chain concept, put forward by Porter (1985), highlights the processes and activities that increase a product's value from the manufacturing process to its final consumption [2]. In agriculture, there exist a number of stages for value chains: production, processing, packaging, marketing, and distribution, all the activities that help increase efficiency and competitiveness within the sector [3].

The role of agribusiness value chains in improving livelihoods is most noticeable in vulnerable areas like Somalia, where rural populations and smallholder farmers face challenges like limited market access, food shortages, and unstable incomes. Value chain interventions can lessen these problems by improving product quality, expanding market access, and encouraging sustainable farming methods [4]. Transforming agricultural potential into observable economic and social advantages, like higher income, job opportunities, and enhanced food security, requires effective agribusiness performance [5]. Agribusiness performance is facilitated by agricultural value chains, which have an influence on the use of agricultural inputs, the processing and marketing of products, and the allocation of value among stakeholders. Effective coordination between actors in value chains results in lower transaction costs, fewer post-harvest losses, and higher-quality products [6]. However, general barriers like fragmented markets, poor infrastructure, and restricted access to technology and credit frequently affect agricultural value chains in fragile environments. These challenges make agribusinesses less competitive and limit their capacity to enhance livelihoods and promote economic growth [7].

In agricultural value chains, improving agribusiness performance requires an integrated approach that examines inefficiencies and encourages inclusivity. Smallholder farmers and other stakeholders may have more opportunities to fairly profit from agricultural production if value chains are strengthened [8]. Improving access to modern farming methods, storage facilities, and market data, for instance, may improve output and lower losses after harvest. Investments in infrastructure, such as roads and cold storage facilities, can improve efficiency and reduce costs. Additionally, integrating agribusiness into regional and international markets can create new revenue streams [9]. Value chains that are optimized improve food security for people living in rural areas, lower economic vulnerability, and generate sustainable income opportunities [10]. Access to markets, equitable pricing practices, and value-adding projects are especially advantageous for smallholder farmers, who are the foundation of agricultural economies. Additionally, agribusiness-led development promotes job creation in a number of value chain segments, from production and input supply to processing and retail [11].

While earlier research areas highlight the role of agribusiness value chains in enhancing livelihoods, particularly in fragile contexts such as Somalia, there have been limited studies that examined the use of Porter's Value Chain approach with the Sustainable Livelihoods Framework (SLF), as the literature indicates. The specific tools through which livelihood assets—human, social, natural, physical, and financial capital—mediate the relationship between agribusiness performance and livelihood outcomes have not been explored in detail. More research is required to respond to the unique

challenges of doing business in fragile environments, where there is political instability, poor infrastructure, and constrained financial resources, when optimizing agribusiness value chains.

This study fills that gap by focusing on the interrelations among components of the value chain and livelihood assets using a holistic framework. It aims to provide a clear understanding of how agribusiness efficiency can be enhanced for sustainable development, productivity gains, and improving livelihoods within fragile settings such as Somalia.

2. Review of Literature

2.1. Introduction

Agribusiness is essential for promoting sustainable development and raising living standards, especially in weak and vulnerable environments like Somalia. Agribusiness performance has a significant impact on food security, income generation, and shock resistance, according to the literature. However, the availability and quality of livelihood assets such as financial, natural, social, human, and physical capital act as mediators in the relationship between agribusiness performance and livelihood outcomes. In order to investigate the dynamics of agribusiness value chains, the function of livelihood assets, and the possibility of improving agribusiness performance to promote sustainable development and poverty alleviation in difficult environments, this review synthesizes the body of existing research.

This research review examines two primary relationships: (1) the influence of agricultural performance on livelihood outcomes in precarious environments, and (2) the mediating role of livelihood assets in the link between agribusiness performance and livelihood outcomes. These links are essential for comprehending how agribusinesses might enhance the socio-economic situations of rural households and communities.

2.2. Agribusiness and Livelihood Assets

The effectiveness with which agricultural companies manage their production, processing, and marketing activities to increase value and competitiveness is recognized as agribusiness performance [12]. Many studies show that, particularly in vulnerable and developing situations, enhanced agribusiness performance significantly improves livelihood outcomes, such as income, food security, and resilience [13].Because it helps farmers and agribusinesses access premium markets and improve product quality, agribusiness efficacy often affects revenue creation in precarious environments.

Agribusiness performance is tightly linked to the five livelihood assets, forming a reinforcing cycle of resilience and productivity [14]. Human capital is augmented by agribusiness-driven training initiatives, digital extension services, and job creation, which improve farmers' competencies, decision-making abilities, and labor productivity [15]. Social capital enhances as agribusinesses promote collective marketing, value chain integration, and trust-based connections, particularly through cooperatives and contract farming models [16]. These networks enhance knowledge dissemination and decrease transaction expenses. The adoption of sustainable techniques by agribusinesses, such as regenerative agriculture or conservation farming, directly influences natural capital by protecting soil, water, and biodiversity while sustaining productivity [17]. The rise of agriculture enhances physical capital by stimulating investment in critical infrastructure such as cold storage, automation, and processing facilities, which mitigate losses and improve efficiency [18]. Ultimately, financial capital increases through enhanced revenue, improved access to agricultural finance, and reinvestment prospects, particularly when associated with mobile banking and digital credit systems. The interactions are bidirectional; robust livelihood assets enhance agricultural performance, establishing a dynamic feedback loop that supports sustained rural development and market competitiveness [19].

The efficacy of the connections between agricultural performance and livelihood assets is frequently influenced by contextual circumstances, especially in unstable and conflict-affected environments [20]. Insecurity and instability may significantly undermine physical and social capital by obstructing market access, mobility, and trust among participants in agricultural value chains [21]. Governance difficulties, including frail institutions, inadequate regulatory frameworks, and

restricted state capacity, impede the allocation of financial resources, hinder infrastructure development, and reduce the effectiveness of supportive policies and services [22]. Moreover, gender-based disparities, such as inequitable access to land, financing, training, and decision-making positions, persistently restrict women's capacity to engage in and gain advantages from agriculture. Structural and institutional impediments can substantially influence the mediating effect of livelihood assets, highlighting the necessity for context-specific agricultural policies that tackle the distinct vulnerabilities inherent in precarious situations [23].

