

Deconstructing the Barriers to Food Self-Sufficiency in Post-Conflict Sierra Leone

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How to cite this paper: Blango, M.M.,
Moiwo, J.P., Kawa, Y.K., Kamara, Y.L. and
Blango, V. (2026) Deconstructing the Bar-
riers to Food Self-Sufficiency in Post-Con-
flict Sierra Leone. *Open Journal of Applied
Sciences*, 16, 3252-3274.

<https://doi.org/10.4236/ojapps.2026.169178>

Received: August 17, 2026

Accepted: September 13, 2026

Published: September 16, 2026

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Abstract

Sierra Leone presents a profound paradox: a nation endowed with abundant agricultural resources, seven major rivers, extensive inland valley swamplands, and a climate ideally suited for rice cultivation, yet persistently dependent on food imports and burdened by alarming rates of food insecurity affecting over 80% of its population. This article undertakes a comprehensive deconstruction of the barriers to food self-sufficiency in post-conflict Sierra Leone, examining the complex interplay of historical legacies, institutional failures, gendered inequalities, and contemporary policy challenges that perpetuate this paradox. Drawing on a political economy framework and extensive analysis of agricultural policy since the end of the civil war in 2002, the study identifies six interconnected constraint clusters. There is the protracted legacy of conflict on agricultural systems and seed diversity; then land tenure dualism and the precarity of smallholder access; the responsibility-authority gap in gendered agricultural labour; the infrastructure deficit in processing, storage, and market connectivity; the tension between large-scale investment models and smallholder-centered approaches; and the political economy of rice import dependency. The analysis reveals that Sierra Leone currently produces some 65% of its domestic rice requirements while spending an estimated \$200 million annually on rice imports. The ambitious Feed Salone initiative seeks to remedy the situation through a \$620 million investment plan. However, this article argues that without addressing the underlying institutional and distributional challenges, the current strategy risks replicating the failures of previous agricultural development programmes by favoring agribusiness interests over the five million smallholder farmers in the country. The study concludes with recommendations for a sequential approach that prioritizes formalizing and

strengthening existing informal agricultural practices, gradually expanding state recognition and resource allocation as smallholder collective bargaining power increases, and embedding food self-sufficiency within the broader framework of rural transformation and social justice.

Keywords

Food Self-Sufficiency, Post-Conflict Agriculture, Gender and Agriculture, Smallholder Farming, Feed Salone

1. Introduction

In Sierra Leone, the pursuit of food self-sufficiency represents a critical development challenge as the country still grapples with the legacies of a devastating civil war that ruined its agricultural infrastructure and fragmented the rural economy. Despite its considerable agricultural potential, Sierra Leone today faces persistent food insecurity that affects a significant fraction of its population, with staple rice imports alone costing an estimated \$200 million annually [1]. The response of government, notably through the flagship Feed Salone Strategy, signals a renewed commitment to agricultural transformation and reducing import dependence. Irrespectively, the path to self-sufficiency remains obstructed by the complex interplay of historical, structural, and socio-economic barriers that demand systematic deconstruction [2].

The civil war fundamentally disrupted agricultural production, displacing farming communities, destroying tools and seed stocks, and breaking the intergenerational transfer of agricultural knowledge and labor. Farmlands laid in fallow and essential young laborers remained in urban areas for better education and employment opportunities [3]. The post-conflict dislocation compounded pre-existing challenges of outdated land tenure framework and effectively non-existent land administration system, creating pervasive tenure insecurity that undermines long-term agricultural investment. The enduring legacy of the conflict is manifested in institutional fragility and the governance environment where traditional leaders, as custodians of customary land, are frequently accused of conflating mandate with ownership. This particularly disadvantages access of women to land rights and reinforces inherently deep-seated gender inequalities. The FAO experience in implementing voluntary guidelines on responsible governance of tenure underscores that these governance challenges are not merely technical obstacles, but fundamentally linked to tenure insecurity that affects most farmers and rights holders in Sierra Leone [4].

Within this fragile post-conflict setting, a series of interlocking barriers continue to impede progress toward food self-sufficiency. The structural constraint faced by smallholder farmers who constitute the backbone of the agricultural sector is particularly acute. This includes limited access to improved inputs, low productivity, climate variability, and weak market linkages that trap producers in

cycles of subsistence and poverty [5]. The challenges are compounded by financial exclusion, with World Bank data indicating that fewer than 29% of the population over the age of 15 have bank accounts. This is substantially lower for women and rural residents, forcing farmers to rely on informal credit arrangements that often involve onerous repayments in crops worth many times the original loan [6]. This financial vulnerability is exacerbated by poor road infrastructure, which forces farmers to sell at low farmgate prices and restricts their ability to capitalize on market opportunities. This in turn creates a perverse cycle in which the very producers who could drive self-sufficiency are systematically disadvantaged [7].

The ambitious Feed Salone strategy, supported by international partners and development banks, represents a significant attempt to address these constraints through coordinated interventions. This is aimed at strengthening agricultural systems, promoting climate-smart agriculture, and building institutional capacity for a more resilient food system [2]. Under the World Bank funded Food System Resilience Program (FSRP), notable progress has been made in developing IVS that can double rice yields and enable year-round cultivation. Under this effort, a comprehensive soil information system has been established to guide farmers. Also, public institutions such as schools, hospitals, and the military have been mandated to use locally produced rice [8]. Yet these efforts occur in a context where critical questions persist about the most appropriate pathways to self-sufficiency. Some NGOs and academics caution that the emphasis on agribusiness and large-scale infrastructure may favor international commercial interests over smallholder farmers, forming the most of the agricultural workforce [6].

