Trends of Sugarcane Farming in Nzoia Sugar Company: A Historical Analysis of Growth and Decline

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Abstract- ***This study examines the historical trajectory of sugarcane farming at Nzoia Sugar Company (NSC) in Bungoma County, Kenya, from its establishment in 1975 to 2020. Using the Cumulative and Cyclical Interdependence Theory by Karl Gunnar Myrdal as a theoretical framework, the research traces how initial development cycles transformed into negative spirals affecting both the company and the surrounding community. Through qualitative research methods including interviews, focus group discussions, and document analysis, the study reveals how NSC progressed from initial success to eventual decline, identifying critical factors that contributed to this trajectory. The findings demonstrate how institutional, community, and individual factors interact to create cycles of growth or decline in agricultural economic activities, offering valuable insights for agricultural policy and management of agro-industrial enterprises in developing contexts.***

I. INTRODUCTION

Sugarcane farming represents a significant agricultural activity in Kenya, particularly in Western, Nyanza, and Coastal regions (Odada et al., 2016). The commercial cultivation of sugarcane in Kenya dates back to the early 1900s, initially introduced by Asian laborers who worked on the Kenya-Uganda railway (Wanyande, 2019). The crop has since evolved to become a major cash crop with substantial socioeconomic importance, especially in rural communities where it supports livelihoods through employment and income generation.

The establishment of Nzoia Sugar Company (NSC) in 1975 marked a significant milestone in the development of Kenya's sugar industry and the introduction of commercial sugarcane farming in Bungoma County. NSC was conceived as part of a broader strategy to develop Kenya's industry and boost economic growth in Western Kenya, aligning with national development policies outlined in the Sessional Paper No. 10 of 1965 on "African Socialism and its Application to Planning in Kenya" (Republic of Kenya, 2015). The company's establishment aimed to create employment opportunities, introduce cash crop farming to local communities, and stimulate regional economic development.

This study examines the historical trajectory of sugarcane farming at NSC from its establishment to 2020, analyzing how various factors interacted to create initial growth followed by eventual decline. The research is guided by Karl Gunnar Myrdal's Cumulative and Cyclical Interdependence Theory, which provides a framework for understanding how institutional, community, and individual factors interact to create cycles of either growth or decline in economic activities.

The study addresses the following research questions:

1. What were the key factors that influenced the establishment of Nzoia Sugar Company in Bungoma County?
2. How has sugarcane farming at NSC evolved from 1975 to 2020?
3. What factors have contributed to the decline in performance of NSC over time?

By examining these questions, this research contributes to our understanding of the dynamics of agricultural economic activities in developing contexts and offers insights for policy and management of agro-industrial enterprises.

II. LITERATURE REVIEW

2.1 Theoretical Framework

This study is anchored in Karl Gunnar Myrdal's Cumulative and Cyclical Interdependence Theory. Myrdal (1957) postulated that economic and social phenomena are characterized by interlocking circular interdependencies where changes in one factor affect and are influenced by changes in other circumstances, creating self-perpetuating systems of either development or decline. According to this theory, initial advantages or disadvantages in a region can set in motion cumulative processes that reinforce the original condition (Fujita, 2018).

Myrdal's theory proposes that economic development is not a linear process but rather a circular one where the interaction between various factors can lead to either "virtuous cycles" of growth or "vicious cycles" of decline (Hirschman, 2015). For instance, the establishment of an industry in a region can create employment opportunities, increase incomes, stimulate local spending, and attract further investment, thus initiating a virtuous cycle of development. Conversely, the decline of an industry can trigger a vicious cycle of unemployment, reduced incomes, decreased local spending, and disinvestment (Krugman, 2016).

The theory further suggests that positive cycles can reverse into negative ones when key institutional supports begin to fail, creating critical breaking points in previously stable institutions (Arora, 2019). This theoretical framework is particularly relevant for understanding the evolution of Nzoia Sugar Company, which initially catalyzed positive development in Bungoma County but later experienced a reversal of fortunes.

2.2 Historical Context of Sugar Industry in Kenya

The sugar industry in Kenya has evolved significantly since the early 1900s when commercial sugarcane farming was introduced by Asian laborers working on the Kenya-Uganda railway (Wanyande, 2019). The first sugar factories were established in the 1920s, including Victoria Nyanza Sugar Company in Kisumu district and Ramisi Sugar Company Limited in coastal Kenya, both privately owned by foreign investors (Odada et al., 2016).