2.2.1. Human Capital and Agribusiness

Agribusinesses can enhance performance by investing in infrastructure, technology, and production inputs when they have access to financial resources [1]. Financial capital constraints can be a significant barrier to agricultural success in unstable environments with limited access to credit. Thus, by providing necessary resources for investment and growth, microfinance, loans, and grants can affect the connection between agricultural performance and livelihood outcomes [24]. The relationship between agricultural performance and livelihood outcomes can be impacted by the presence of livelihood assets, which include social, human, and physical capital [25]. In regions with instability and limited resources, understanding these processes is crucial to developing policies that promote sustainable agricultural development and poverty alleviation. Human capital refers to an individual's abilities, health, and education, all of which have a direct impact on their ability to engage in and benefit from agricultural activities. Skilled labor is essential for improving agribusiness performance because it increases agricultural output quality and productivity. Human capital has the power to either support or undermine the positive impacts of agricultural performance on livelihood outcomes in precarious environments, which are marked by low educational attainment and serious health problems [26]. By giving people, the necessary skills for more effective participation in agricultural value chains, improved access to training, education, and healthcare can help bridge the gap between agricultural performance and livelihood outcomes. The relationship between livelihood outcomes and agribusiness performance is often impacted by effective management of natural capital, which promotes agribusinesses' success and flexibility in response to changing environmental conditions [27].

2.2.2. Social Capital's Role in Livelihood Outcomes

In developing countries, particularly in vulnerable areas where agriculture supports rural economies, agribusinesses are crucial for promoting economic growth and improving livelihood outcomes [28]. The effectiveness of agriculture is often linked to resilience, food security, and revenue generation in unstable environments like Somalia. The global value chain (GVC) frameworks within donor-driven development initiatives underscore their capacity to improve market access, productivity, and socio-economic results in developing nations [4]. Although GVC-centric strategies can promote upgrading and integration into the global economy, the research underscores important constraints, such as power disparities, a limited emphasis on export-oriented growth, and a disregard for local contexts. The study calls for comprehensive interventions that address the structural disparities, emphasize socio-economic goals, and integrate local and regional value chains. This view is particularly relevant to agribusiness, where sustainable development and fair value allocation are very important. Social capital can enhance agricultural performance in Somalia by encouraging cooperation and reducing transaction costs, while social cohesiveness and trust among rural communities can lessen the risks of political instability [29]. Agribusinesses can improve value chain operations and spread ideas through social capital, which improves rural residents' quality of life.

2.2.3. Physical Infrastructure and Market Access

Agricultural value chains can influence food security among smallholder farmers in Sub-Saharan Africa. While highlighting the potential for process, product, and functional upgrading to improve productivity, incomes, and market access, it flags obstacles including

fragmented land, limited technology access, and inequities in social relationships [28]. This points out the dire need for participatory, locally based approaches for sustainable food security and poverty reduction. The correlation between agricultural success and food security is well-established. Enhanced agricultural operations result in more dependable and varied food production, hence increasing food accessibility for local populations. Furthermore, improving resilience to climate change and economic shocks depends heavily on agricultural success. The ability of households to recover from or adapt to external shocks, such as price changes, natural disasters, or economic downturns, is known as livelihood resilience. Agribusinesses that prioritize sustainability, resource efficiency, and technological innovation are more resilient to external constraints, ensuring consistent revenue streams and a consistent supply of food [30]. By increasing the sustainability of agricultural production systems and enabling communities to more effectively survive shocks, agribusiness efficacy can significantly boost resilience in precarious environments like Somalia, where political instability and climate change exacerbate vulnerability.

Furthermore, smallholder farmers can obtain better market knowledge, resources, and support when they are part of strong social networks. Infrastructure, machinery, and technology are all examples of physical capital, which is essential to the success of agricultural endeavors [31]. The effectiveness and competitiveness of agribusinesses are severely hampered in Somalia by inadequate infrastructure, as well as restricted access to modern storage facilities, dependable transportation networks, and cutting-edge processing technologies. Smallholder farmers' profitability is often lowered by post-harvest losses and high transportation costs brought on by inadequate cold storage and poor road networks [32]. The gap between agricultural performance and livelihood outcomes can be closed by strategically investing in roads, irrigation systems, market facilities, and renewable energy technologies. These enhancements promote economic resilience and sustainable growth for rural communities by increasing access to local, regional, and global markets in addition to increasing operational efficiency and lowering losses [9].

2.3. Conceptual Model

The conceptual model (**Figure 1**) illustrates how agribusiness performance is connected to livelihood assets and livelihood outcomes. Agribusiness performance, measured by productivity, profitability, and market penetration, enhances the supply of livelihood assets in the form of human, social, natural, physical, and financial capital. These assets determine whether individuals and communities are able to utilize effective livelihood strategies. The causal relationship is highlighted in this model, illustrating how agribusiness performance influences livelihood outcomes by building livelihood assets.

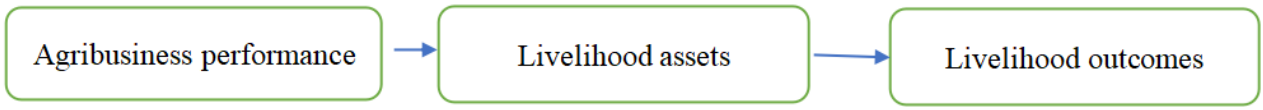

Figure 1. Conceptual Model of Agribusiness performance, Livelihood assets and Livelihood outcomes.

