

Unintended Consequences of Sugarcane Commercialisation on Food Security and Nutrition in Mafucula, Eswatini

Samuel Bhekinhlanhla Dlamini¹ and Nokwanda Dlodlu²

¹Department of Consumer Science and Community Development, Faculty of Consumer Sciences, University of Eswatini, P.O. Luyengo, Luyengo M205, Kingdom of Eswatini

²Department of Consumer Science and Community Development, Faculty of Consumer Sciences, University of Eswatini, P.O. Luyengo, Luyengo M205, Kingdom of Eswatini

Abstract: The study sets out to examine the impacts of the sugarcane out grower scheme of EWADE on the food security, nutrition, and health of the people of Mafucula, Eswatini, using a mixed research approach that combines the survey results of the 35 participating households and the results of the interview and focus group discussions conducted with the same sample. From the quantitative results, it is evident that the food security situation in Mafucula is critical, with 66% of the participating households experiencing food shortage in the last 30 days, 69% experiencing undernutrition-related illness, and 83% citing the reduction in the amount of land available for food production as the reason behind the worsening nutritional situation in the area. Even though the majority, 60%, of the participating households are part of the scheme, the results show that the benefits are few and unevenly distributed, with the average increase in income standing at 3.09 and a standard deviation of 1.28 on a scale of 1 to 5, and 61% experiencing a reduction in the production of food crops. In addition, the results show that the impacts of the scheme are more pronounced on the women, who are more affected by the situation than the men, and the fact that the community is vulnerable to the risks associated with the sugar market, which is volatile and thus affects the stability of the food situation in the area. From the results, it is evident that the commercialization of sugarcane is associated with livelihood risks and nutritional trade-offs, and thus the assumption that market-led approaches to rural development are linear is questionable, and the study recommends a shift to more nutrition-sensitive, participatory, and more secure approaches to agricultural programming to address the trade-offs and risks associated with the commercialization of the crop.

Keywords: Food Security, Nutrition, Health Outcomes, Sugarcane Schemes and Socio-Economic Factors.

INTRODUCTION

The region where Mafucula is located, Lubombo in Eswatini, is one of the most economically deprived regions in the country. Eswatini's World Bank (2023) reports that 69% of the rural population in Eswatini resides under the national poverty line, 25% of which is considered extremely poor. Mafucula epitomises this [reality], characterised by high unemployment, lack of access to basic services and deep-rooted inequality. These structural factors have direct implications for the health of, and nutrition among, residents, particularly in rural areas that base their livelihoods on the soil, on agriculture and on informal economies. One of Mafucula's decisive social and economic turning points was the resettlement of Simunye communities to pave way for commercial sugarcane estates. Led by the Eswatini Water and Agricultural Development Enterprise (EWADE), this relocation was portrayed as a development project, designed to catalyse rural economic development. But forced relocations, as documented by the International Organization for Migration (2023), are frequently drivers of disruption of livelihoods, severance of cultural relationship with the host land, and erosion of social integration. In Mafucula, the

destruction of area previously used for subsistence farming has eroded household food production and increased reliance on market-based food systems, and hence food insecurity.

This paradox of development that further exposes vulnerability, a phenomenon that is reflected more widely across sub-Saharan Africa. This literature on neoliberal agricultural reforms and externally imposed models of development points to the frequent prioritization of export-led monocultures to the detriment of local food systems. Research conducted by Terry and Ogg (2017) and Phungwayo et al. (2021) observe that, in spite of likely increases in national GDP, sugarcane expansion schemes can displace traditional farming systems, decrease dietary diversity, and challenge nutrition outcomes. However, there is a dearth of localised research evidence to interrogate these issues in the Eswatini context, especially in communities such as Mafucula.

The conceptual structure of this is based on the Food Security Framework which focuses on the four core areas of availability, access, utilization and stability. In Mafucula, access to them is limited by the transition to high sugar cane

agriculture, which in turn limits how diverse and how often families eat these foods, while use is undermined by lack of dietary diversity and stability is problematised by erratic rainfall and economic shocks. This framework enables an understanding of the intersections of structural and institutional elements in shaping food and health outcomes. Political Ecology of Health also provides a critical framework for understanding the sociopolitical determinants of nutrition and health. This view emphasises the influence of power, land tenure and governance on access to resources. In Eswatini, where all land is held in trust by the monarchy and distributed by traditional authorities, insecure land tenure and lack of legal protection has left rural communities exposed to forced evictions and discrimination. Amnesty International (2018) notes that these are often evictions without consent or compensation, in contravention of international human rights standards and compromising community resilience.

Women, children and elderly are the populations mostly affected demographically in mafucula. Such populations suffer from layered vulnerabilities on account of restricted opportunities for education, health care, employment and the like. Women and children in Eswatini are at high risk for poverty and HIV/AIDS, which further limits their options for ensuring that they receive adequate nutrition to be healthy (United Nations Population Fund, 2020). The Elizabeth Glaser Pediatric AIDS Foundation (2024) estimates that more than 120,000 women and 10 000 children aged under 15 years are living with HIV in Eswatini, with rural areas most affected by the epidemic. This intersection of gender, health and food insecurity requires targeted and inclusive interventions.

However, with all these difficulties, there seems to be an increasing focus on integrated, nutrition-sensitive development approach. Phungwayo et al. (2021) propose multisectoral cross-cutting packages combining agriculture, health and social protection that address the underlying causes of malnutrition. However, governance gaps persist. According to Kushitor and Koornhof (2021), Eswatini has a number of nutrition specific and nutrition sensitive programs in place, the sectors are weakly coordinated, and community participation is not fully enhanced. This fragmentation is counterproductive to

interventions and does not stop the cycle of vulnerability.