The development of the sugar industry in Kenya was shaped by two key policy documents: The Swynnerton Plan of 1954 and the Sessional Paper No. 10 of 1965. The Swynnerton Plan initiated a shift from large-scale European farming to commercial peasant agriculture, creating opportunities for Africans to participate in cash crop cultivation (Ndungu et al., 2022). The Sessional Paper No. 10 of 1965 explicitly identified sugar as a key crop for development, stating that the government would prioritize expanding sugar production to meet domestic demand and provide a surplus for export (Republic of Kenya, 2015).

After independence, the Kenyan government established several state-owned sugar factories, including Muhoroni (1964), Mumias (1973), and Nzoia (1975), to boost domestic sugar production and reduce reliance on imports (Makina et al., 2018). These establishments aligned with the government's policy of Africanization, which aimed to transfer economic control from foreign entities to Kenyans (Otieno, 2016).

2.3 Challenges Facing Sugar Industry in Developing Countries

Sugar industries in developing countries face numerous challenges that affect their sustainability and competitiveness. Waswa et al. (2021) identified financial mismanagement, outdated technology, and inadequate government support as key challenges facing state-owned sugar factories in Kenya. Similarly, Raheman et al. (2019) found that poor credit risk management and competition from private companies significantly affected the performance of public sugar mills in Pakistan.

Climate change presents another significant challenge to sugar industries globally. Singels et al. (2018) noted that sugarcane production is particularly vulnerable to climate change due to low adaptation capacity, high vulnerability to natural hazards, and poor forecasting systems. Changes in temperature and rainfall patterns can significantly affect sugarcane yields and quality, impacting the profitability of sugar factories (Li et al., 2020).

Regional trade agreements also impact the competitiveness of domestic sugar industries. Ibrahim et al. (2018) observed that different COMESA member countries produce sugar at different costs but are exposed to the same market price, creating stiff competition. This disadvantages countries with higher production costs, such as Kenya, where the cost of producing a tonne of sugar exceeds global averages due to factors like high taxation on inputs and inefficient production systems (Wekesa et al., 2018).

III. METHODOLOGY

3.1 Research Design

This study employed a qualitative research design with a historical approach to examine the trends of sugarcane farming at Nzoia Sugar Company from 1975 to 2020. The research sought to understand how various factors interacted over time to influence the trajectory of sugarcane farming in the region, making a qualitative approach appropriate for capturing the complexity and context-specificity of these interactions (Creswell & Poth, 2018).

3.2 Study Area

The study was conducted in Bungoma County, focusing on the areas surrounding Nzoia Sugar Company. The company is located in Bungoma South sub-county, 5km from Bukembe, off Bungoma-Eldoret highway. The study area was selected because it represents one of Kenya's major sugar belts and has experienced significant transformations in sugarcane farming since the establishment of NSC in 1975.

3.3 Data Collection Methods

The study utilized multiple data collection methods to ensure comprehensive coverage of the research questions and enhance the reliability of findings through triangulation:

1. Oral Interviews: The researcher conducted in-depth interviews with 20 key informants, including current and former employees of Nzoia Sugar Company, local government officials, and community members with historical knowledge of sugarcane farming in the region. The interviews focused on understanding historical trends, factors influencing these trends, and the socioeconomic impacts of sugarcane farming.
2. Focus Group Discussions (FGDs): Three FGDs were conducted with different stakeholder groups: NSC casual workers, NSC officers, and community members. Each FGD comprised 8-12 participants and focused on collective experiences and perceptions of sugarcane farming trends.
3. Document Analysis: The researcher reviewed archival records from the Kenya National Archives, company reports, government publications, and academic literature to corroborate and supplement primary data from interviews and FGDs.

3.4 Data Analysis

The collected data was analyzed using thematic analysis, which involved identifying patterns and themes across the dataset (Braun & Clarke, 2019). The analysis was guided by the theoretical framework of Cumulative and Cyclical Interdependence, focusing on how various factors interacted to create cycles of growth or decline in sugarcane farming.

The analysis process involved several steps: (1) familiarization with the data through repeated reading of transcripts and documents; (2) generating initial codes to identify significant aspects of the data; (3) searching for themes by collating codes into potential themes; (4) reviewing themes to ensure they accurately represented the data; (5) defining and naming themes; and (6) producing the final analysis (Braun & Clarke, 2019).