2.4. Conclusions

The evidence shows that good agricultural performance greatly helps people's lives, especially in places like Somalia that face challenges. Better agricultural performance leads to higher income, more food security, and stronger resilience for rural communities. How well agribusiness programs work mostly depends on how accessible and good the resources for living are, which affects the relationship between agricultural performance and people's lives. Investing in these resources: education, infrastructure, social networks, and financial services, could increase the positive impact farming success has on rural communities. The aim of

this paper is to gain insight into these processes to offer information on how agribusinesses in tough areas could better support sustainable development and reduce poverty.

3. Methodology

This research utilized a quantitative approach to investigate the correlations between agribusiness performance, livelihood assets, and livelihood outcomes in Somalia's vulnerable agriculture sector. The study was directed by a cohesive conceptual framework derived from Porter's Value Chain model and the Sustainable Livelihoods Framework. This dual-framework methodology was chosen to encompass both the operational aspects of agriculture and the multifaceted characteristics of livelihood assets in at-risk areas. The selection of Somalia as the research location underscores its significance as a precarious environment where agriculture is pivotal for economic production, food accessibility, and community resilience.

The selection of Somalia is based not just on its significant reliance on agriculture but also on its exemplification of wider unstable and conflict-affected environments. Somalia, as a nation contending with enduring insecurity, inadequate institutional capacity, and insufficient infrastructure, exemplifies the fundamental issues encountered by agricultural stakeholders in unstable contexts worldwide. The nation's informal and disjointed value chains, gendered access to productive resources, and vulnerability to climate shocks reflect circumstances in many conflict-affected or post-conflict economies throughout Sub-Saharan Africa, the Middle East, and South Asia. This study analyzes the interplay between agribusiness performance, livelihood assets, and outcomes, offering transferable insights on how market-oriented agricultural interventions might bolster resilience and promote inclusive growth in comparable vulnerable settings. Consequently, although anchored in Somalia, the ramifications of this research pertain to a broader array of low-governance, high-vulnerability agricultural systems.

A systematic questionnaire was created utilizing previously validated instruments and theoretical frameworks from pertinent literature. The items were modified to represent the socio-economic situations of rural Somali populations and encompassed agricultural performance, livelihood assets, and livelihood outcomes. Agribusiness performance was assessed using indices of production, profitability, and market penetration. Livelihood assets encompassed human, social, natural, physical, and financial resources, whereas livelihood outcomes were defined by characteristics including income, food security, employment, and resilience. Each component was evaluated using many items graded on a five-point Likert scale from "strongly disagree" to "strongly agree." The questionnaire was evaluated by academic specialists and local practitioners to ensure clarity, cultural relevance, and content validity before deployment.

Data were gathered from 400 persons actively involved in the agriculture value chain. The sampling technique was purposeful, focusing on participants engaged in agriculture, processing, logistics, and marketing. The areas of Afgoye, Balcad, Mogadishu, Johar, and Baladwayne were chosen due to their importance in agricultural output and commerce. Data collection was executed via in-person interviews conducted by professional enumerators. Ethical guidelines were rigorously adhered to, encompassing informed permission, voluntary participation, and the guarantee of respondent confidentiality.

The investigation employed Structural Equation Modeling (SEM) to examine the proposed correlations among the constructs and to assess the mediating function of livelihood assets. Structural Equation Modeling (SEM) was chosen due to its capacity to concurrently estimate various correlations among observable and latent variables, rendering it appropriate for evaluating intricate theoretical models that incorporate mediating factors. Considering the study's conceptual framework, which encompasses both direct and indirect impacts across several dimensions, SEM offered the methodological rigor required to elucidate these interdependencies within a unified analytical framework. Before calculating the structural model, the measurement model was evaluated using Confirmatory Factor Analysis. This stage confirmed that the constructs exhibited internal consistency and construct validity. Reliability was assessed by Cronbach's alpha and composite reli-

ability, whilst convergent validity was evaluated using Average Variance Extracted. The Heterotrait-Monotrait (HTMT) ratio was employed to assess discriminant validity. Model fit indicators were employed to validate the sufficiency of the measurement model prior to advancing to structural analysis. All statistical analyses were performed using standard SEM software, adhering to known methodological principles in empirical social science research.

This study employed a methodological approach that guaranteed the constructs were conceptually robust and statistically dependable, while the sampling and data collection methods yielded a representative overview of agribusiness participants in the chosen locations. This strategy enabled a thorough analysis of the connections among agricultural performance, livelihood assets, and livelihood outcomes within a precarious and under-explored national setting.

4. Data Analysis

4.1. Demographics

To contextualize the influence of agricultural value chain components on performance and livelihood outcomes, it is essential to have a solid understanding of the demographic characteristics of the participants. Having these insights allows for the identification of critical trends, such as age distribution, gender roles, education levels, and wealth discrepancies, which are essential for personalizing interventions to improve the performance of agribusiness. Furthermore, the analysis of demographic patterns offers a basis for understanding the socio-economic circumstances and resource distribution within the research region. **Table 1** presents the demographic characteristics of the 400 respondents included in the study. This is in line with the objective of the study, which is to integrate Porter's Value Chain framework with the Sustainable Livelihoods Framework.

Table 1. Demographic characteristics of study participants (N = 400).