Lubombo district is vulnerable to food insecurity because of its physical geography as it is characterized by Semi-arid climate, poor soil fertility and poor infrastructure. According to the Integrated Food Security Phase Classification (IPC) report (2023), Lubombo has the highest percentage of population facing severe food insecurity in IPC Phase 3 (Crisis) and Phase 4 (Emergency) with more than 35% of people experiencing extreme food insecurity. Teferra said these are complicated by cycle droughts, economic shocks and the protracted adverse impacts of the COVID-19 pandemic, which disrupted food supply and decreased incomes of households.

In this context, this study aims to address a pressing gap in the literature by examining at a local, empirical level the implications for food security and health of EWADE's sugarcane schemes in Mafucula. It seeks to go beyond macro-economic statistics to focus on the impact on the families and the quality of life of the disadvantaged, especially of women and children. By adapting theoretical frameworks to from these two fields, this study will develop a more sophisticated understanding of structural obstacles to nutrition and well-being in rural Eswatini.

The objective of this study is to provide a critical analysis on how EWADE's sugarcane outgrower schemes have influenced food security, nutrition, and health of Mafucula, ESwatini. Although these efforts are intended to enhance rural people's livelihoods through market-oriented agriculture, they displaced subsistence farming, impaired dietary diversity, and weakened household food sovereignty. This study aims to address a significant empirical void by examining unintended consequences of externally propagated development paradigms and identifying approaches for reorienting rural development toward the promotion of community health. The research will generate policy and programming relevant findings to centre food justice, livelihood diversity and health equity. In seeking to inform action, the research will examining the current status of food security and nutrition in Mafucula and determine the social economic-structural drivers of food insecurity and poor health. It will also assess the direct and indirect effects on household livelihoods, food systems, and

community health in Mafucula of EWADE sugarcane development projects. A study will be made of how people of differing groups within communities, including women and children, perceive and cope with changing food and livelihood systems in the framework of the model of EWADE. Finally, a model for food security and a healthy resilient population in Mafucula will be proposed including context-specific nutrition-focused policy and programmatic interventions.

Statement of the Problem

Food security and malnutrition still are key issues in Mafucula, Eswatini despite continuous world and country developmental efforts. The promotion of sugarcane out grower schemes by EWADE which was supposed to improve people's livelihood has paradoxically increased food insecurity and health risks. The development of monoculture for export displaced subsistence agriculture and redefined local economies, in turn eroding food sovereignty. EWADE (2024) states that 80% of the profit from sugar cane production falls in the hands of intermediaries, leaving in return a yearly average wage of E10,000 for the farmers, which are not suitable to sustain a nutritional well-being. This economic exclusion has coincided with deteriorating health statistics, as exemplified by the 2019 Mhlume Inkhundla Vulnerability Assessment report. Similar development paradigms elsewhere in sub-Saharan Africa produce the same results: externally promoted projects often undermine small-scale food systems, disempowering smallholder communities. But, there is still insufficient local empirical study. This is an important gap to fill because we know little about how EWADE's interventions unintentionally exacerbate food insecurity and health in Mafucula. It seeks to determine the corrective interventions that strengthen household agency, increase livelihood diversification, and prioritize nutrition sensitive development. This work adds to a growing rethinking of collective rural interventions to models that are equitable, locally adapted, and health promoting.

LITERATURE REVIEW

The promotion of commercial agriculture as a solution to rural development in sub-Saharan Africa is extensively advocated. Yet this story is now being contradicted by new evidence, which shows that those interventions have in fact frequently intensified inequality and scarcity of

food. Mhlanga-Ndlovu (2022) analyses neoliberal agricultural reforms in Eswatini where sugarcane schemes have led to the displacement of subsistence agriculture and the reproduction of economic dependence. Similarly, Nsimiire and Owoyesigire's (2023) study in Uganda determined that sugarcane commercialization in Uganda resulted in fewer land for food crops, thus compromising household food security. These results reveal that commercial agriculture and high GDP do not necessarily lead to an improved life for the majority of smallholders. The discrepancy between macroeconomic achievements and micro well-being is a theme that is frequently identified in the literature. This article extends these critiques by examining Mafucula, in which EWADE's sugarcane plantations have reconfigured local livelihoods, inadvertently transforming food access and health.

Food security is a concept that has developed over time to consider four interrelated dimensions: availability, access, utilization and stability (FAO, 2022). These dimensions are highly pertinent, especially in rural Eswatini where land use and sources of income are changing and traditional food systems are being disturbed. Phungwayo et al. (2021) claim that food security in Eswatini is 'not a question of production, but a structural concern that is embedded in social and political structures which include land tenure and access to markets'. The political ecology of health framework also places food insecurity in context, as a result of power imbalances and institutions failure (Kushitor & Koornhof, 2021). It is through these theoretical lenses that the reconfiguring of access to health and food resources through development projects such as EWADE's sugarcane schemes must be examined. Although these contributions are important guidelines, they are also criticized for the lack of localized, empirical basis. This article fills this void by using these theories to illuminate the everyday lived experience of Mafucula inhabitants and thus paints a richer picture of food security in the context of development.