Recent research points to the importance of adopting a more informed understanding of self-sufficiency that moves beyond aggregate production statistics to consider differentiated impacts on various segments of the population. The concept of food self-sufficiency, measured as the ratio of domestic production to consumption, can mask significant intra-country disparities and hide systemic impediments to food access for certain populations. This is the case particularly for women-headed households, youth, and ex-combatants who remain marginalized in post-conflict agrarian structures [5]. Evidence suggests that combining support for cash crop production with nutrition-sensitive interventions can yield substantial dietary benefits. Solely supporting cash crop production may also paradoxically inhibit household dietary diversity by diverting land and labor away from food crop cultivation. This insight challenges the conventional emphasis on staple grain self-sufficiency and highlights the need for an integrated approach that enhances both production and access to nutritious food. This is particularly needed during the lean season when rural households are most vulnerable and forced to skip meals or reduce portion sizes [7].

This article deconstructs the barriers to food self-sufficiency in post-conflict Sierra Leone through an integrated analysis of the historical, institutional, economic, and socio-cultural factors that shape agricultural production and food access. Drawing on documentary review, it examines the complex interface between post-conflict recovery, land governance, smallholder finance, market access, and

nutrition outcomes that collectively determine the capacity of Sierra Leone to feed itself. In doing so, it contributes to the growing literature on food system transformation in fragile and conflict-affected settings. It argues that meaningful progress toward self-sufficiency requires not only technical solutions, but also fundamental reforms in governance, inclusion, and the political economy of agricultural development.

In this study, food self-sufficiency is defined as the ratio of domestic production to domestic supply for a basket of staple commodities (cereals, pulses, root crops), expressed as a percentage over a one-year reference period. The denominator is total supply; formulated as: production + imports – exports $\pm$ stock changes. Values at or above 100% indicate no net import dependency [9]. Then food sufficiency as the extent to which a country can meet its aggregate food needs from domestic production, irrespective of trade [10]. This construct is analytically distinct from food security, which exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food—a condition that does not require domestic origin. Dietary adequacy concerns the quality and diversity of micro-nutrient and macro-nutrient intake; a nation may be self-sufficient in staple calories and yet fail to meet nutritional requirements [11]. Household access to food, measured through indicators such as Household Dietary Diversity Score (DDDS), captures the economic and physical ability of families to procure food [12]. National food self-sufficiency does not guarantee household access, given pervasive poverty, price volatility, and infrastructural bottlenecks [11].

2. Method and Materials

2.1. Analytical Framework

The political economy framework was used in this study to analyze the barriers to food self-sufficiency in post-conflict Sierra Leone. Political economy analysis, as applied to agricultural development, examines how power relations, institutional arrangements, and distributional conflicts shape policy outcomes and resource allocation. This approach is particularly appropriate for understanding post-conflict agricultural transitions because it directs attention to how the legacies of war (including disrupted social relations, weak state institutions, and the emergence of new power configurations) mediate the implementation of agricultural policies.

The framework draws on three complementary theoretical traditions. First, it incorporates insights from the literature on post-conflict reconstruction, which emphasizes how the re-establishment of agricultural systems requires not only physical rehabilitation, but also restoration of social trust, institutional capacity, and knowledge systems that underpin sustainable farming practices [13]. Second, it engages with feminist political economy approaches that highlight how gendered divisions of labour, access to resources, and decision-making authority shape agricultural outcomes in ways that are often overlooked in conventional policy analysis [14]. Third, it draws on critical agrarian studies, which interrogate the distributional

consequences of agricultural development models, particularly the tension between smallholder-centered approaches and large-scale capital-intensive strategies [15].

2.2. Data Sources

The analysis was drawn on multiple sources of data to ensure triangulation and comprehensiveness. The primary data were derived from systematic review of agricultural policy documents, including National Land Policy (2017), Feed Salone initiative strategy documents, and various development plans and project evaluations. These documents provided insight into the stated objectives, implementation mechanisms, and resource allocation priorities of government and donor-funded agricultural programmes [4] [16].

Literature on agricultural development of Sierra Leone and the post-conflict reconstruction was the second major source. The study was drawn extensively on the doctoral research of Chakanda (2009) on rice genetic resources in post-war Sierra Leone, which provided detailed empirical evidence on how the war affected seed systems and varietal diversity [17]. The work of Kassoh *et al.* (2026) on gendered labour and food provisioning in urban agriculture in Freetown offered important insights into the responsibility-authority gap that characterizes the agricultural women in participation [14]. Research on institutional challenges for wetland management in the Eastern Province illuminated the complexities of land access and labour in post-conflict settings [18].

Third, the study incorporated referenced grey literature from international organisations, including reports from World Food Program (WFP), FAO, World Bank (WB), and the African Development Bank (AfDB). These sources provided quantitative data on food insecurity, production figures, and investment commitments, as well as qualitative assessments of program implementation [19] [20]. Contemporary news media and policy analysis, particularly from The Africa Report, offered up-to-date information on recent policy developments and stakeholder perspectives [1] [6].

2.3. Document Search Process

A systematic document review was done to synthesize existing definitions, measurement approaches, and conceptual boundaries of food self-sufficiency and its related constructs. No primary field data was collected either through surveys, interviews, or stakeholder consultations. All the evidence was derived exclusively from publicly available published literature and institutional reports.

The search locations comprised three academic databases (Scopus, Web of Science, and Google Scholar) and two institutional repositories (the FAO online document library and the World Bank Open Knowledge Repository). The search strings were designed according to the research questions, following established systematic review practice [21]. The search terms were: (“food self-sufficiency” OR “food self-reliance” OR “food autonomy”) AND (“definition” OR “measurement” OR “indicator” OR “food security” OR “dietary adequacy” OR “household

access”), applied to titles, abstracts, and keywords. The search was restricted to documents published between 1996 (Post-Lomé Declaration) and 2026, in English, with full-text availability.