Characteristics	F	%
Age		
18–25	171	42.80
26–35	103	25.80
36–45	92	23.00
46–55	30	7.50
Above 56	4	1.00
Gender		
Male	348	87.00
Female	52	13.00
Education		
No formal education	200	50.00
Primary education	126	31.50
Secondary education	27	6.80
College diploma	7	1.80
University degree	40	10.00
Occupation		
Farming	268	67.00
Processing	71	17.80
Marketing	15	3.80
Logistics	46	11.50

Table 1. *Cont.*

Characteristics	F	%
Marital Status		
Single	27	6.80
Married	351	87.80
Divorced	16	4.00
Widowed	6	1.50
Experience		
Less than 1 year	18	4.50
1–3 years	196	49.00
4–6 years	170	42.50
More than 6 years	16	4.00
Household Size		
1–2 members	29	7.30
3–5 members	192	48.00
6–8 members	166	41.50
More than 8 members	13	3.30
Income Level		
Less than $100	15	3.80
$100–$500	210	52.50
$501–$1000	86	21.50
$1001–$2000	86	21.50
More than $2000	3	0.80
City		
Mogadishu	51	12.80
Afgoye	168	42.00
Balcad	127	31.80
Johar	35	8.80
Baladwayne	8	2.00
Others	11	2.80

The demographic analysis of the study, which is presented in **Table 1**, offers valuable insights into the characteristics of persons who are involved in activities related to agricultural transactions. Many participants, which accounts for 42.8% of the total, are between the ages of 18 and 25, demonstrating the participation of a younger generation in the sector. A considerable majority of participants, 25.8%, are between the ages of 26 and 35. On the other hand, the proportion of participants who are over 45 years old is significantly lower, with just 8.5% of them being in this age range.

This suggests that there is a significant dependence on younger labor forces, which may be the result of the physical demands of activities related to agriculture or the departure of older persons from the labor field. A significant majority of the sample is comprised of males, with men accounting for 87% of the respondents. The participants' levels of education are especially low, with fifty percent of them not having completed any formal schooling and thirty-one point five percent having just completed basic education. In the United States, just 1.8% of the population has completed their high school education, and only 10% have earned a degree from a university.

This shows that persons with limited educational possibilities are drawn to the agricultural sector, which may be associated with the industry's emphasis on physical labor rather than technical abilities. Regarding occupation, 67 percent of the participants are engaged in farming, which demonstrates the essential position that farming plays in the value chain of the agricultural industry. Other responsibilities, such as processing (17.8%), logistics (11.5%), and marketing (3.8%), are represented by a smaller percentage, which suggests that there is an unequal distribution among the activities that make up the value chain. Most participants are married (87.8%), which is reflective of the social structure of the workforce in the agricultural industry, which may play an important role in the maintenance of livelihood activities when family support networks are present. With 48% of respondents living in homes with three to five individuals and 41.5% living in families with six to eight members, the size of the household is an important characteristic.

This reflects the frequency of big families, which may have an impact on the labor contributions to activities related to agriculture as well as the distribution of sources of revenue. 52.5% of the population earns between $100 and $500, while only 21.5% earn more than $500. This indicates that the income levels are predominantly moderate. It appears that there is limited profitability inside the agriculture operations due to the low income. The bulk of participants are in the cities of Afgoye (42%), Balcad (31.8%), and Mogadishu (12.8%), according to their geographic location among the participants. It is also likely that the concentration in some cities may be the result of improved agricultural prospects or the availability of resources in particular places.

4.2. Measurement Model

The measurement model for the study was developed to check the validity and reliability of the constructs used to measure agribusiness performance, livelihood assets, and livelihood outcomes in the context of Somalia's agricultural value chains, which indicates a strong and reliable measurement of the constructs. The developed measurement model is presented in **Figure 2.**

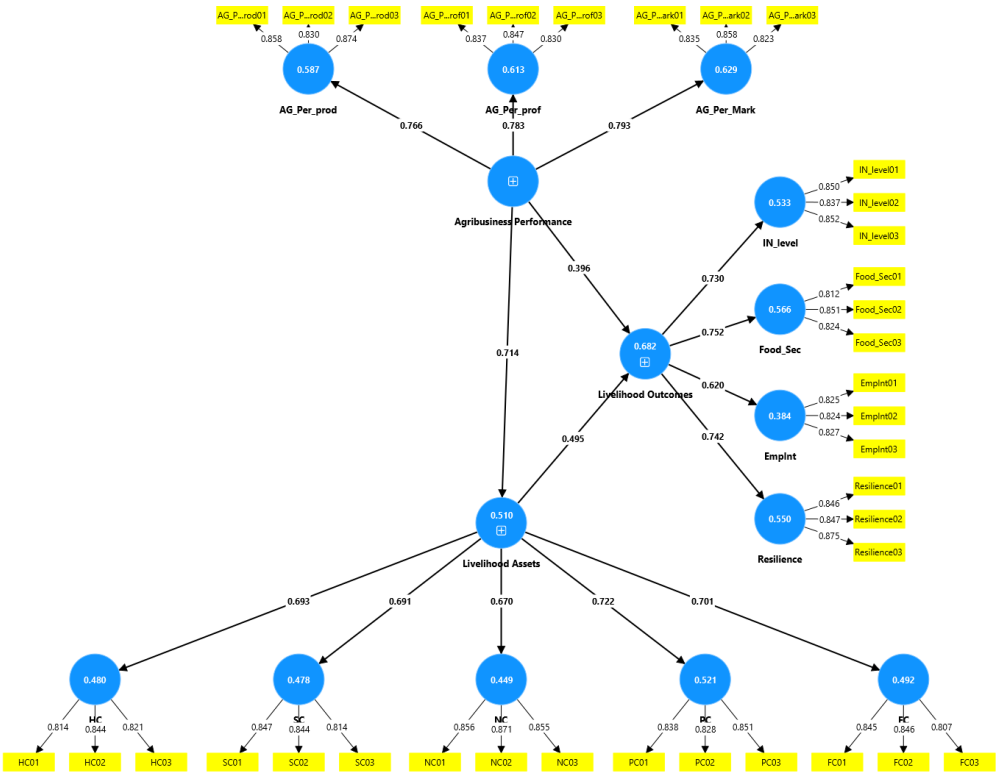

Figure 2. Measurement model.