Diet is a key factor for health specifically in rural areas where diverse food and health care are less available. UNICEF Eswatini (2023) shows that 25% of children under 5 are stunted, with stunting prevalence being higher in the Lubombo and Shiselweni regions. These results are associated with a lack of dietary diversity and limited

availability of good quality food. WFP (2023) notes that, despite significant investment in agriculture, Eswatini is still highly dependent on food imports, and that rural households are in a state of chronic food insecurity. The evidence indicates that commercial agriculture has not translated into improved nutrition. It has tended to encourage, instead, monoculture production, which suppresses dietary diversity and increases susceptibility to market shocks. Our study contributes to literature by assessing the impact of EWADE's sugarcane schemes on household nutrition and health in Mafucula. It also addresses the adverse effects of these structural changes on women and children, who make up the most vulnerable population due to the socio-economic and health inequities.

Monoculture farming, and especially sugarcane farming has been highly condemned as being against food sovereignty and ecological resilience. Monoculture exhausts soil of nutrients diminishes the variety of life and is reliant on external inputs (Greener4Life 2023). In Eswatini, sugarcane schemes have displaced mixed cropping systems that used to be household's food sources (Mhlanga-Ndlovu, 2022). This transition has led not only to less dietary diversity but also a dilution of indigenous knowledge systems and cultural practices with respect to food production. The literature also highlights how a monoculture has increased vulnerability to weather shocks, where reliance on a single crop has been used for cash income. Supporters claim that sugarcane pays off, but opponents point out that profits are not distributed, and that smallholders take the risks. This article extends this analysis by examining how monoculture farming, permitted under EWADE, has affected the food sovereignty of Mafucula.

Food insecurity and negative health outcomes are more prevalent among women and children in rural Eswatini. According to UNFPA (2020) women are systematically marginalised with little access to the land, to education or to health care and thus do not have the means to ensure that their families are adequately fed. Phungwayo et al. (2021) highlight the necessity of gender-responsive approaches for improving the effectiveness of food and nutrition interventions. Yet, many development programmes such as EWADE have not managed to sufficiently incorporate gender equity in their design and

implementation. The literature shows that women do most of the work related to food production and child care, for example, but have little decision-making authority about land and money. This gap is addressed in this study by analysing how EWADE's sugarcane schemes have impacted women's access to food, income and health care in Mafucula. It also investigates the way gendered power relations influence household responses to food insecurity, thus adding to an integrated perspective on the development ramifications of the IFPRI strategy.

Despite many policies designed to enhance food nutrition security in Eswatini, the implementation is disjointed. Phungwayo, Kushitor, and Koornhof (2021) argued that in Eswatini, although there were nutrition-sensitive programmes in place, coordination across sectors was weak and community involvement was negligible. In its assessments of that country's sugar sector, the EU, in 2021, highlighted that even though irrigation and infrastructure were pumped in quite heavily, structural social and economic imbalances were not addressed. This indicates that policy systems frequently favour economic 'outputs' to the detriment of the human 'product'. This study responds to this call by offering localized evidence on how policy blind spots that characterize EWADE's sugarcane schemes lead to food insecurity and health vulnerabilities in Mafucula. It also makes policy recommendations that reflect community needs and evidence.

Current literature has identified serious problems related to monoculture, unfair distribution of profits, and policy incoherence (Phungwayo et al., 2021; Mhlanga-Ndlovu, 2022). These studies, however, generally analyse national or regional effects with little empirical attention to the local level. Furthermore, although conceptual frameworks, such as the Food Security Pillars or Political Ecology, have provided some valuable insights, their local adaptation to conditions in Eswatini has been limited. This omission is especially notable within Mafucula, an area where discrepancy between displacement, commercial sugarcane agriculture, and deteriorating health indices calls for specific scholarly inquiry. Accordingly, this study helps to enrich the academic and policy discourse by offering a context-specific perspective on EWADE's interventions.

METHODOLOGY

The research design for this study was descriptive, non-experimental using mixed method. Combining qualitative and quantitative methods made it possible to offer an in-depth analysis of the social-economic and health impacts of EWADÉ's sugarcane projects in Mafucula. Quantitative findings provided evidence for measurable patterns in food security and health; qualitative findings demonstrated context-specific information regarding household experiences and community interactions. This design would enable an examination of complex, real-world phenomena while not controlling for factors (Creswell & Creswell, 2018). Descriptive designs are especially helpful to explain reports of current conditions and to generate theories for prediction. The mixed-methods approach was congruent with the study's aims, which were to measure patterns, assess effects, and formulate locally relevant recommendations. By mapping both statistical patterns and lived experiences, the design supported a more comprehensive view of how externally imposed agricultural interventions impact local food systems, nutrition and health.

The study participants were the residents of Mafucula and those who were directly affected by EWADÉ's sugarcane projects. Random sampling was employed to select 60 participants to fulfil the diversity of the community including smallholder farmers, women, youth, and elder persons. This procedure was selected since it helps to find information-rich and fact-loaded cases in relation to the research questions (Etikan et al., 2016). The participants were approached through local leaders and community connections to ensure an ethically sound and voluntary recruitment. A sample of 40 survey participants and 20 key informants for in-depth interviews and focus groups provided data. The stratified nature of the sampling provided wide and deep depths for data collection making it possible for the study to get viewpoints across food security and health issues. However, the small sample size was appropriate because the study aimed for contextual depth rather than statistical generalization, which is congruent with established standards for qualitative-dominant mixed-methods research.

The study used two main data collecting tools: A structured tool and a semi-structured guide for interviews. The quantitative household questionnaire covered information regarding the

household demographic composition, sources of income and available food, dietary intake and self-reported health indicators. It was adopted from already tested instruments of regional food security assessments (WFP, 2023). The interview guide, aimed at capturing qualitative information, such as lived experiences, coping mechanisms, and perception of impact of the sugarcane schemes. This covered open-ended questions grounded in the Food Security Framework and Political Ecology of Health, ensuring theoretical congruence. Clarity and relevance, respectively, of the two instruments were assessed by two experts in community nutrition and rural development. Face validity and linguistics pre-testing was carried out on five respondents from a bordering community to check for clarity and sequencing. This double-instrument strategy permitted convergence of results and avoided the loss of both statistical evidence and narrative details.

