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LOW-CALORIE SWEETENERS IN THE ERA OF SUGAR TAXATION IN AFRICA: PUBLIC HEALTH OPPORTUNITIES AND POLICY DILEMMAS

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ABSTRACT

The introduction of sugar taxes in Africa, beginning with South Africa's 2018 Health Promotion Levy and followed by similar fiscal measures in countries such as Ghana and Nigeria, has intensified policy debates on the role of low-calorie sweeteners (LCS). These fiscal interventions were designed to curb rapidly increasing rates of obesity, diabetes and other non-communicable diseases (NCDs), yet they have also triggered a swift shift toward LCS use as substitutes for sugar. This dual effect illustrates both progress in health-oriented policy and emerging challenges surrounding long-term health effects, regulatory coherence, and consumer equity. Artificial sweeteners such as aspartame and sucralose, together with natural alternatives including *Stevia rebaudiana*, *Thaumatococcus daniellii* and *Pentadiplandra brazzeana*, offer potential advantages in weight and glycemic control. However, evidence remains divided: while short-term randomized trials demonstrate benefits for energy balance and glucose regulation, long-term observational studies report inconsistent or adverse associations with metabolic and cardiovascular risk. Reflecting this uncertainty, the World Health Organization (WHO) in 2023 advised against the use of non-sugar sweeteners for weight management, creating tension between global recommendations and Africa's urgent need for cost-effective dietary interventions. Beyond the health dimension, Africa's sweetener policy landscape reveals underexplored agricultural, economic and governance opportunities. Indigenous sweeteners such as thaumatin and brazzein represent potential sources of regional innovation and trade diversification, yet investment, processing infrastructure, and regulatory alignment remain limited. This review synthesizes scientific, economic, and policy evidence on LCS in Africa to clarify how fiscal and regulatory instruments can support sustainable sugar reduction. It identifies key governance gaps uneven regulation, weak consumer awareness, and affordability barriers and proposes three strategic priorities: harmonized regional frameworks to ensure regulatory consistency, targeted investment in indigenous sweetener production, and equitable access to safe, affordable alternatives. By integrating global evidence with Africa's contextual realities, this review offers a balanced framework for advancing public health while fostering inclusive economic development.

Key words: Low-calorie sweeteners, Sugar tax, *Stevia rebaudiana, Thaumatococcus daniellii*, *Pentadiplandra brazzeana*, Africa, Nutrition transition

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INTRODUCTION

Africa is undergoing a profound nutritional transition, with traditional diets increasingly replaced by processed foods high in sugar, fat and sodium. This shift has driven a sharp rise in obesity, type 2 diabetes, and cardiovascular disease, with the International Diabetes Federation projecting that diabetes cases in sub-Saharan Africa will more than double by 2045 [1]. These trends highlight the urgent need for strategies to reduce sugar consumption and curb the growing burden of NCDs. In response, several countries have introduced fiscal and regulatory measures. South Africa's 2018 Health Promotion Levy, taxing beverages with more than 4 g sugar per 100 mL, reduced purchases of taxed products and spurred reformulation [2]. However, it also led to increased use of low-calorie sweeteners (LCS), raising questions about long-term health effects, regulatory consistency and consumer perceptions. Low-calorie sweeteners include artificial options such as aspartame and sucralose, as well as natural sweeteners like *Stevia rebaudiana*, *Thaumatococcus daniellii* and *Pentadiplandra brazzeana,* the latter two originating from African plants. They provide sweetness with minimal calories, offering potential benefits for weight management, diabetes control and oral health (Table 1) [3-6]. Yet evidence remains divided: short-term trials show reduced energy intake and improved glycemic control, while long-term studies suggest possible risks including weight gain and cardiovascular disease [7]. In 2023, the WHO advised against using non-sugar sweeteners for weight management, underscoring this uncertainty. In Africa, these global debates intersect with regional challenges: limited local research, fragmented regulatory frameworks, low consumer awareness, and strong political-economic interests tied to sugar [8]. Contradictory policies also complicate the landscape, for example, while the Health Promotion Levy indirectly promoted LCS use, South Africa's draft R3337 regulation proposed warning labels on products containing LCS, potentially stigmatizing them. Previous studies have emphasized *Stevia rebaudiana* agricultural potential, but broader health and policy dimensions of LCS under sugar taxation remain underexplored [9,10].