Source selection criteria followed a three-stage screening: i) title/abstract review to exclude off-topic or purely agronomic production studies; ii) full-text review to retain only documents that explicitly define or operationalize at least one of the four concepts (food self-sufficiency, food security, dietary adequacy, or household access); and iii) quality appraisal, retaining peer-reviewed journal articles, FAO or World Bank technical reports, and official policy documents, while excluding opinion pieces, news articles, and non-referenced grey literature [22].

Deductive thematic coding was done using a pre-defined codebook with four parent codes (self-sufficiency, food security, dietary adequacy, household access) and six child codes (denominator specification, commodity scope, reference period, nutritional thresholds, access dimensions, and stability). Two reviewers independently coded a 20% random sample, and intercoder reliability assessed through percentage agreement ($\geq 80\%$) and discrepancies resolved through iterative discussion to ensure consistency and dependability [23]. The synthesized findings were tabulated by code to produce the conceptual distinctions presented in the introduction and discussion.

2.4. Geographic and Temporal Scope

The geographic scope of the study covered the entire Sierra Leone, with particular focus on regions that have been the focus of agricultural development interventions, including the Eastern Region (Kenema, Koidu, and the surrounding areas), Bo District in the south, and Western Area including Freetown. The temporal scope extended from the end of the civil war in 2002 to date, with particular focus on policy developments from 2020 onwards, including the launch of Feed Salone initiative in 2023 and the subsequent investment commitments.

2.5. Data Analysis

A combination of thematic coding and narrative synthesis was done. Policy documents, academic literature, and referenced grey literature were coded for themes related to the six constraint domains identified in the analytical framework. The coding process was iterative, allowing for the emergence of additional themes and refinement of existing categories. Narrative synthesis was used to integrate findings across sources, identifying patterns of convergence and divergence, and to construct a coherent account of the barriers to food self-sufficiency. This approach made it possible to move beyond description to explanation, identifying causal mechanisms that connect institutional arrangements to agricultural outcomes.

3. Results and Analysis

3.1. Conflict and Agricultural System

The 11-year civil war in Sierra Leone (1991-2002) inflicted profound damage on

its agricultural systems, an impact that continues to shape food production and self-sufficiency over two decades later. The war disrupted all forms of agricultural production, with farmers losing considerable seed stocks and infrastructure [17]. The destruction was not merely physical, but extensive to affect knowledge systems, social networks, and institutional arrangements that underpin sustainable agriculture.

The effectiveness of farmers in cultivating and managing seed systems, and their options to grow rice under insecure conditions, were disrupted nationwide. A key finding for post-war recovery was that total losses for some rice varieties were averted because varieties occurred in multiple locations, facilitated by farmer seed exchanges and population movements during the war. This dispersal presented a viable option for post-war recovery [17]. This finding is significant for understanding agricultural system resilience. Seed exchange networks, developed over generations, served as a buffer against complete loss, preserving genetic diversity despite formal system disruptions. Although changes occurred in rice genetic resources between pre-war and post-war periods, genetic diversity actually increased in post-war rice varieties, suggesting that farmers adapted their practices in response to changing circumstances.

The war also affected perceptions of farming as a livelihood. According to The Africa Report [1], post-war recovery created a dependency culture, with people accustomed to receiving aid rather than engaging in productive agriculture. This psychological dimension is largely overlooked in policy discussions focused on physical reconstruction and technical inputs. The report argues that the destruction of the perception of farm profitability, and the emergence of aid dependency as a coping strategy, created attitudinal barriers to agricultural transformation that persist today.

Post-conflict institutional rebuilding faces significant challenges. The Ministry of Agriculture, like other state institutions, was severely weakened and has struggled to regain policy capacity. While post-war decentralization reforms created new spaces for interaction between state agencies, traditional leaders, and communities, Maconachie [18] observes that these interactions faced significant implementation challenges. Timbo [15] illustrates this through Agricultural Business Unit (ABU) initiative, which faced limited capacity, weak coordination, and insufficient resources.

3.2. Land Tenure Dualism and Smallholder Precarity

Land tenure in Sierra Leone is characterized by a dual system dating to the colonial era. Freehold and leasehold tenure operate in and around the capital, while unwritten customary laws govern the rest of the country, largely untouched by English law [4]. This dual system shapes land access, investment, and agricultural development, creating significant barriers to food self-sufficiency.

The customary tenure system, governing most smallholder farmers, involves a complex web of rights and obligations varying across ethnic groups and regions.

Land is typically held by families or communities, with household heads having use rights rather than full ownership. Women's access is particularly precarious, mediated through male family members and subject to male elder discretion. FAO [4] notes that farmers, most of whom are women, operate in an informal and precarious system without legal titles to land.

The 2017 National Land Policy aimed to address these challenges through comprehensive reform. FAO [4] describes it as one of the documents most closely adhering to the Voluntary Guidelines on the Responsible Governance of Tenure, with a 10-year implementation plan. However, the Borrowing Agency [16] reports that implementation faces significant challenges, including lack of exact land measurements, unreliable boundary markers, and difficulty reconciling customary claims with statutory registration systems.

Post-war pressure on land resources has intensified due to population growth, return of displaced people, and growing interest from agribusiness and mining companies [18]. This has intensified land conflicts and created new forms of land grabbing by domestic elites and international investors. Civil society organisations and smallholder advocacy groups, as cited in Christian Conteh [6], have raised concerns that the agricultural investment strategy of the government (offering thousands of hectares of land to international investors) could displace local communities and concentrate land in the hands of large-scale operators.

Land tenure arrangements have significant implications for food self-sufficiency. Smallholder farmers lacking secure land rights have limited incentives to invest in long-term improvements and face difficulties accessing credit. The precarity is particularly acute for women, who constitute most agricultural labor, but have limited land rights. FAO [4] notes that although the New Land Policy proposes spousal consent for land registration, laws still allow men to register land without their wives, perpetuating the gender gap.