Standardized procedures were used to collect reliable data in this research. The survey was conducted by trained field workers who were fluent in both English and siSwati. Trustworthiness in the qualitative tradition was established through credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985, as cited in Nowell et al., 2017) We emphasized credibility and transferability, or external validity of the findings. Credibility was promoted by member checking, where participants were asked to check and validate transcripts for correctness. Support for transferability was achieved through rich, contextual description. Reliability was ensured through maintaining a record of decisions and modifications at each stage of the research. Confirmability was addressed using reflexive journaling to document potential bias. Cronbach's alpha was also applied to questionnaire subscales resulting in coefficients above 0.70, indicating an acceptable level of internal consistency (Tavakol & Dennick, 2011). Together, these integrated approaches served to bolster the methodological rigour and credibility of the study findings.

The study received ethical approval from the University Research Ethics Committee before fieldwork. All respondents gave their informed consent following being informed of the aim and procedures, and their rights, to disengage at any point with no offence. Consent forms were available in both English and siSwati to allow full understanding. Pseudonyms were assigned and

data were stored on password-protected equipment to ensure confidentiality. Participants responses were anonymous in all reporting. Vulnerable populations, such as women and older subjects, were also carefully considered to protect their autonomy and dignity. The research followed the Belmont Report ethical principles of respect for persons, beneficence, and justice (National Commission, 1979). Furthermore, community access procedures were adhered to including consultations with traditional leaders.

Field work in Mafucula was conducted during five weeks. Interviewer-administered questionnaires were used to collect quantitative data and this helped to standardize the subject responses. Interviews were face-to-face, conducted within safe neutral venues, usually at participants' homes or community halls. Semi-structured interviews and two focus group discussions (one for the women farmers and the other with the community elders) were used to collect qualitative data. All qualitative sessions were audio taped with consent and transcribed. Data was collected by two trained local research assistants. The mixed methods design facilitated dynamic triangulation between qualitative themes and discussion of these with members of the quantitative sample. This approach yielded data that were progressively more rich and pertinent (Creswell & Plano Clark, 2017). Data collection was scheduled to avoid the high agricultural periods and religious events so that a higher response and better data quality was obtained.

Quantitative data was coded and analysed with SPSS Version 30. Averages, frequencies and standard deviations were used to report variables

for food security, income and health. Associations between sugarcane scheme enrolments and nutrition and health indicators were examined using cross-tabulations. As for qualitative data, a thematic analysis was performed in accordance with Braun and Clarke's (2019) six phases - familiarization, coding, theme development, review, definition, and reporting. Qualitative transcripts were coded and sorted in Excel software. Codes were developed deductively based on the theoretical framework as well as inductively from reading the narratives. The multiple sources of data triangulated with one another to enrich the interpretation of findings across methods. "Erosion of food autonomy," "hidden costs of monoculture" and "gendered vulnerability" were themes that gave greater depth to community-level processes. This analytic approach was consistent with the goal of the study to generate findings accurate on the one hand, but nuanced to context, on the other.

RESULTS AND DISCUSSION

Demographic Data

The characteristics of Mafucula families display a strong encumbering female bias on caregiving and household management (71.4% participants), many of them as de facto heads or co-managers. This gendered trajectory, and low education more than half has primary schooling restricts household agency to act within volatile food and income environments (also in echoed in literature on rural livelihoods; O'Laughlin, 2017; Rao, 2020). Although sugarcane enterprises are expected to contribute to financial equilibriums; only 28.6% are employed on the scheme with informal activities prevailing, with 42.9%, revealing the prevalence of precarious income strategies.