Model Fit

The model fit was assessed using several fit indices. As shown in **Table 2**, the Chi-Square/df ratio of 1.71 falls within the excellent fit range of 1.00–3.00, indicating a good balance between model complexity and data explanation. The assumed Comparative Fit Index (CFI) was 0.93, and the Tucker-Lewis Index (TLI) was 0.93, exceeding the recommended threshold of 0.90 and suggesting that the model adequately fits the data. The Root Mean Square Error of Approximation (RMSEA) was 0.04, indicating a close approximation between the proposed model and the population covariance matrix, signifying high model precision, and the Standardized Root Mean Square Residual (SRMR) was 0.06, suggesting minimal discrepancies between observed and predicted correlations. Collectively, these indices provide strong evidence of the model's exceptional fit, confirming its validity and reliability in explaining the relationships between agribusiness performance, livelihood assets, and livelihood outcomes.

Table 2. Model fit indices.

Fit Index	Value	Interpretation
Chi-Square/df	1.71	Excellent fit (1.00–3.00 range)
Comparative Fit Index (CFI)	0.93	Excellent fit
Tucker-Lewis Index (TLI)	0.93	Good fit (> 0.90)
Root Mean Square Error of Approximation (RMSEA)	0.04	Good fit
Standardized Root Mean Square Residual (SRMR)	0.06	Good fit

In **Table 3**, the measurement model was assessed for construct reliability and validity. As shown in **Table 1**, all constructs demonstrated good internal consistency, with Cronbach's alpha values ranging from 0.77 to 0.83. Composite reliability values were also above the recommended threshold of 0.70, ranging from 0.77 to 0.83. Most constructs exhibited adequate convergent validity, with Average Variance Extracted (AVE) values above 0.50.

Table 3. Construct's reliability and validity.

Construct	α	ρ_a	ρ_c	*AVE*
Agribusiness Performance				
Productivity	0.82	0.82	0.89	0.73
Profitability	0.79	0.79	0.88	0.70
Market penetration	0.79	0.79	0.88	0.70
Livelihood Outcomes				
Income Levels	0.80	0.80	0.88	0.72
Food security	0.77	0.78	0.87	0.69
Employment	0.77	0.77	0.87	0.68
Resilience	0.82	0.82	0.89	0.73
Livelihood Assets				
Human capital	0.77	0.77	0.87	0.68
Social capital	0.78	0.78	0.87	0.70
Natural capital	0.83	0.83	0.90	0.74
Physical capital	0.79	0.79	0.88	0.70
Financial capital	0.78	0.78	0.87	0.69

Note: α = Cronbach's alpha; ρ_a = Composite reliability (rho_a); ρc = Composite reliability (rho_c); AVE = Average variance extracted.

Discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio. As shown in **Table 4**, all HTMT values were below the conservative threshold of 0.85, indicating adequate discriminant validity. This suggests that the constructs are distinct from each other.

Table 4. Discriminant validity (Heterotrait-Monotrait ratio – HTMT < 0.85).

Construct	1	2	3	5	6	7	8	9	10	11	12	13
1. Productivity	–											
2. Profitability	0.47	–										
3. Market penetration	0.52	0.57	–									
5. Income levels	0.46	0.63	0.53	–								
6. Food security	0.40	0.70	0.61	0.42	–							
7. Employment	0.47	0.32	0.56	0.55	0.33	–						
8. Resilience	0.48	0.58	0.51	0.40	0.63	0.26	–					
9. Human capital	0.41	0.49	0.37	0.36	0.40	0.34	0.40	–				
10. Social capital	0.60	0.60	0.56	0.58	0.73	0.37	0.46	0.52	–			
11. Natural capital	0.28	0.26	0.19	0.39	0.55	0.18	0.42	0.42	0.36	–		
12. Physical capital	0.72	0.56	0.49	0.42	0.65	0.45	0.71	0.44	0.49	0.46	–	
13. Financial capital	0.56	0.61	0.54	0.61	0.50	0.36	0.66	0.49	0.38	0.48	0.45	–

4.3. Structural Model

The structural model for the study was developed to check for the direct and indirect effects of agribusiness performance on livelihood outcomes. Furthermore, the mediating role of livelihood assets was also measured. The influences were interpreted as significant with p-values. The developed structural model is presented in **Figure 3**.