IV. RESULTS AND DISCUSSION

This section presents research findings organized thematically to illuminate the historical trajectory of sugarcane farming at Nzoia Sugar Company. The analysis applies Myrdal's theoretical framework to interpret how various factors interacted over time, creating patterns of growth and decline.

4.1 Strategic Establishment and Initial Success (1975-1989)

The research reveals that NSC's establishment represented a deliberate development strategy based on careful assessment of various geographical, agricultural, and socioeconomic factors. According to agricultural officers interviewed, the selection process involved comprehensive soil analyses that confirmed the suitability of the region's fertile alluvial soils for multiple sugarcane varieties (Muricho, 2024; Kakai, 2024). The research identified three critical factors that influenced the site selection:

First, the area's hydrological conditions were particularly favorable, with proximity to River Nzoia and its tributaries ensuring reliable water access. Document analysis of company feasibility studies from 1973 indicated that water availability was a primary consideration, anticipating potential irrigation needs that would later become crucial as climate patterns changed (Mulubi, 2024).

Second, demographic factors played a significant role, as explained by a senior company official: "The relatively low population density facilitated land acquisition with minimal displacement" (Okwach, 2024). This demographic advantage allowed for the creation of a substantial nucleus estate of 4,629 hectares, with 3,600 hectares designated for direct cultivation.

Third, political considerations influenced the final site selection, with local leaders advocating for the factory's placement to stimulate regional economic development (Muyoma, 2024). This political support created initial momentum and community buy-in that would sustain the company through its early years.

The initial operational structure featured a tripartite ownership model with Government of Kenya (98%), Industrial Development Bank (1%), and Five Cail Babcock Company (1%). This arrangement exemplifies what Arora (2019) describes as "institutional complementarity," where public resources, financial expertise, and technical knowledge combined to create optimal conditions for growth.

Production data from company records shows a remarkable growth trajectory during the first decade of operations. From an initial output of 25,000 tonnes in 1979, production climbed steadily to 70,000 tonnes by 1989, representing a 180% increase. This growth coincided with the successful implementation of out-grower schemes beginning in 1980, which expanded from approximately 2,000 farmers initially to over 60,000 by 2010 (Juma, 2024).

This early phase exemplifies what Fujita (2018) terms "positive circular cumulation," where initial investments triggered complementary developments across multiple sectors, reinforcing growth patterns. The research found that employment generation, infrastructure development, and increased local spending created a self-reinforcing cycle of regional economic improvement.

4.2 Transition and Fluctuation (1990-2000)

The second decade of NSC's operations marked a critical transition period characterized by significant management changes and production instability. Analysis of production records reveals pronounced fluctuations, with annual output varying between 50,000 and 75,000 tonnes, breaking the previous pattern of consistent growth.

A pivotal development during this period was the shift from French technical management to full Kenyan leadership. While this transition aligned with national goals of indigenizing key economic sectors, interviews with long-serving employees revealed implementation challenges. As one senior manager explained: "The transition occurred before adequate knowledge transfer was complete, creating operational gaps" (Kakai, 2024).

Focus group discussions with company officers identified this period as the beginning of governance challenges that would eventually undermine the company's performance. The research found that financial management practices deteriorated significantly, with audit records from Kenya National Archives (KNA/BV/3/2/53) documenting "haphazard financial decisions" and "general care-free attitude in the commitment of huge sums of money."

This period also saw increasing competition from private sugar manufacturers. West Kenya Sugar Company, which began operations in 1981, expanded its production capacity to 1,800 tonnes per day by 2005, establishing relationships with approximately 35,000 small-scale farmers within the western Kenya sugar region (Misiko, 2024). This emerging competition introduced market pressures that the state-owned NSC was institutionally unprepared to address.

The research indicates that attempts to address declining performance included contracting F.C. Schaffer and Associates to revitalize factory operations between 1999 and 2003. However, this intervention proved unsuccessful due to disagreements over performance targets and implementation strategies (NSC Officers FGD, 2024).

Applying Myrdal's theoretical framework, this period represents a critical juncture where positive developmental cycles began reversing into negative ones. As Krugman (2016) notes, institutional weaknesses can transform virtuous cycles into vicious ones when adaptive responses fail to address emerging challenges. The research finds that NSC's management structures lacked the flexibility and accountability mechanisms needed to navigate changing market conditions effectively.

4.3 Systemic Decline and Multiple Causation (2001-2020)

The third phase in NSC's trajectory shows a steep decline pattern, with annual production falling to approximately 30,000 tonnes by 2020—less than half of its peak production. Financial data indicates accumulated losses totaling Ksh 58.9 billion as of June 2022, making the company technically insolvent (Government of Kenya, 2023).