Therefore, this review aims to synthesize and contextualize existing evidence on LCS use and regulation, particularly in Africa, to identify gaps in health and policy research and to propose locally relevant strategies for harmonious and equitable LCS governance. This focus differentiates this study by incorporating nutritional science, policy analysis, and the economic potential of indigenous sweeteners within Africa's evolving public health framework.

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MATERIALS AND METHODS

Search Strategy

This narrative review was conducted to synthesize peer-reviewed and grey literature on low-calorie sweeteners (LCS), sugar taxation, and nutrition transition in Africa. The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework conceptually to ensure transparency in literature identification and screening. Searches were conducted across major international databases PubMed, Scopus, and Google Scholar as well as grey literature sources including the World Health Organization (WHO), Food and Agriculture Organization (FAO) and national policy documents.

The search strategy combined the following key words: *"low-calorie sweetener," "non-nutritive sweetener," "sugar tax," "Africa," "stevia," "Thaumatococcus daniellii,"* and *"Pentadiplandra brazzeana."* A total of 65 records were retrieved from scientific databases and 52 records from grey literature sources. After the removal of 15 duplicates, 102 titles and abstracts were screened, and 95 full texts were assessed for eligibility. Of these, 86 studies were included in the final synthesis. The selection process is summarized in Figure 1 (PRISMA-style conceptual flow diagram).

Eligibility Criteria

Studies were included if they focused on low-calorie or non-nutritive sweeteners in the context of Africa's nutrition transition or sugar-reduction policy, addressed regulatory, economic, or public health dimensions of sugar taxation or sweetener substitution, and were published between 1988 and 2025 in English. Studies were excluded if they lacked relevance to Africa, focused solely on sugar production efficiency, or did not discuss taxation, regulation, or health implications of LCS. All identified records were manually screened by title and abstract, followed by full-text evaluation. Both peer-reviewed publications and grey literature (policy briefs, governmental reports, and institutional reviews) were included to ensure comprehensive coverage of scientific and policy perspectives. Data were extracted and synthesized according to key themes: classification and properties of LCS, market and policy trends following sugar taxation, health implications and consumer perception, and opportunities for indigenous sweetener development and commercialization. Discrepancies during the screening process were resolved through discussion among co-authors until consensus was reached.

Screening and Data Extraction

The screening was conducted in two stages. First, the title and abstract were reviewed to identify studies that looked at low-calorie or non-nutrient sweeteners within Africa's nutrition transition or sugar reduction policies. Then, the full text was screened to determine their relevance to regulatory, economic, or public health

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dimensions related to sugar taxation or sweetener replacement. For data extraction, two reviewers independently recorded key information, including research settings, policy types, methodological approaches, evaluated results and key conclusions.

Risk of Bias Assessment

Given the narrative review design, no formal meta-analysis or quantitative bias assessment was conducted. However, the quality and credibility of each included source were assessed based on methodological clarity, source reliability, and policy relevance. Institutional and peer reviewed materials were prioritized to minimize information bias.