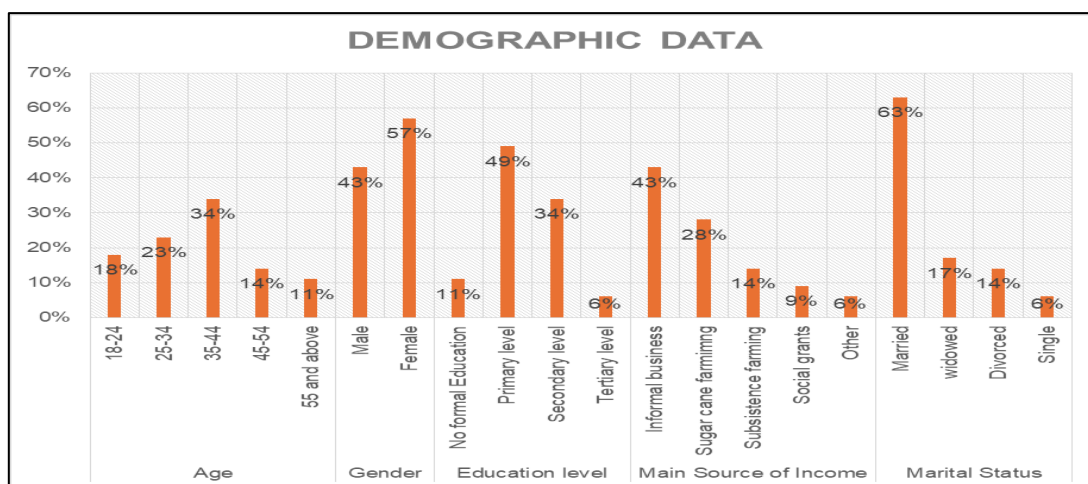


Figure 1: Demographic data

Thematic analysis reveals that embedded gender norms relegate caregiving to women and place men in a position of authority over food provision and financial management, thus leaving informal power asymmetries unchecked (Kabeer, 2016). However, this division is 'complicated' by the ways in which 'roles shift back and forth between men and women and interfaces with other responsibilities and forms of work' (Chant 2012:1) A shift from the traditional wife at home and husband at work stereotype has occurred, with women working the land and caring for children or engaging in care labour and petty trading, showing evidence of adaptive strategies within constraint (Chant, 2014). The confluence of gendered labour, low educational capital and informal livelihoods reveals such a tension: higher household income is not necessarily associated with food security, indicating that trade-offs in nutrition arise from structural inequalities (HLPE, 2020). Intergenerational embeddedness also surfaced as a broad theme; the elderly not only own the land knowledge but also affect agrarian decisions which combine adaptive resilience with hierarchical stiffness. "One of us determines what to plant because I have seen famines," one speaker said, an assertion of timebound capacity informed by circular experience. However, this control might risk marginalizing youth voices and stifle creativity, risk long-term flexibility. These results problematize the linear way of understanding development impacts of commercial agriculture, showing that sugarcane schemes are enrolling households in a network of relational and

structural asymmetries that generate uneven accumulations of well-being. This analysis sits alongside and pushes further your comparative frame, examining how security of livelihoods, food, and bodies crisscross contested terrains of gender, age, and economic precarity.

Status of Food Security and Nutrition

Regarding food security and nutrition status findings of the research show an acute nutritional crisis in Mafucula, formed as the intersection of structural constraints and deepening livelihood precarity. Although the growing of sugarcane was expected to increase household welfare, and therein reduce food insecurity, there is evidence of the opposite 66% of the households' experienced situations were 'they ran out of food' during the last 30 days and 69% experienced undernutrition-related the illnesses, a classical sign of malnutrition, pointing towards unfavourable prevailing nutritional statuses amidst the expansion of commodifiable agriculture. These results are suggestive of nutritional trade-offs as the market-orientated crops replace subsistence, reducing diet resilience (Bezner Kerr et al., 2022). It further reflects constrained food use despite physical market proximity indicating economic in addition to geographic unaccess (FAO, 2023), This is in accord with a Betlanders' comment we shared above that knows all food is available at a physically (market level) but an economically (expensive) affordable level and not for the involvement in very expensive commercial peanut oil extraction.

Table 1: Current State of Food Security and Nutrition

CURRENT STATE OF FOOD SECURITY AND NUTRITION			
Indicator	Category	Frequency	Percentage
Frequency of meals per day	Once	4	11%
	Twice	21	60%
	Thrice	10	29%
	More than 3 times	1	0%
Ran out of Food (30days)	Often	23	66%
	Sometimes	8	23%
	Rarely	4	11%
	Never	0	0%
Undernutrition-related Illness (12 months)	Yes	24	69%
	No	6	17%
	Not Sure	5	14%
Access to Fruits & Vegetables (3x/week)	Yes	30	86%
	No	5	14%
Prevalence of Malnutrition	Reduced Land Access	29	83%
	Lack of Income	27	77%

	Market prices too high	13	37%
	Poor Harvest	11	31%
	Other	2	6%

The qualitative responses enrich this picture: meal skipping and food borrowing reflects cyclic vulnerability and not wasting food is further confirming this pattern, by the word of “just dinner porridge” or “no fruits in weeks” loveliness, nutritional monotony, and the eventual impact on long-term health in particular for the more vulnerable populations. Crucially, the 83% who identified farmland replacement by sugarcane point to a juxtaposition between agro-industrial land use and food sovereignty. This echoes wider discussions on agrarian transitions, through which rural livelihoods are reorganized by the flow of capital exposing households to a food risk othered onto them (Patel, 2013; Hall et al., 2017). But residents' stories also depict makeshift agency in skimping on food, prioritizing meals for children, often in the harshest of circumstances, pointing to a resourcefulness as much a function of hunger as of plenty. These results contradict linear development belief and indicate that increased income-earning opportunities do not necessarily lead to overall well-being. They are instead symptomatic of a complex matrix of structural and

nutritional vulnerabilities, that are indicative of the nature of land tenure insecurity, income volatility and commoditisation of rural space thereby forming a robust argument for reasserting food security and nutrition back at the centre of agro-development planning.

Impacts of Sugarcane Schemes on Livelihoods and Health

The sugarcane project has spun a multi-dimensional fabric of livelihoods and health sensitivities, disclosing a range of reality as depicted in table 2 below. With participation from 60% of households, the relatively low mean changes in income (3.09) and large standard deviation (1.28) indicate considerable variation: while some households average limited gains, others see no improvement or are actually worse off. This heterogeneity mirrors in the contract farming literature the repeated story of stagnant developmental effects due to asymmetrical bargaining power, debt-based obligations, and precarious working condition (Thorpe & Reed, 2021).