The research identifies five interconnected factors driving this decline, illustrating Myrdal's concept of circular and cumulative causation where multiple elements reinforce each other to accelerate decline:

4.3.1 Governance and Financial Management Failures

Analysis of interview data reveals systemic governance failures manifesting in three key areas. First, political interference significantly disrupted management continuity, with frequent leadership changes preventing sustained strategic implementation. Documentary evidence shows that between 2007 and 2023, NSC had seven different managing directors, with tenures often ending prematurely due to politically motivated removals rather than performance considerations (Kokonya, 2024).

Second, procurement irregularities became institutionalized, with multiple interviewees describing instances where equipment purchases disregarded technical specifications or operational needs. Archival records describe the 1990-1991 procurement of Vanguard tractor and trailer units that were "absolutely inappropriate" for local conditions, being too heavy for existing bridges and incompatible with local road infrastructure (KNA/BV/3/2/53).

Third, resource misallocation accelerated during political cycles, with one operations manager explaining that "company resources were frequently diverted to political activities, particularly during election periods" (Mang'eni, 2024). This finding aligns with Waswa et al. (2021), who identified political interference as a key factor undermining state-owned enterprises in developing economies.

4.3.2 Market Liberalization and Competitive Disadvantages

The research found that NSC's operational model became increasingly uncompetitive in a liberalized market environment. Private competitors like West Kenya and Naitiri Sugar Companies established more

efficient procurement systems and payment structures that attracted farmers away from NSC. Analysis of media reports confirms that by 2017, cane poaching had become so severe that NSC temporarily halted operations due to raw material shortages (Business Daily, 2017).

Additionally, the policy framework governing sugar importation created uneven competitive conditions. While private mills were permitted to import and repackage duty-free sugar, public factories faced restrictions that placed them at a significant price disadvantage (Mulubi, 2024). This finding supports Ibrahim et al.'s (2018) conclusion that regional trade agreements often create asymmetric impacts across different market participants.

4.3.3 Technological Stagnation and Infrastructure Deterioration

Documentary analysis and expert interviews reveal critical technological deficiencies at NSC. The processing equipment installed in 1978 remained largely unchanged for over four decades, far exceeding its economic lifespan of approximately 30 years (NSC Casual Workers FGD, 2024). Government inspection reports from 2023 identified numerous critical components requiring replacement, including "boiler tubes, refractory walls, steam turbines, mill rollers, and process house pumps" (Policy on Revitalization of the Sugar Industry, 2023).

The research found that maintenance practices deteriorated significantly as financial constraints intensified. Annual maintenance routines, previously conducted over six-week periods, became irregular and inadequate. As one technical manager explained: "The overworked and unserviced machinery faced frequent breakdowns, further increasing maintenance costs and creating a negative feedback loop" (Misiko, 2024).

Vehicle and agricultural equipment faced similar deterioration, with field observations documenting numerous grounded tractors and transport vehicles. Interview data suggests that contracting arrangements for equipment hire often replaced repair and maintenance of existing assets, creating additional financial inefficiencies (Makokha, 2024).

4.3.4 Environmental Challenges and Failed Adaptation

The research identified increasing environmental pressures on sugarcane production at NSC. Climate data analysis shows shifting rainfall patterns affecting the rain-fed cultivation system predominant in the region. Multiple respondents identified rainfall unreliability as a critical factor reducing yields over time (Okoth, 2024).

While the company recognized this challenge and initiated an irrigation pilot project in 2016, implementation failures prevented its successful adoption. Security issues, resource constraints, and poor project management led to the theft of irrigation infrastructure and abandonment of the initiative (Emotto, 2024). This finding illustrates how adaptation capacity constraints can exacerbate environmental challenges, consistent with Singels et al.'s (2018) research on climate vulnerability in sugarcane production systems.

Soil degradation emerged as another significant environmental factor, with focus group data indicating that continuous monocropping and improper fertilization practices reduced soil fertility over time. Agricultural officers reported that "excessive use of urea fertilizer affected soil fertility in the Nzoia sugar belt, making sugarcane yields too low" (Walungwa, 2024). This aligns with Li et al.'s (2020) findings on the importance of sustainable soil management practices in maintaining productive capacity in sugarcane systems.