3.3. Gendered Agricultural Labor Gap

A key finding from recent research is the significant disparity between labor contributions by women and their authority over agricultural decision-making and resources. Kassoh *et al.* [14] identify this as a “responsibility-authority gap”, representing a fundamental barrier to productivity and food self-sufficiency that mainstream policy has largely overlooked.

The study examined gendered labor relations, decision-making, and resource access in urban vegetable production in Freetown, and found that women contribute the most labor and time in vegetable production and bear primary responsibility for food preparation and household nutrition. However, this responsibility is not matched by secure access to land, credit, or institutional support. Instead, women's labor sustains household food security under highly informal and precarious conditions, often involving children's participation and heightened vulnerability [14].

This pattern extends to rural farming systems nationwide. Women are respon-

sible for most agricultural labor (planting, weeding, harvesting, post-harvest processing), but have limited decision-making authority over planting, harvesting, and use of proceeds. Women also have limited access to agricultural inputs, extension services, and credit, which are often directed to male household heads. As FAO [4] notes, women operate in informal and precarious situations without legal titles to land, undermining their ability to invest in productivity improvements or benefit from development programs.

The responsibility-authority gap has significant implications for food self-sufficiency. Studies consistently show that empowering women in agriculture increases productivity, improves nutrition, and ensures sustainable resource management. Conversely, systems that fail to recognize women's contributions undermine productivity and perpetuate inefficiency. Kassoh *et al.* [14] further argue that this gendered structure creates vulnerabilities exacerbated by climate change and economic shocks due to limited resources to cope with production failures or adapt to changing conditions.

From the perspective of civil society observers, the Feed Salone initiative has not adequately addressed the gendered dimensions of agricultural production. Its focus on providing inputs and attracting large-scale investment does not directly address structural inequalities constraining women's productivity. The European Commission [20] indicates that the EU agricultural program, which includes support for strengthening farmer institutions and improving access to finance, has the potential to address some gender inequalities if implemented with a gender-responsive approach. However, evidence to date suggests that such programming has not sufficiently prioritized gender equity.

3.4. Infrastructure Deficit

The lack of adequate infrastructure for agricultural processing, storage, and market connectivity constitutes a major barrier to food self-sufficiency. The Africa Report [1] states that the country produces about 65% of its domestic rice requirements, but the lack of processing facilities forces heavy reliance on imports. This deficit affects self-sufficiency through post-harvest losses, limited market access, and inability to add value.

Inadequate processing facilities constitute a particularly acute constraint. As The Africa Report [1] observes, although Sierra Leone is 70.8% rice self-sufficient in production terms, the lack of processing capacity means much domestically produced rice is not available in markets—either consumed at home or stored as seed. Annual demand is about 1.2 million MT, with only about 350,000 MT (29.2%) imported. The report argues that this import figure represents not solely a production deficit, but also the inability of the processing and marketing system to connect production with consumers.

The post-harvest processing constraint is especially significant for rice, which requires milling. The lack of rural rice mills forces farmers to either sell paddy at low prices to traders who transport it to urban mills or consume it at home. This

reduces incentives to increase production beyond household needs and limits availability of domestically produced rice in urban markets. The Forum for Agricultural Research in Africa [19] notes that the government's plan to invest in processing infrastructure, including agro-processing zones, represents an important step toward addressing this constraint.

Road infrastructure is another critical constraint. Many productive agricultural areas are poorly connected to markets, limiting the ability of farmers to sell produce and that of consumers to access locally produced food. The lack of rural roads increases transaction costs, reduces farm-gate prices, and encourages subsistence production. The Africa Report [1] mentions the government's plan to improve roads to the three main "rice bowls". However, it remains uncertain whether these investments will benefit smallholder farmers as opposed to large-scale commercial operators.

Energy infrastructure is also critical. Lack of reliable electricity limits processing facilities and value-addition. FARA [19] notes that the plan to establish energy access for agricultural processing is an important component of the food self-sufficiency strategy. However, as with other infrastructure investments, the distribution of benefits and the extent to which smallholder farmers access resulting services are uncertain.

Storage infrastructure (warehouses, silos, and cold storage) is inadequate to support efficient marketing. Christian Conteh [6] reports that lack of storage forces farmers to sell immediately after harvest when prices are lowest or suffer significant post-harvest losses. This deficit is particularly acute for perishable crops and rice, which requires proper drying and storage. Lack of storage also contributes to food insecurity during the lean season when prices rise and availability declines.

3.5. Large-Scale versus Smallholder Investment

A key challenge in the agricultural development strategy is the competition between large-scale capital-intensive approaches and smallholder-centered models. Christian Conteh [6] cites civil society organisations expressing concern that the Feed Salone initiative, while nominally supportive of smallholders, emphasizes attracting international investment, creating large irrigated areas, and promoting commercial agriculture—potentially favoring agribusiness interests at the expense of the five million smallholder farmers.

FARA [19] reports that the government has raised over \$620 million from international development banks, including the AfDB, OPEC, and the Arab Bank for Economic Development in Africa, toward food self-sufficiency. The Africa Report [1] adds that the \$100 million secured from the AfDB in 2024 is part of the broader strategy estimated to cost \$1.8 billion. These investments aim to improve infrastructure, create large-irrigated areas, and provide inputs to smallholder farms. However, NGOs and academics [6] warn that the emphasis on large-scale irrigation and international investors may replicate failures of previous agricul-

tural development programs.

Timbo [15] provides historical context for these concerns. Smallholder farmers have long experienced marginalization, with colonial and post-independence governments favoring export crops and large-scale production. The Sierra Leone Produce Marketing Board (SLPMB), intended to guarantee stable prices, was reportedly engulfed in corruption and mismanagement, shifting support toward large farms for export production rather than providing smallholders with technological and marketing support.