Table 2: Impacts of Sugarcane Schemes in Livelihoods and Health

Impacts on Livelihood and Health			
Variable	Scale Used	Mean	Standard Deviation
Participation	Yes=1, No=0	0.60	0.50
Income Change	5 to 1 (↑ to ↓)	3.09	1.28
Food Crop Reduction	Yes=1, No=0, NA excluded	0.61	0.50
Health Status	4 to 1 (↑ to ↓)	2.23	0.93
Input Access	Yes=1, No=0, NA excluded	0.45	0.51

These patterns are animated by qualitative narratives in which respondents describe a significant decline in subsistence farming; the focus on one crop, sugar cane has eroded food self-sufficiency and reduced resilience to food shocks. This is consistent with evidence on how commercialization inadequately integrated into inclusive design can reduce agency and reinforce dietary trade-offs (Fanzo & Borelli, 2020). While the above levels of seasonal employment grew, marginal incomes are watered down by cooperative deductions, costs of transport are high,

and we have a paradox of livelihood due to the fact that increased economic activity means very poorest options for empowerment. This fragility is underlined by participants’ retellings of ongoing food borrowing and lease debate. Health effects were also mixed: while some explained better access to health services, many narrated evident nutritional deteriorations, particularly among children, orienting away from the relationship between income and health, as would have been assumed. Such contradictions also echo larger concerns about several models of rural

development that externalize food risk in the pursuit of growth (Pingali et al., 2022). And within this complexity, there is community agency, one of households adjusting with shared childcare, food rationing, and informal reciprocity networks, highlighting adaptive abilities formed through adversity. Considered in the comparative perspective of livelihoods, food security, and well-being these insights tellingly point to the need for recalibrated policy and interventions that prioritize equity, sustainability, and the nutritional integrity in agro-commercial landscapes.

Community Experience and Coping Strategies

The article demonstrates how the sugarcane scheme has remodelled life in Mafucula in uneven and frequently negative terms, especially in terms of eroded gender relations, food security and social networks. The focus of this paper is quantitative,

suggesting that there is a decline in women’s control of food production, with 17.1% reporting gains and 31.4% losses, revealing a declining capacity to act and achieve nutritional self-sufficiency. This is consistent with evidence that agrarian commercialization may reinforce patriarchal social norms by increasing male domination in decision-making over income and on land use (Kawarazuka et al., 2018). Coping mechanisms are mostly unsustainable: almost half of households would be required to engage in market sales despite income precariousness and 25.7% would cope through meal skipping. The declining diet quality of children, identified by 37.1%, suggests a nutritional cost to the next generation that is directly opposite to the perceived scheme benefits.

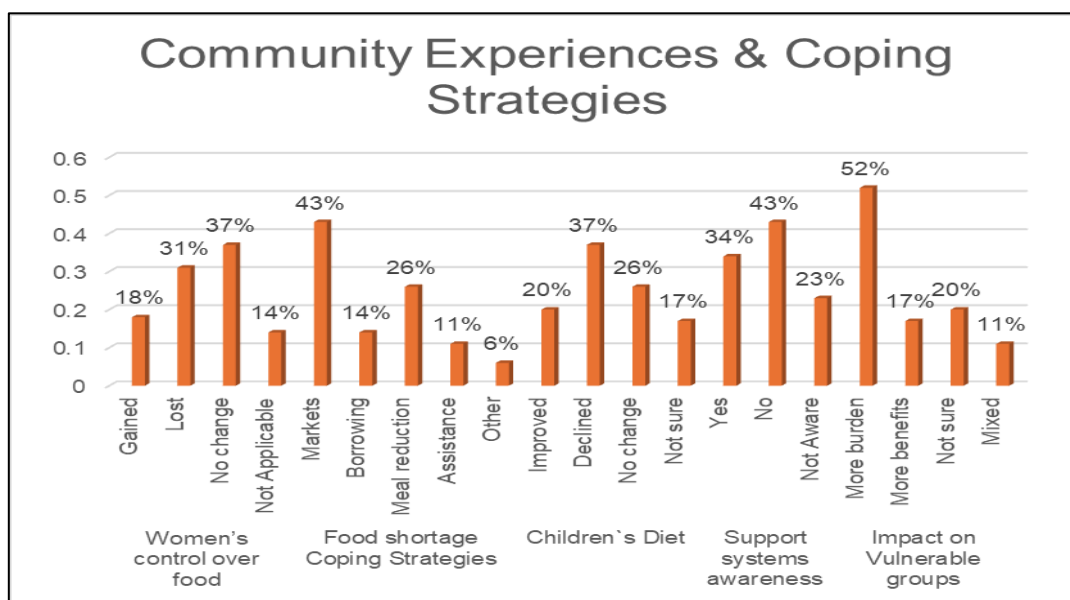


Figure 2: Community Experience and Coping Strategies

Qualitative narratives reinforce this exposure: unpaid work burden on women has shot up, girls' education is being sacrificed and social solidarity strained under common scarcity. These patterns demonstrate a structural “stretch” or increase in stretching of (already strained) household coping gave no institutional buffering (Slater & Kim, 2022). The lack of in-built support systems (42.9% report no available aid) further exacerbates exclusion, exposing the marginal nature of the most precarious. The exclusion of community members from important decisions on land utilization and food production were noted, along with elite capture and lack of transparency in

decision-making, indicative of the participatory shortfalls that have marked top-down models of rural development (Verma, 2016). The finding that more than half of the sample felt the project disproportionately affected women, children and the elderly, supports criticisms that development projects, when poorly interfaced with local governance structures, entrench hierarchies rather than erode them. These insights, embedded within your comparative framework, signal the coming together of the dynamic, contested terrain of wellbeing, food security and livelihoods to underline the necessity to reorganize development through participatory and equity-tainted eyes.