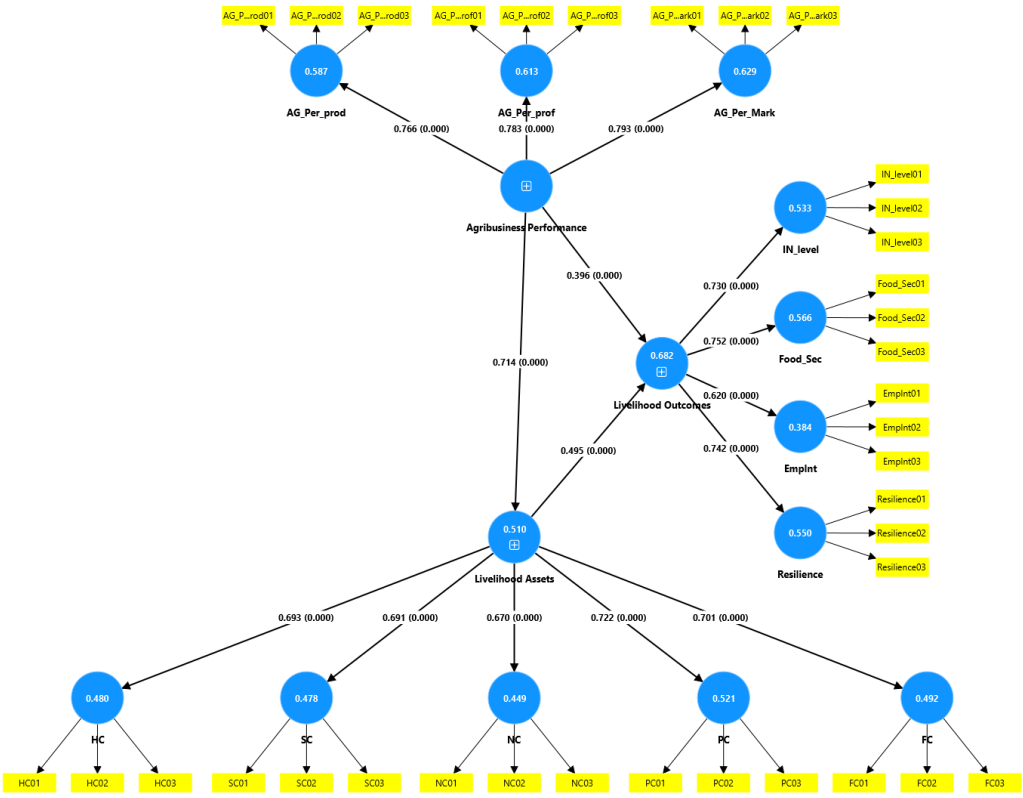

Figure 3. SEM model.

4.3.1. R Square

The R-square values from the structural model highlight the explanatory power of the predictors on livelihood assets and livelihood outcomes. For livelihood assets, the model explains 51% of the variance (R-square = 0.510), with an adjusted R-square of 0.508, indicating that this is a moderately strong model for understanding the factors influencing livelihood assets. For livelihood outcomes, the model shows a higher explanatory power, accounting for 68.2% of the variance (R-square = 0.682) with an adjusted R-square of 0.680, reflecting a robust model fit. These results demonstrate that agribusiness performance and the mediating role of livelihood assets significantly contribute to explaining variations in livelihood outcomes, while also moderately capturing the factors that influence livelihood assets. The findings suggest that the model is highly effective for livelihood outcomes and reasonably effective for livelihood assets, providing strong support for the structural relationships explored in the study (see **Table 5**).

Table 5. R-square of the structural model.

Outcome Variable	R^2	Adjusted R^2
Livelihood assets	0.510	0.508
Livelihood outcomes	0.682	0.680

4.3.2. Direct Effects

The results demonstrate significant direct effects in the structural model, highlighting the relationships between agribusiness performance, livelihood assets, and livelihood outcomes. Agribusiness performance has a strong positive effect on livelihood assets (β = 0.714, p = 0.000), indicating that improvements in agribusiness performance significantly enhance the availability and quality of livelihood assets. Additionally, agribusiness performance has a moderate positive direct effect on livelihood outcomes (β = 0.396, p = 0.000), showing that while it directly contributes to better livelihood outcomes, its impact is less pronounced compared to its influence on livelihood assets. Livelihood assets, in turn, have a strong and significant positive effect on livelihood outcomes (β = 0.495, p = 0.000), emphasizing their critical role in improving overall livelihoods. These findings suggest that while agribusiness performance directly impacts livelihood outcomes, its effects are also likely mediated through livelihood assets (as p < 0.001, with narrow confidence intervals confirming the strength of these relationships), which act as a key intermediary in achieving better livelihood results (see **Table 6**).

Table 6. Direct effects.

Direct Path	*β*	*SE*	*t*	*P*	*95% CI [LB–UB]*
Agribusiness Performance -> Livelihood Assets	0.714	0.025	28.785	0.000	[0.663–0.760]
Agribusiness Performance -> Livelihood Outcomes	0.396	0.039	10.038	0.000	[0.316–0.472]
Livelihood Assets -> Livelihood Outcomes	0.495	0.039	12.795	0.000	[0.418–0.571]

4.3.3. Indirect Effects

The results reveal a significant indirect effect of agribusiness performance on livelihood outcomes through livelihood assets, with a path coefficient of 0.353, a p-value of 0.000, and a T-statistic of 11.894. This demonstrates that livelihood assets play a crucial mediating role in the relationship between agribusiness performance and livelihood outcomes. The findings

suggest that while agribusiness performance directly contributes to improved livelihoods, its impact is significantly amplified at $p < 0.001$ through its influence on livelihood assets, with narrow confidence intervals confirming the strength of these relationships (see **Table 7**).

Table 7. Indirect effects.

Indirect Path	*β*	*SE*	*t*	*P*	*95% CI [LB–UB]*
Agribusiness Performance -> Livelihood Assets -> Livelihood Outcomes	0.353	0.030	11.894	0.000	[0.296–0.413]

4.4. Hypotheses Testing

- **H1.** *Agribusiness performance has a significant positive impact on livelihood outcomes (income, food security, and resilience) in fragile contexts.*

The results strongly support the hypothesis that agribusiness performance has a significant positive impact on livelihood outcomes, including income, food security, and resilience, in fragile contexts. The direct effect of agribusiness performance on livelihood outcomes is positive and statistically significant ($\beta = 0.396$, $p = 0.000$), with a robust T-statistic of 10.038. This indicates that improvements in agribusiness performance directly contribute to better livelihood outcomes in fragile contexts, reflecting its critical role in enhancing economic stability, food availability, and resilience against shocks.

- **H2.** *Livelihood assets (human, social, natural, physical, and financial capital) mediate the relationship between agribusiness performance and livelihood outcomes in fragile contexts.*

The hypothesis (H2) that livelihood assets mediate the relationship between agribusiness performance and livelihood outcomes in fragile contexts is supported, but the results indicate partial mediation, not full mediation. The significant indirect path ($\beta = 0.353$, $p < 0.001$) shows that livelihood assets act as a mediator. However, since the direct effect from agribusiness performance to livelihood outcomes ($\beta = 0.396$, $p < 0.001$) remains significant and relatively strong, it suggests that livelihood assets only partially explain how agribusiness performance influences livelihood outcomes. Thus, agribusiness performance impacts livelihood outcomes both directly and through its effect on livelihood assets.