Timbo [15] further documents that the Structural Adjustment Program (SAP) in the mid-1980s marginalized smallholder farmers by removing subsidies, promoting exports, and reducing Ministry of Agriculture employment. The removal of subsidies and privatization of tractor hire services had significant negative impacts on smallholders who could not afford new market prices. The Africa Report [1] notes that these neoliberal policy prescriptions, including opening markets to imports, are blamed for contributing to current import dependence.

The current investment strategy risks repeating past mistakes. Christian Conteh [6] cites civil society concerns that the strategy will favor international agribusiness corporations such as Bayer Crop Science and Syngenta, exposing smallholder farmers to input dependency and market concentration risks. Jack Thompson [24] reports that experiences of similar food self-sufficiency attempts in other West African countries (e.g., Burkina Faso, Ghana) have been mixed, with concerns that these initiatives benefit large-scale operators more than smallholder farmers.

Smallholder farmers themselves have expressed skepticism, as documented in Christian Conteh [6]. In Bo District, farmers' discussions about rice challenges (including access to land, lack of storage, training, and processing capacity) unify around the lack of optimism about government help. The most common concern is the lack of labor to create irrigated fields, as youth exodus to urban areas means hiring labor at costs out of reach for many.

3.6. Import Dependent Political Economy

The import dependency characterizing the Sierra Leone rice economy cannot be understood simply as a market outcome; it must be analyzed in terms of political and economic interests that have shaped trade and agricultural policies over time. The reliance of the country on rice imports, accounting for 35% (42,000 MT) of domestic consumption and \$200 million in annual spending, is a product of policy choices, donor conditionalities, and path-dependent effects of earlier interventions [1].

Sierra Leone was historically a rice exporter, and the transition to a net importer reflects broader shifts in agricultural and trade policy. The Africa Report [1] argues that the IMF pressured Sierra Leone in the 1980s to stop investing in agriculture and open markets to imports as a condition for loans. Timbo [15] describes how the neoliberal policy environment of this period, prioritizing market liberal-

ization and reduced state intervention, had lasting effects on the rice economy.

From a political economy perspective, import dependency is reinforced by the interests of urban consumers benefiting from cheap rice imports, and by commercial interests of importers and traders who profit from import trade. Cheap rice imports from Asia, subsidized by exporting countries, have consistently undercut domestic production. The preference for imported rice, particularly among urban consumers, also reflects perceived quality and convenience compared to locally produced rice, which is often poorly milled and inconsistently available [24].

Import dependency is also sustained by the domestic rice market structure. Many smallholder farmers consume their rice or store it as seed, limiting its market visibility. Lack of processing, packaging, and marketing infrastructure means locally produced rice is not presented as an attractive alternative. The Africa Report [1] notes the plan to expand rice processing, packaging, and marketing in major towns (Freetown, Kenema, Koidu, Makeni) to increase awareness of local produce and compete with imports. However, this effort faces significant challenges, including the low quality of locally produced rice and established urban consumer preferences.

The economic consequences of rice import dependency are significant. The Africa Report [1] states that rice imports take one-third of Sierra Leone's food import bill and represent a substantial drain on foreign exchange reserves, weakening the local currency and its purchasing power. Volatility of international rice prices exposes Sierra Leone to external shocks, such as price spikes during the COVID-19 pandemic and Russia-Ukraine conflict, which increased food insecurity and inflationary pressures.

Efforts to achieve rice self-sufficiency face political economy obstacles beyond technical constraints. Jack Thompson [24] suggests that the interests of importers, traders, and urban consumers who benefit from imported rice represent a constituency that may resist policies raising domestic rice prices or restricting imports. The transition to self-sufficiency would require not only increasing domestic production, but also changing consumer preferences, building marketing infrastructure, and managing distributional effects of reduced import competition. These are fundamental political challenges involving the distribution of costs and benefits across different groups in society.

4. Discussion

4.1. Constraint Cluster Synthesis

The analysis above reveals six interconnected clusters of barriers to food self-sufficiency in post-conflict Sierra Leone—the legacy of conflict on agricultural systems; land tenure dualism; gendered responsibility-authority gap; infrastructure deficit; large-scale versus smallholder investment concerns; and import-dependent political economy. While each constraint domain has been analyzed separately, the constraints within the collective domain are deeply interwoven, mutually reinforcing, and embedded in the institutional and political dynamics of the

post-conflict state.

The legacy of conflict, for example, is not merely a historical fact, but an ongoing factor shaping land tenure arrangements, gendered labour patterns, and institutional capacity. The war disrupted not only agricultural production, but also social institutions governing land access, labor relations, and intergenerational transmission of agricultural knowledge [17]. The post-conflict period has been characterized by the re-emergence of these institutions in forms that have not fully recovered from the disruptions. The loss of seed stocks, population displacement, and the destruction of farming viability as a livelihood have had effects that continue to constrain agricultural transformation [1].

Similarly, the gendered responsibility-authority gap is embedded in broader institutional arrangements governing land, labour, and agricultural policy. The dual land tenure system, with its complex interactions between statutory and customary law, creates opportunities to undermine women's land rights [4]. The agricultural policy environment, emphasizing large-scale commercial agriculture while neglecting the specific needs women farmers, reinforces structural inequalities that constrain women's productivity. Infrastructure deficits, particularly in processing and marketing, disproportionately affect women because they bear primary responsibility for these activities [14]. The analysis of these interconnections suggests that addressing any single barrier in isolation is unlikely to achieve food self-sufficiency.

4.2. Reconciling Rice Self-Sufficiency

A critical clarification is required regarding the Sierra Leone rice self-sufficiency statistics, as the figures reported in policy discourse often conflate paddy rice (unmilled) with milled rice (edible grain), and fail to distinguish between production, marketed supply, and consumption. This conflation obscures the true nature of the import gap and undermines effective policy design.