Policy Suggestions and Community Priorities

The respondents' preferences for policy reform in Mafucula reflect a strong preference for land-based autonomy, participatory governance and integrated well-being. Land access (51%), followed by inputs (46%), were rated among the most urgent needs and confirmed food security as structurally constricted by the denial of access to productive resources, especially in land-use decisions favouring sugarcane to the detriment of subsistence. This emphasis reflects wider community desires for greater autonomy over both livelihoods and food, a rejection of structural

disempowerment that is symptomatic of agribusiness-mediated rural transitions (Bernstein & Oya, 2019). Decisive backing for local input (88%), in this respect, suggests a repudiation of extractive, top-down development and resonates with concerns that rural residents are too often acted upon rather than partners in shaping transformation (Cousins et al., 2023). Mixed farms' wide support (80%) may also reflect a joint approach to coping with nutritional trade-offs and seeking a compromise between assisting the market and the challenges of food sovereignty.

Table 3: Policy Suggestions and Community Priorities

Policy Suggestions and Community Priorities			
Variable	Categories	Frequency	Percentages
Support for Enhanced Household Food Security	Access to land	18	51%
	Agricultural inputs	16	46%
	Employment opportunities	15	43%
	Government food aid	10	29%
	Health services	9	26%
	Nutrition education	6	18%
	Other	2	6%
Importance of Community Input in Development Programs	Yes	31	88%
	No	3	9%
	Not Sure	1	3%
Support for Mixed Farming	Yes	28	80%
	Maybe	5	14%
	No	2	6%
Support Option	School feeding programs	20	57%
	Clinics/mobile health	17	49%
	Agricultural extension	12	33%
	Food Banks	9	28%
	Other	2	6%
Suggested Change	Access to land for food production	13	37%
	Improved agricultural inputs/support	10	29%
	Expanded nutrition and health services	6	17%
	Stronger community voice/involvement	4	11%
	Other	2	6%

The qualitative narratives support this evidence: “let one plot per family remain for food” calls for an ethically grounded land duality, where livelihood cannot replace local dietary resilience. While calls to school-feeding and mobile clinics reflect the centrality of well-being surpassing income measures, evidence of community driven linkages between agriculture and health is also shown. Through the repeated featured of participant youth education, vocational training, gender equity, and empowerment it appears the participating stakeholders have a sense of long-

term community resilience and vision for intergenerational growth. However, these priorities are also ambivalent: it promised economic development, while its legacy of girls dropping out from schools, falling food production, elite capture suggests uneven returns and institutional fragility. Placing these findings within the comparative context of livelihoods, food security and well-being, it is evident that responses in policy and practice will need to be participatory, land-sensitive, and cognizant of relational dynamics that delimit and facilitate resilience.

SUMMARY AND CONCLUSION

In this research we explore the socio-dietary implications of the EWADE's sugarcane out grower schemes in Mafucula, Eswatini, and how they influence food security and health at the household level. Underpinned by a nutrition-sensitive development perspective, the study employs a convergent parallel mixed-methods approach combining evidence from 35 household surveys with qualitative themes extracted through 15 semi-structured interviews, participatory mapping and local health facility records. Quantitatively, the nutritional intake of the scheme participants has decreased significantly (mean households dietary diversity score: 4.1), and access to traditional crops declined because of land reallocations. Qualitative narratives expose unintended gendered consequences, for women in particular, of heavier workloads and caregiving responsibilities in response to intensified commercial agriculture. A thematic synthesis drawn on the four pillars of food security (availability, access, utilization, stability), reveals system level tensions between short term income generation and future household nutrition stability. These findings suggest a disconnect between the aspirations for development and local experience.

The inquiry shows that sugarcane commercialization in Mafucula has (re)shaped household livelihoods, food security, and well-being via structurally unequal and sometimes paradoxical effects. Even though existing income generation is low, households are trapped in a downward spiral of household income and consequently a lack of dietary diversity and agency for women. Changes toward monocultural farming practices and elite-centred governance have undermined resilience, degraded smallholders' capacity to cope, and increased intergenerational vulnerabilities. Although there are still mutual aid and informal tactics by which people are adapting, these responses are stretched thin and are not sustainable. Mafucula's communities want to see participatory, land-sensitive policies that recuperate their food sovereignty, align income with nutrition and support young people and women. Their aspirations betray frustration in top-down planning and seek integrated, equity-informed strategies that will help to remove such structural exclusions and build intergenerational resilience and agency in the rural landscape. Results The results stress the urgency of the need

for pro-poor, participatory, nutrition sensitive and equity focused development strategies that place local voice and local level food sovereignty at the heart of long-term social protection.

RECOMMENDATIONS

To improve the sugarcane schemes, it is suggested that nutrition-sensitive planning to promote the production of food not only cash crops, set aside land for household subsistence and encourage cropping diversity. Establish participatory governance mechanisms with local farmers, including women and youth, in decision making bodies to guarantee equitable benefit sharing, while being responsive to communities. Establish community-based nutrition surveillance systems by training local health workers and community committees on how to monitor dietary diversity and nutrition indicators for immediate action and feedback loops.

REFERENCES

1. Amnesty International. "They don't see us as people: Security of tenure and forced evictions in Eswatini." (2018).
2. Bernstein, H., & Oya, C. "Rural futures. How much should markets rule?." (2014).
3. Bezner, K. R., Hickey, G. M., Lupafya, E., & Dakishoni, L. "Agroecological approaches and household food and nutrition security in low-income settings." *Global Food Security*, 32 (2022): 100617.
4. Braun, V., & Clarke, V. "Reflecting on reflexive thematic analysis." *Qualitative research in sport, exercise and health* 11.4 (2019): 589-597.
5. Chant, S. "Exploring the "feminisation of poverty" in relation to women's work and home-based enterprise in slums of the Global South." *International Journal of Gender and Entrepreneurship* 6.3 (2014): 296-316.
6. Cousins, B., Hebinck, P., & Goboza, S. "Participation without power? The limits of inclusive rural development in South Africa." *World Development*, 163 (2023): 106217.
7. Creswell, J. W., & Creswell, J. D. "Research design: Qualitative, quantitative, and mixed methods approaches." *Sage publications*, (2017).
8. Creswell, J. W., & Clark, V. L. P. "Designing and conducting mixed methods research." *Sage publications*. (2017).
9. Elizabeth Glaser Pediatric AIDS Foundation, "Eswatini HIV impact factsheet." (2024).