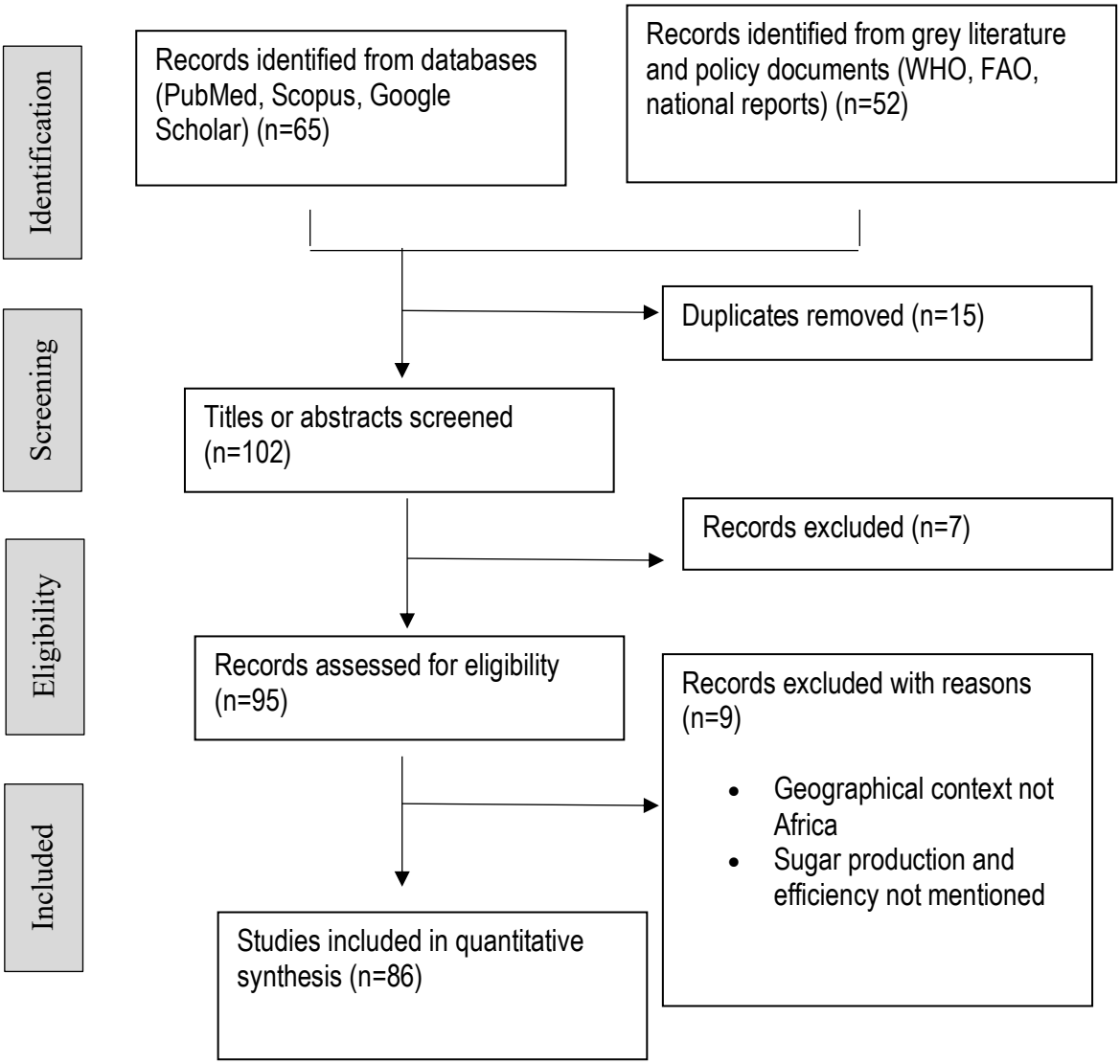

Figure 1: Flow diagram of the study search and selection process

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RESULTS AND DISCUSSION

History of low-calorie sweeteners

The history of LCS spans over 100 years. The first non-sugar sweetener appeared in 1879 with the discovery of saccharin at Johns Hopkins University in the United States. It gained commercial recognition as a substitute during sugar shortages. Subsequently, during the mid-20th century, various artificial sweeteners such as cyclamate, aspartame, acesulfame K, and sucralose were developed and introduced into the global food industry [11]. These artificial sweeteners were widely used due to their advantage of providing sweetness while having almost no calories, but they simultaneously raised persistent safety concerns and regulatory conflicts. Some sweeteners were banned in specific countries before undergoing a process of re-approval. These cases demonstrate that the development of LCS was shaped by the interplay of scientific evidence, industrial interests, consumer perception, and regulatory policies [12]. Research and utilization of natural sweeteners also continued steadily. *Stevia rebaudiana*, native to South America, has traditionally been used in food, beverages and medicine. After being approved as a food additive in Japan in the 1970s, it saw global commercial expansion. The U.S. Food and Drug Administration (FDA) recognized *Stevia rebaudiana* extracts as Generally Recognized as Safe (GRAS) in 2008, and the European Union (EU) approved it in 2011. *Stevia rebaudiana* is now established as one of the most widely used natural low-calorie sweeteners. The African continent also possesses its own unique sweetener resources [13]. *Thaumatococcus daniellii* is a protein-based sweetener extracted from the fruit of, *Thaumatococcus daniellii* an indigenous plant of West Africa, possessing a sweetness thousands of times stronger than sugar. *Thaumatococcus daniellii* has been approved as a food additive and flavor enhancer in the European Union and the United States since the 1990s, but its industrial utilization in its native Africa remains limited. *Pentadiplandra brazzeana*, another protein sweetener derived from *Pentadiplandra brazzeana* in Central Africa, possesses high sweetness intensity and stability, offering significant commercial potential [14]. However, it remains in its early stages due to insufficient research and policy support. These indigenous