4.2.1. Clarification of Measures

Rice statistics in Sierra Leone are typically reported in two forms:

- a) Paddy rice: The unhusked grain as harvested from the field. Milling removes the husk and bran, with a standard conversion rate of approximately 1.0 MT of milled rice = 1.4 MT of paddy rice (*i.e.*, a 40% husk/bran weight loss).
- b) Milled rice (white rice): The edible grain ready for consumption, which is the basis for import statistics and urban consumer demand.

When comparing production to demand and imports, milled rice equivalent is the appropriate common measure. All figures below are converted to milled rice equivalent for consistency.

4.2.2. Production and Self-Sufficiency

The Africa Report [1] states that Sierra Leone is 70.8% rice self-sufficient in terms of production. However, this figure requires careful interpretation:

- a) What it measures: This rate refers to paddy rice production relative to esti-

mated national consumption requirements (also measured in paddy equivalent, estimated at 1.4 times actual milled consumption). It does not mean that 70.8% of consumed rice is locally milled and marketed.

b) Why it is misleading for policy: Because most domestically produced paddy is consumed at home or stored as seed rather than milled and marketed, the proportion of marketed milled rice available to urban consumers is significantly lower.

4.2.3. Demand and Import Volumes

As reported in The Africa Report [1]:

a) Annual total demand for rice in Sierra Leone is 1.2 million MT. This figure refers to milled rice equivalent for all uses (human consumption, seed, and waste).

b) Domestic paddy production is reported at 70.8% of total consumption requirements. In milled rice equivalent terms, this translates to roughly 850,000 MT of milled rice equivalent from domestic production (1.2 million MT demand $\times$ 70.8%).

c) Imports are reported at 350,000 MT annually. This figure refers to milled rice imports (the edible grain entering the country for consumption).

d) The import share of domestic consumption is therefore 29.2% (350,000 MT imports $\div$ 1.2 million MT total demand). This aligns with the statement that imports account for 29.2% of consumption.

4.2.4. Reconciling Contradiction

The apparent contradiction (that domestic production covers 70.8% of demand, yet 29.2% of consumption is imported) is reconciled when distinction is done between:

a) Production self-sufficiency (70.8%): Domestic paddy production (in milled equivalent) relative to total national consumption needs. This figure is based on aggregate production estimates and does not account for post-harvest losses, farm-level consumption, or seed retention.

b) Marketed supply shortfall (29.2% imports): The proportion of total consumption that must be imported because domestically produced rice is not milled, processed, and brought to market in sufficient quantities to meet urban and commercial demand.

The gap between production and marketed supply arises from several factors documented in the literature:

a) High farm-level consumption: Many smallholder farmers consume their paddy production at home rather than marketing it.

b) Seed retention: A significant portion of paddy is stored as seed for the next planting season.

c) Post-harvest losses: Poor drying, storage, and pest control cause substantial losses between harvest and milling.

d) Processing constraints: The lack of rural rice mills forces farmers to either sell paddy at low prices to traders (who transport it to urban mills) or consume it at

home, reducing the volume of domestically milled rice reaching urban markets [1].

Therefore, the 70.8% production self-sufficiency rate does not translate to 70.8% of consumption being met by domestically milled, marketed rice. The actual marketed domestic rice supply is considerably lower, and the 29.2% import share represents the gap between total consumption and marketable domestic supply, not a simple production deficit.

4.2.5. Policy Implications

This clarification has significant implications. Achieving food self-sufficiency requires not only increasing paddy production, but also:

- a) Expanding milling and processing capacity to convert paddy into edible rice;
- b) Improving storage and market infrastructure to reduce post-harvest losses;
- c) Enhancing market linkages so that smallholder production reaches urban consumers; and
- d) Addressing incentive structures that lead farmers to consume or store their paddy rather than market it.

Future reporting should consistently specify whether figures refer to paddy or milled rice, and whether the measures are total production, marketed supply, or consumption. This will enable more accurate policy targeting and performance monitoring.

4.3. Feed Salone Initiative

The Feed Salone initiative, launched in 2023, represents the most ambitious effort to achieve food self-sufficiency in post-conflict Sierra Leone. The initiative focuses on enhancing agricultural productivity through investments in farmers, seeds, and essential inputs, aiming to reduce import dependence and improve food security [19]. The Africa Rice experts have commended the initiative as ambitious and forward-looking [1]. However, the analysis presented above raises significant concerns about its approach and likely effectiveness.

A key concern is the emphasis on large-scale capital-intensive approaches that may benefit agribusiness interests at the expense of smallholder farmers. The focus on creating large-irrigated areas, attracting international investors, and providing inputs such as chemical fertilizers, seeds, and pesticides follows a model widely criticized for its negative social and environmental consequences [6]. The experience of the Green Revolution in Asia, which increased rice production but at significant environmental and social costs, serves as a cautionary case. Concerns about the reliance of the initiative on input packages that expose farmers to agribusiness corporations such as Bayer Crop Science and Syngenta highlight risks of creating dependencies that undermine long-term sustainability.

The initiative also appears to underinvest in institutional dimensions of agricultural transformation. The provision of inputs and infrastructure, while necessary, is insufficient without accompanying efforts to strengthen institutional capacity of smallholder farmers, including their ability to organize collectively, and access credit and market produce. Timbo [15] suggests that the emphasis on at-

tracting large-scale investment may crowd out farmer-led development, which has been more effective in achieving sustainable productivity. The neglect of gendered dimensions of agricultural production is particularly concerning, given evidence that women's empowerment is key to agricultural transformation [14].

Implementation of the initiative also faces significant challenges. The lack of adequate labor, as identified by smallholder farmers in Bo District, is a critical constraint not addressed by the focus on inputs and infrastructure. The exodus of young people to urban areas, attracted by alternative livelihoods such as motor-bike-taxi driving, suggests that agricultural transformation requires not only technical interventions but also efforts to improve the economic attractiveness of farming as a livelihood [6]. Thus, any success will depend on whether the initiative can create conditions for young people to see farming as a viable and desirable career.