10. Eswatini Water and Agricultural Development Enterprise (ESWADE). "Annual performance report." *Mbabane, Eswatini: ESWADE*. (2024).
11. Etikan, I., Musa, S. A., & Alkassim, R. S. "Comparison of convenience sampling and purposive sampling." *American journal of theoretical and applied statistics* 5.1 (2016): 1-4.
12. European Union. "Final Evaluation: Eswatini Sugar Sector." (2021).
13. Fanzo, J., Hunter, D., Borelli, T., & Mattei, F. "Diversifying food and diets—using agricultural biodiversity to improve nutrition and health. Taylor/Francis Group, London/New York." (2013).
14. FAO. "The State of Food Security and Nutrition in the World 2022." *Rome: FAO*. (2022).
15. FAO. "The State of Food Security and Nutrition in the World 2023." *Rome: FAO*. (2023).
16. Greener4Life. "The Impact of Monoculture on Food Security." (2023).
17. Hall, R., Scoones, I., & Tsikata, D. "Plantations, outgrowers and commercial farming in Africa: agricultural commercialisation and implications for agrarian change." *The Journal of Peasant Studies* 44.3 (2017): 515-537.
18. Clapp, J. "Food security and nutrition: building a global narrative towards 2030." (2020).
19. Integrated Food Security Phase Classification (IPC). "Eswatini acute food insecurity and malnutrition analysis." (2023).
20. International Organization for Migration. "Development-induced displacement and resettlement in Southern Africa." *Geneva, Switzerland: IOM Publications*. (2023).
21. Kabeer, N. "Gender equality, inclusive growth, and labour markets." *Women's economic empowerment*. Routledge, 2021. 13-48.
22. Kawarazuka, N., Locke, C., McDougall, C., Kantor, P., & Morgan, M. "Bringing analysis of gender and social-ecological resilience together in small-scale fisheries research: Challenges and opportunities." *Ambio* 46.2 (2017): 201-213.
23. Kushitor, M. K., & Koornhof, H. "Coordination challenges in nutrition-sensitive interventions: Lessons from Eswatini." *African Health Sciences*, 21.4 (2021): 1895–1907.
24. Mhlanga-Ndlovu, N. "Socio-economic effects of neoliberal transformation on Irrigated Agriculture in Eswatini: A case of Sugarcane Farmers' Groups in the Komati Downstream Development Project." *Capital penetration and the peasantry in southern and eastern Africa: Neoliberal restructuring*. Cham: Springer International Publishing, (2022): 203-218.
25. United States. National Commission for the Protection of Human Subjects of Biomedical, & Behavioral Research. "The Belmont report: ethical principles and guidelines for the protection of human subjects of research." *Vol. 2. The Commission*, (1978).
26. Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. "Thematic analysis: Striving to meet the trustworthiness criteria." *International journal of qualitative methods* 16.1 (2017): 1609406917733847.
27. Nsimiire, W., & Owoyesigire, B. "Effects Of Sugarcane Growing On Food Security Among Smallholder Farmers In Proximity To Kinyara Sugar Limited In Masindi District, Uganda." *International Journal of Agriculture and Environmental Research* 9.1 (2023): 1-16.
28. O'Laughlin, B. "Livelihoods and the political economy of African households." *Review of African Political Economy*, 44.151 (2017): 1–16.
29. Patel, R. "The long green revolution." *The Journal of Peasant Studies* 40.1 (2013): 1-63.
30. Phungwayo, M., Dlamini, N., & Magongo, T. "Linking food security and nutrition in Eswatini's rural development policy." *Journal of Southern African Food Studies*, 15.2 (2021): 48–65.
31. Phungwayo, T., Kushitor, M. K., & Koornhof, H. "Governance of food and nutrition security in Eswatini." *Agriculture & Food Security*, 10.45 (2021): 1–12.
32. Pingali, P., Aiyar, A., Abraham, M., & Rahman, A. "Transforming food systems for a rising India." *Springer Nature*, (2019).
33. Rao, N. "Women's access to land and household food security: Linking evidence and policy." *Gender, Technology and Development*, 24.1 (2020): 1–17.
34. Slater, R., & Kim, D. "Resilience, coping and social protection in protracted crises." *Disasters*, 46.1 (2022): 1–20.
35. Tavakol, M., & Dennick, R. "Making sense of Cronbachs alpha. *InternationalJournal of*

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- Medical Education, 2, 53-55. Retrieved fromhttps." (2011),
36. Terry, G., & Ogg, A. "The unintended consequences of large-scale agricultural investments in Africa." *Development Policy Review*, 35.3 (2017): 293–312.
37. Thorpe, J., & Reed, P. "Inclusive business and development: Lessons from value chain development with smallholders in Africa." *Journal of Business Ethics*, 170.4 (2021). 631–648.
38. UNICEF Eswatini. "Nutrition Programme Overview." (2023).
39. United Nations Population Fund (UNFPA). "State of World Population: Against My Will." (2020).
40. Verma, R. "Incorporating participatory approaches in agricultural development: Lessons from sub-Saharan Africa." *Development in Practice*, 26.6 (2016): 678–690.

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