sweeteners are considered resources through which Africa can make a unique contribution to the global LCS market. The use of LCS in Africa is closely linked to recently introduced sugar taxes. South Africa implemented a Health Promotion Levy in 2018, which spurred product reformulation across the beverage industry [15]. This process saw LCS actively adopted as a sugar substitute, demonstrating how policy pressure can be a key factor in shaping new consumption patterns. Countries like Kenya are promoting *Stevia rebaudiana* cultivation as a form of agricultural innovation and export opportunity, positioning LCS at the intersection of agriculture, industry and health. The global history of low-

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calorie sweeteners has evolved through scientific discovery, commercial diffusion, regulatory debates, and re-approval processes [16]. In Africa, this trajectory is unfolding alongside the introduction of public health policies like sugar taxes. The potential utilization of not only international LCS like *Stevia rebaudiana* but also indigenous resources such as *Thaumatococcus daniellii* and *Pentadiplandra brazzeana* offers agricultural and economic opportunities while simultaneously raising new challenges regarding long-term health effects and regulatory consistency [17].

Distribution and market trends

Globally, the use of LCS has expanded steadily since the 1970s, with–*Stevia rebaudiana* first adopted in Japan and artificial sweeteners such as aspartame, acesulfame K, and sucralose gaining wide use in the US and Europe. Recent analyses indicate that the global market for LCS continues to expand, reflecting both consumer demand for reduced-sugar products and government-led fiscal interventions. In Africa, empirical evidence from South Africa demonstrates how taxation policies can reshape the food environment [18]. Following the 2018 Health Promotion Levy (HPL), national purchase data showed that average daily sugar intake from taxed beverages declined from 16.25 g per person before the levy to 10.63 g one year later, with reduced purchases of taxed drinks and a modest increase in untaxed alternatives [19]. However, comparable data from other African countries remain limited, and current assumptions about continent-wide market growth are largely extrapolated from global trends. This highlights the need for more region-specific evidence on LCS consumption, reformulation rates, and consumer response to taxation policies (Figure 2).