4.4. Comparative Evidence

The challenge Sierra Leone faces in achieving food self-sufficiency is not unique and can be illuminated by comparative evidence from other post-conflict and agricultural transformation contexts.

The experience of Uganda, which has implemented a Self-Reliance Model in refugee settlements, offers insights into the potential of smallholder-centered approaches. In the Bidibidi refugee settlement, refugees are trained in agricultural techniques and supported to shift from aid dependency to self-sufficiency [25]. The program demonstrates that with appropriate training, access to land, and supportive institutional arrangements, smallholder farmers can significantly increase production and improve livelihoods [26]. The success of the program suggests that the provision of skills, rather than just inputs, is critical to agricultural transformation.

The experience of the Democratic Republic of Congo (DRC), which has implemented a Community Food Resilience Project in post-conflict settings, offers another instructive example. The project, which combined humanitarian, development, and peacebuilding efforts, restored trust between communities, developed community action plans, and provided training and support for agricultural production [13]. The project success is based on the recognition that agricultural transformation in post-conflict settings requires not only technical interventions but also restoration of social trust and development of community institutions. Its focus on women's groups and mothers' co-operatives also highlights the importance of addressing gendered inequalities in agricultural development.

The comparative evidence suggests that successful agricultural transformation in post-conflict settings requires a sequenced approach that begins with strengthening existing informal practices, gradually expanding state recognition and resource allocation as the collective bargaining power of farmers increases. Kassoh *et al.* [14] describe this as "responsibility without authority" in the context of gendered labor, suggesting that formalization and institutional reform should be ac-

companied by efforts to address the underlying power imbalances that constrain agricultural productivity.

4.5. Institutional Food Self-Sufficiency

The analysis suggests that achieving food self-sufficiency in Sierra Leone requires a fundamental shift in approach—from a narrow focus on technical interventions and large-scale investment to a more institutionally-grounded strategy that addresses the structural barriers to agricultural transformation. Such a strategy recognizes that food self-sufficiency is not merely a technical challenge, but a political and institutional one that requires changes in power relations and distributional arrangements that shape agricultural outcomes.

First priority—address land tenure dualism: The National Land Policy provides a framework for reform, but its implementation has been slow and uneven. A more aggressive approach to land registration and tenure regularization, with particular attention to women's land rights, is needed. The Voluntary Guidelines on the Responsible Governance of Tenure, to which Sierra Leone has committed, provide a framework for such reform [4]. However, implementation should be accompanied by efforts to strengthen the institutional capacity of land administration, resolve land conflicts, and ensure that land rights are effectively protected.

Second priority—address gendered responsibility-authority gap: This requires not only gender-responsive agricultural programs, but also efforts to strengthen women's collective organizations, improve access to land and credit, and ensure that women have voice and authority in agricultural decision-making [14]. The evidence from the DRC Community Food Resilience Project suggests that women's groups and mothers' co-operatives can be effective vehicles for such empowerment [13].

Third priority—infrastructure investment appropriate for smallholders: This includes not only large-scale infrastructure such as roads and processing facilities, but also small-scale farmer-led irrigation and storage solutions. Maconachie [18] suggests that the emphasis on large-scale irrigation, a feature of the Feed Salone initiative, may not be appropriate for the smallholder-dominated agricultural system. Instead, investments in small-scale irrigation (such as valley bottom development and smallholder-managed irrigation schemes) may be more effective and equitable.

Fourth priority—strengthen institutional capacity of smallholder farmers: This includes the ability to organize collectively, access credit, and market produce. Farmer organizations, co-operatives, and producer networks have shown to be effective in improving bargaining power, reducing transaction costs, and facilitating access to inputs and services. The EU program, which includes support for strengthening farmer institutions and producer networks, offers a promising model [20]. However, such support should be accompanied by efforts to ensure that these organizations are inclusive and accountable, particularly to women and

marginalized groups.

5. Conclusions and Recommendations

5.1. Conclusions

In this study, the barriers to food self-sufficiency in post-conflict Sierra Leone are deconstructed. The analysis reveals a paradox of plenty, in which the endowment of abundant agricultural resources fails to prevent persistent food insecurity and import dependence. The analysis shows that this paradox is not explainable by resource scarcity or technical inadequacy alone, but understood as a product of deeply embedded institutional failures, historical path dependencies, and political economy dynamics that systematically disadvantage smallholder farmers.

The study identifies six interconnected constraint clusters: protracted legacy of conflict on agricultural systems and seed diversity; land tenure dualism and precarity of smallholder access; responsibility-authority gap in gendered agricultural labour; infrastructure deficits in processing, storage, and market connectivity; large-scale investment versus smallholder-centered tension; and political economy of rice import dependency. These constraints are not discrete but mutually reinforcing, creating a complex web of barriers not addressed through technical solutions alone.

Regarding gendered agriculture labor patterns, the evidence base requires careful differentiation between urban and rural contexts. There is robust evidence that women contribute the most labor in that specific setting while lacking commensurate decision-making authority and secure access to resources. This responsibility-authority gap is well-documented for urban agriculture in Freetown [14]. However, this urban-based study cannot independently substantiate nationwide rural patterns. Rural agriculture systems in Sierra Leone are characterized by different crops (primarily rice, cassava, and other staples), different tenure arrangements (overwhelmingly customary), and different labor dynamics than urban vegetable production.

It is documented that across Sierra Leone, women operate in informal and precarious tenure situations without legal titles to land, and that customary systems often mediate women's access through male relatives [4]. Women also play significant roles in rice production and post-harvest processing in rural areas, but their participation in decision-making is often constrained by customary institutions. However, systematic quantitative evidence on responsibility-authority gap specifically in rural Sierra Leone is lacking. The extent to which documented patterns apply to rural rice-farming systems remains an important area for future research. The discussion on gendered agricultural labor in this study is drawn primarily on the Freetown urban study, with rural patterns inferred from related scholarships on land tenure and institutional constraints, but not yet conclusively established by rural-specific empirical research.