5. Discussion of the Results

The findings of this study offer vital insights into the link between the performance of agribusiness and the outcomes of livelihoods, as well as the function of livelihood assets as mediators in unstable environments such as Somalia. Even though the findings demonstrate the significance of agribusiness performance in terms of its ability to drive increases in income, food security, and resilience, they also shed light on the intricate relationships that exist between agribusiness performance and livelihood outcomes, which are mediated by livelihood assets. This part addresses the most important findings, discusses the consequences of those findings, and provides a larger perspective for agriculture in fragile settings.

5.1. Agribusiness Performance and Livelihood Outcomes

The findings of this research provide substantial evidence in support of the concept that the performance of agribusiness has a favorable impact on the outcomes of livelihoods in marginalized communities. The coefficient of 0.396 for the direct effect of agribusiness performance on livelihood outcomes suggests that increases in agribusiness efficiency and effectiveness contribute considerably to improved economic stability, food security, and resilience for rural people in Somalia. This is the case because agribusiness performance has a direct influence on livelihood outcomes. This conclusion is consistent with the findings of prior research,

such as those conducted by Staritz [4], which highlight the significant role that agribusiness value chains play in boosting revenue for farmers by strengthening their access to markets and encouraging higher-value markets. Furthermore, when agribusinesses improve their performance, smallholder farmers get access to better resources, markets, and technology, all of which directly contribute to improved people's ability to make a living.

This direct link between the performance of agribusiness and the results of livelihoods is particularly pertinent in Somalia, where agriculture serves as the foundation of the economy and the rural population relies significantly on agricultural operations for their means of subsistence. The enhancement of agricultural performance has the potential to increase income levels, boost food security, and strengthen resilience against economic and environmental shocks. All of these are essential for communities that are confronted with continuous difficulties connected to food insecurity and poverty.

In addition, the discovery that resilience is favorably connected with agribusiness success highlights the wider influence that resilience has. It is essential for communities to have resilience in fragile situations in order to recover from and adapt to external shocks. These shocks might be caused by political instability, climate change, or economic volatility. The findings of the study indicate that agribusinesses that are concentrating on enhancing sustainability, resource management, and technological innovation may be better positioned to weather these shocks. This highlights the need for cultivating efficient agribusinesses in order to ensure long-term resilience [30].

5.2. The Role of Livelihood Assets as Mediators

One of the most important discoveries made by this research was that livelihood assets play a role in mediating the connection between the performance of agriculture and the results of livelihood options. It was shown that livelihood assets, which include human, social, natural, physical, and financial resources, had a strong beneficial influence on livelihood outcomes. Furthermore, it was discovered that livelihood assets explain 51% of the variance in livelihood outcomes. This lends credence to the idea that the performance of agriculture is essential for the improvement of livelihoods; however, the availability and quality of assets that are used for livelihoods magnify the effects of these factors.

As a result of the identification of human capital as a crucial mediator, the argument that enhancing the capabilities, education, and health of individuals directly impacts their capacity to participate in agricultural operations was strengthened. Depending on the circumstances, human capital may either support or hinder the potential advantages of agricultural performance [26]. This is especially true in insecure contexts, where options for education and healthcare are frequently restricted. This study highlights the significance of investing in education and healthcare to equip individuals with the ability to effectively engage in value chains, hence increasing the influence that the performance of agriculture has on the outcomes of livelihoods.

Additionally, playing a crucial part in moderating the relationship is the concept of social capital. Thiele et al. [31] who stated that strong social networks and trust may lower transaction costs, promote market access, and foster collaboration in agricultural value chains; the findings of this study agree with their argument. Strengthening social capital through community-based projects might further enhance the advantages of agricultural performance in Somalia, which would provide improved access to markets and resources for smallholder farmers. In Somalia, social cohesion has the potential to suffer the consequences of political instability.

It was also clear that natural capital played a role since the availability of natural resources and their management in a sustainable manner had an impact on the performance of agriculture and the consequences of livelihoods. In Somalia, where environmental deterioration and climate change pose a danger to agricultural output, the development of sustainable resource management practices is essential. This study underscores the necessity of incorporating climate-smart farming techniques into agribusiness plans to improve resilience and assure food security over the long run [28].

The model indicates that there is a need for significant investments in infrastructure to reduce barriers to market access and improve efficiency. However, it was

discovered that physical capital, which includes both technology and infrastructure, had a direct and moderate impact on both the performance of agribusinesses and the outcomes of livelihoods. In line with research that emphasizes the significance of infrastructure in lowering post-harvest losses and enhancing access to higher-value markets [33], this is congruent with the findings of those studies. To improve the performance of agriculture in Somalia and, therefore, the results of livelihoods, it is essential to create physical capital in the form of transportation, storage, and processing facilities.

Another important mediator was financial capital, which, by providing agribusinesses with access to financial resources, made it easier for them to make investments in production inputs, infrastructure, and technological advancements. The limited availability of credit and financial services in unstable contexts such as Somalia might result in financial capital limitations that can impede the expansion and effectiveness of agribusinesses. It is vital to have access to microfinance, loans, and other financial services to overcome these obstacles and enable agribusinesses to flourish, which eventually influences the outcomes of livelihoods [24].

Although the study's findings indicate that livelihood assets act as a mediator in the connection between agricultural performance and livelihood outcomes, it is essential to emphasize that the mediation is not without flaws. Even after considering the role that livelihood assets play as a mediator, the direct influence of agricultural performance on the results of livelihood operations continues to be considerable. Considering this, it appears that although livelihood assets play a significant role in magnifying the impact of agricultural performance, agribusinesses may nevertheless enhance livelihood outcomes even in the absence of livelihood assets.

As a result of this discovery, the notion that the effect of agricultural performance on livelihood outcomes is exclusively dependent on the improvement of livelihood assets is called into question. It brings to light the necessity of more nuanced interventions that not only enhance the effectiveness and competitiveness of agricultural companies but also simultaneously seek to develop the asset base of rural communities.