4.3.5 Supply Chain Disruptions and Land Use Changes

The research found that NSC's supply chain faced multiple disruptions as the positive interdependencies that had sustained the out-grower system broke down. When financial constraints prevented the company from providing inputs to farmers, many could not independently purchase the necessary fertilizers and

seeds, leading to reduced yields or abandonment of sugarcane cultivation (Wekesa, 2024).

Demographic changes further complicated supply dynamics, with population growth leading to land fragmentation. Focus group discussions revealed that "smaller land parcels discouraged investment in commercial sugarcane production due to perceived diseconomies of scale and longer payback periods" (NSC Officers FGD, 2024). This finding supports research by Wandati (2014) on the challenges of maintaining viable commercial agriculture on increasingly subdivided landholdings.

Competition from alternative crops also increased as farmers sought options with faster returns and lower input requirements. Food crops like maize, sweet potatoes, and vegetables gained prominence, particularly as payment delays for sugarcane deliveries became more common (Wesonga, 2024). This diversification pattern mirrors findings by Masayi (2012) on increasing crop diversity in response to unstable sugar markets.

Perhaps most significantly, the research found substantial underutilization of NSC's nucleus estate—land directly controlled by the company that could have provided a stable supply of raw materials. Field observations confirmed that large portions of this land remained uncultivated, while other sections showed evidence of poor crop management (Kundu, 2024). This paradoxical situation—material shortages alongside underutilized productive capacity—exemplifies what Myrdal terms "institutional failure," where organizational dysfunction prevents effective resource utilization.

Viewed collectively through Myrdal's theoretical framework, these findings demonstrate how multiple factors interacted to create reinforcing cycles of decline. Initial governance failures reduced financial performance, which limited maintenance capabilities, accelerating equipment deterioration and reducing productivity. This in turn further constrained financial resources, creating a negative spiral that ultimately threatened the company's viability. The interrelationship between institutional, environmental, market, and technological factors illustrates the complex, multidimensional nature of agricultural enterprise challenges in developing economies.

CONCLUSION

This study has examined the historical trajectory of sugarcane farming at Nzoia Sugar Company from its establishment in 1975 to 2020, revealing how initial success gave way to decline over time. The findings demonstrate the relevance of Myrdal's Cumulative and Cyclical Interdependence Theory in understanding how institutional, community, and individual factors interact to create cycles of either growth or decline in agricultural economic activities.

The establishment of NSC initially created positive interdependencies that benefited both the company and the surrounding community. The company provided employment opportunities, introduced cash crop farming to local farmers, and contributed to infrastructure development. In turn, the community supplied labor and sugarcane, creating a virtuous cycle of development that supported the company's operations and profitability.

However, this positive cycle eventually reversed into a negative spiral due to several interrelated factors, including financial mismanagement, competition from private companies, outdated technology, climate change impacts, and reduced sugarcane supply. These factors created a vicious cycle where financial constraints led to poor maintenance, which reduced efficiency and profitability, further exacerbating financial problems.

The study highlights the critical role of effective management, technological innovation, and adaptive capacity in sustaining agricultural economic activities in the face of changing environmental, economic, and social conditions. It also underscores the importance of addressing systemic issues such as corruption, inadequate policy frameworks, and shortsighted decision-making that can undermine the sustainability of agricultural enterprises.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

1. Governance Reform: Implement comprehensive governance reforms at NSC to address issues of financial mismanagement and corruption. This should include strengthening oversight mechanisms, enhancing transparency in procurement processes, and ensuring merit-based appointments to leadership positions.
2. Technological Modernization: Invest in upgrading the processing equipment at NSC to improve efficiency and reduce production costs. This will enhance the company's competitiveness in the face of increasing competition from private companies.
3. Climate Adaptation Strategies: Develop and implement climate adaptation strategies, including efficient irrigation systems and drought-resistant sugarcane varieties, to mitigate the impacts of climate change on sugarcane production.
4. Supply Chain Management: Strengthen the relationship between NSC and out-grower farmers by providing timely payments, technical support, and affordable inputs. This will encourage farmers to continue or return to sugarcane farming, ensuring a steady supply of raw materials to the factory.
5. Policy Review: Review and revise policies related to the sugar industry in Kenya, including those on taxation, import regulations, and pricing mechanisms, to create a more conducive environment for domestic sugar production.
6. Diversification: Explore opportunities for diversification of products and revenue streams, such as co-generation of electricity from bagasse, production of ethanol from molasses, and development of other sugar by-products, to enhance the company's resilience and profitability.

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