The government-backed Feed Salone initiative, while ambitious and forward-looking, appears to reproduce many of the weaknesses of earlier agricultural de-

velopment programs by favoring large-scale capital-intensive approaches over the needs of smallholder farmers. The emphasis on attracting international investors, creating large-irrigated areas, and providing input packages exposes farmers to the risks of agribusiness concentration and input dependency. The neglect of gendered dimensions of agricultural production is particularly concerning, given the broader evidence that women's empowerment is central to agricultural transformation. However, the specific mechanisms and priorities for rural Sierra Leone require further investigation.

The comparative evidence from Uganda and the DRC suggests that successful agricultural transformation in post-conflict settings requires a different approach. Such approach begins with strengthening existing informal practices, gradually expanding state recognition and resource allocation as farmers' collective bargaining power increases. Such an approach prioritizes investments in farmer organizations, small-scale infrastructure, and gender-responsive programming, while addressing institutional and political economy barriers that constrain agricultural transformation.

5.2. Recommendations

Based on the analysis, the following recommendations are made for policy and practice actions. Whereas the recommendations address gendered labour patterns, they are framed with appropriate attention to the evidence base; drawing on the urban study for urban contexts, and on related tenure and institutional scholarships for rural applications, while also acknowledging the need for further rural-specific research.

i). **Reorienting agricultural investment towards smallholder-centered approaches:** The current emphasis on large-scale capital-intensive approaches should be balanced with investments that favour smallholder farmers, who dominate the agricultural landscape. This includes support for farmer-led irrigation, small-scale processing facilities, and local market development. Investments should be designed to strengthen the productivity and resilience of smallholder farmers rather than to create dependencies on agribusiness corporations.

ii). **Implementing land tenure reform that addresses women's land rights:** The National Land Policy provides a framework for reform, but its implementation should be accelerated and accompanied by efforts to secure women's land rights—in both rural and urban contexts. It has been documented that across the country, women operate in informal tenure situations without legal titles [4]. This includes ensuring that women have secure and enforceable rights to the land they cultivate, that spousal consent is required for land registration, and that land administration institutions are accessible to women.

iii). **Addressing gendered labour and decision-making constraints through targeted programming:** Agricultural programs should be designed to address the specific constraints faced by women farmers. Drawing on the Freetown urban study, urban vegetable producers face a responsibility-authority gap that limits

their productivity and well-being [14]. For rural contexts, while similar patterns are plausible given land tenure constraints and institutional barriers, targeted rural research is needed to confirm the extent and nature of the responsibility-authority gap. Programmatic priorities should include support for women's collective organizations, gender-responsive extension services, and micro-credit programs, adapted to the specific crops, tenure arrangements, and labor systems of each context.

iv). **Investing in infrastructure that benefits smallholder farmers:** While large-scale infrastructure such as roads and processing facilities is important, investments in smallholder-managed solutions should be prioritised. This includes support for farmer-led irrigation schemes, local-level storage facilities, and market infrastructure that connects smallholder farmers directly with consumers.

v). **Strengthening farmer organizations and institutional capacity:** Support for farmer organizations, co-operatives, and producer networks should be expanded, with the aim of ensuring that these organizations are inclusive and accountable. Such support should include capacity building in collective marketing, input procurement, financial management, and advocacy. Particular attention should be paid to ensuring women's meaningful participation in these organisations, building on lessons from programs such as the Community Food Resilience Project in the Democratic Republic of Congo [13].

vi). **Developing a sequenced approach to agricultural transformation:** The transition to food self-sufficiency should be approached as a long-term process that begins with strengthening existing informal practices and gradually expands state recognition and resource allocation as farmers' collective bargaining power increases. This sequenced approach could enable farmers to build their capacity and reduce the risks of displacement and dependency.

vii). **Addressing the political economy of import dependency:** The transition to food self-sufficiency requires addressing the political economy obstacles that sustain import dependence. This includes managing the transition to higher domestic rice prices, building consumer preference for locally produced rice, and developing the marketing infrastructure needed to connect farmers with consumers.

viii). **Monitoring and evaluating programs with a focus on equity and inclusion:** Agricultural programs should be monitored and evaluated not only for their impact on production but also for their effects on equity, inclusion, and benefit distribution. This requires the development of indicators that capture the experiences of different groups, including women, youth, and smallholder farmers. For gendered outcomes, indicators should be disaggregated by both sex and location (urban/rural), recognising that patterns documented in one context may not apply uniformly across the country.

ix). **Investing in rural-specific gendered agricultural research:** Given the limitations of the current evidence base, future research should prioritise systematic, quantitative studies of gendered labour patterns, decision-making authority, and

resource access in rural Sierra Leonean agricultural systems. This research should examine different crops (rice, cassava, other staples), different tenure systems, and different regions to provide the evidence needed for context-appropriate policy design.

Acknowledgements

We acknowledge the support and contributions of the research community of the Sierra Leone agricultural development and the many researchers and practitioners whose insights informed this study. We also acknowledge the assistance of institutional partners, including Njala University.

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Declaration of AI-Assisted Technology Use

During the preparation of this manuscript, the authors utilized artificial intelligence (AI)-assisted tools (specifically, large language models) for the purposes of language refinement, grammar correction, and enhancing the clarity and readability of the text.

All AI-generated suggestions were critically reviewed, edited, and approved by the authors to ensure accuracy, scientific integrity, and originality. The authors take full responsibility for the final content, interpretation of data, and conclusions presented in this paper. No AI tools were used to generate core scientific data, conduct analyses, or replace author intellectual contributions. The use of these tools was strictly limited to the writing and editing phase to improve the presentation of the paper.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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