The study offers substantial insights into the relationship between agricultural performance and livelihood outcomes; however, it possesses several limitations. The application of selective sampling and the spatial concentration of respondents in Afgoye and Balcad may restrict the generalizability of the findings throughout Somalia. Moreover, dependence on self-reported data may lead to response bias, and the cross-sectional design limits causal findings. Future study ought to employ longitudinal methodologies and encompass a wider geographic scope to corroborate and enhance these findings.

6. Conclusions and Policy Implications

6.1. Conclusions

This study examined the impacts of agribusiness value chains on livelihood outcomes in fragile situations, specifically Somalia. The availability and quality of livelihood assets, such as human, social, natural, physical, and financial capital, intensify the effects of improved agribusiness performance, which the study confirms directly increases income, food security, and resilience. The results show that the combination of Porter's Value Chain approach and the Sustainable Livelihoods Framework (SLF) provides an easy mechanism for enhancing market access, resource use, and economic resilience. The results highlight the need for a holistic approach that takes into account the broader socioeconomic factors that enable rural communities to benefit from these developments in addition to improving agricultural performance. Political instability, poor infrastructure, and scarce financial resources are challenges that make it hard for agribusiness to grow and survive. The study highlights the need for policies that promote investment in infrastructure, improve local value chains, and ease access to financial support. It also emphasizes the value of social capital and institutions in improving linkages in value chains, innovation, and livelihood resilience in the long term.

6.2. Implications for Policy and Practice

This study's findings have substantial policy implications for enhancing agricultural performance and livelihood outcomes in vulnerable environments. The subsequent points are very pertinent:

- Targeted Investments in Livelihood Assets: Improving vital livelihood assets, such as financial, social, and human capital, should be a top priority for policymakers. Access to healthcare, education, and vocational training will be made possible by policies that equip rural communities with the information and abilities needed to take part in and benefit from improved agricultural performance. Additionally, expanding access to financial services like insurance and microcredit would enable farmers and agribusinesses to make investments in infrastructure, production inputs, and technology, leading to better performance and livelihood results.
- Enhancing Social Capital: Policymakers should prioritize initiatives that foster community-based networks and trust because they understand the critical role social capital plays in facilitating access to markets, resources, and information. Initiatives for community-driven development that encourage cooperation between farmers, processors, and other value chain players can lower transaction costs, improve market accessibility, and speed up the spread of knowledge and innovations. In order to promote inclusive and equitable development, policy must also give priority to empowering women and underrepresented groups to hold leadership roles within value chains.
- Incorporating Sustainability into Agribusiness Plans: Plans for agribusiness expansion must prioritize sustainability. The adoption of climate-smart farming methods that integrate sustainable resource management into value chains ought to be encouraged by policymakers. By supporting practices like water conservation, soil fertility management, and the production of drought-resistant crops, agribusinesses can increase their resilience to climate change and economic disruptions. Furthermore, incorporating sustainability into agribusiness strategies will ensure that improvements in agricultural output are long-lasting and beneficial for coming generations.

The relationship between agricultural performance, livelihood outcomes, and livelihood assets in precarious environments is clarified by this study. By enacting policies that give priority to improving agribusiness performance and the overall socio-economic environment, Somalia and similar fragile environments can achieve sustainable development, improve food security, and cultivate economic resilience. Taking on the interconnected challenges of agricultural performance and the strengthening of livelihood assets is essential for promoting sustainable prosperity in rural communities within vulnerable contexts. In Somalia, specific policy measures must tackle the distinct structural limitations confronting rural people. Expanding access to financial services necessitates the creation of Sharia-compliant microfinance choices that conform to local customs. Investment in infrastructure should focus on rural feeder roads and irrigation systems, particularly in high-potential areas such as Lower Shabelle and Hiiraan. Enhancing extension services and market information systems is crucial for increasing farmers' production and negotiating strength. Furthermore, gender-responsive programming is essential due to the underrepresentation of women in agricultural leadership and decision-making roles. Customized vocational training for youth can enhance labor market opportunities and diminish reliance on humanitarian assistance. These tactics tailored for Somalia are crucial for converting agriculture advancements into widespread enhancements in livelihoods.

6.3. Study Limitations and Directions for Future Research

This study provides valuable insights into the influence of agricultural performance and livelihood assets on rural outcomes in precarious environments, although numerous limitations must be recognized. The cross-sectional design restricts the capacity to infer causality or monitor long-term changes over time. Future research may utilize longitudinal or panel data methodologies to evaluate the dynamic effects of agricultural interventions on livelihoods. The study is geo-

graphically restricted to specific high-production areas in Somalia, perhaps constraining its applicability to other places experiencing other types of fragility, such as drought or armed conflict. Third, the study lacks a thorough disaggregation by gender, age, or livelihood categories, which are essential for comprehending the varied consequences among population subgroups. Future research may employ intersectional methodologies or mixed methods designs to investigate how these dynamics manifest across social categories. Ultimately, although the SEM technique yields substantial statistical insights, qualitative validation via case studies or interactive methods might enhance and contextualize the results.

Author Contributions

A.Y.S.A. oversaw data administration, data purification, performed descriptive analysis, assessed the model utilizing SmartPLS software, communicated the results, composed the discussion, and prepared the initial document. M.A.A.F. directed project management, formulated the model, spearheaded data gathering, synthesized the literature research, and contributed to conception, oversight, and comprehensive project administration. Z.A.M. produced the literature review, drafted the introduction, conducted quality control, and co-wrote the discussion and conclusion sections, while also contributing to the conception and review and editing of the text. A.Y.S.A. further obtained the financing for the project. All authors have reviewed and consented to the published version of the work.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of SIMAD University, Mogadishu, Somalia (Approval Number: EC000201, approved in August 2024).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study. The data collected were fully anonymized to ensure participant confidentiality.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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