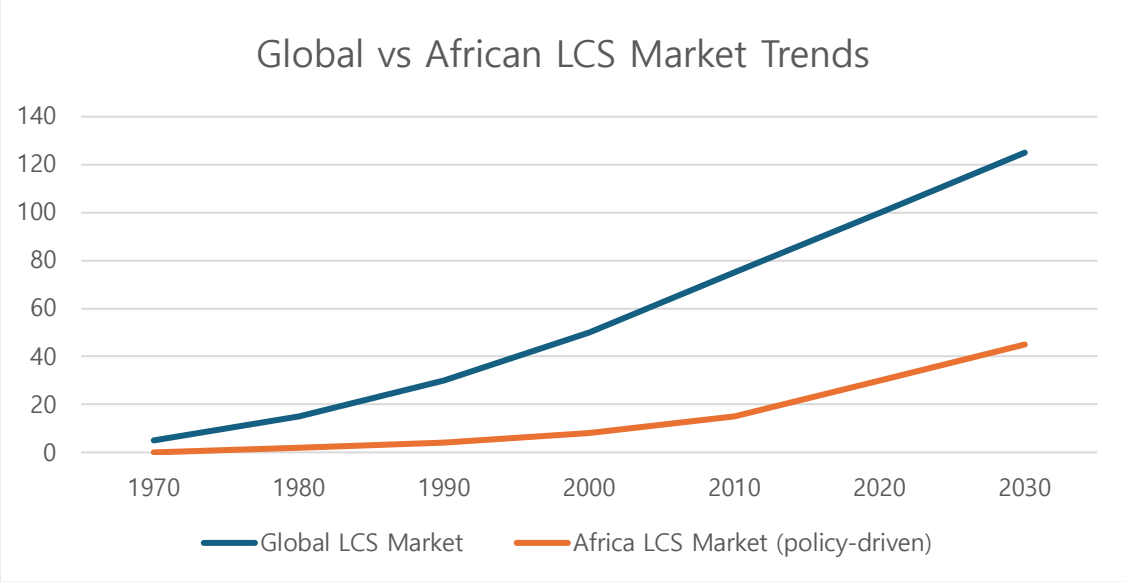

Figure 2: Conceptual overview of LCS market evolution and policy interactions

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Globally, the use of LCS has steadily expanded since the 1970s, and countries like Mexico, Chile and the UK have implemented sugar taxation policies, driving large-scale product reform. In Mexico, the 2014 soda tax led to an average 6–10% decline in sugar-sweetened beverage sales within two years and accelerated the introduction of reformulated low-calorie products [20]. The UK's 2018 Soft Drinks Industry Levy demonstrated how fiscal policy can reshape industry practices, prompting over 50% of major beverage manufacturers to reduce sugar content or switch to LCS alternatives [21]. While the LCS market in Africa remains in its early stages, it is gradually emerging through policy diffusion and industry adaptation. The use of LCS such as aspartame, sucralose, and *Stevia rebaudiana* supports this policy-led transition. This indicates that LCS adoption in Africa is shaped more by policy and industry restructuring than by consumer choice. Agricultural initiatives are also emerging [22]. Kenya promotes *Stevia rebaudiana* cultivation as a cash crop to diversify beyond sugarcane and boost export income. Meanwhile, Africa possesses unique indigenous sweeteners such as *Thaumatococcus daniellii* and *Pentadiplandra brazzeana*, which hold significant global potential but remain underutilized locally due to limited investment, infrastructure, and regulatory support. Consumer acceptance presents another barrier. While global studies show skepticism toward artificial sweeteners, in Africa, literacy gaps and limited access to scientific information further constrain awareness and informed choice [23]. Regulatory contradictions add complexity: for example, South Africa's HPL incentivized LCS use, yet the draft R3337 regulation proposed inserting warning labels on LCS-containing products, sending conflicting signals to consumers and industry. Overall, Africa's LCS market is characterized by policy-driven growth, limited consumer awareness and underutilized indigenous resources. South Africa demonstrates how fiscal measures can stimulate adoption, and Kenya illustrates agricultural potential, but sustainable expansion will require clearer regulatory alignment and improved consumer education [24].

Health and metabolic effects

Low-calorie sweeteners have been presented as a key tool in strategies to reduce sugar intake, yet controversy persists regarding their health and metabolic effects. low-calorie sweeteners offer the potential to contribute to weight management, blood glucose control and improved oral health by providing sweetness with minimal calories. Indeed, randomized controlled trials (RCTs) and some systematic reviews have shown that LCS can reduce total energy intake in the short term and decrease postprandial blood glucose elevation and insulin requirements in diabetic patients. Xylitol and *Stevia rebaudiana* have also been reported to have positive effects on oral health, such as lowering the risk of tooth decay [25]. However, consistent conclusions regarding long-term health effects have not been reached. While

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several cohort studies reported a neutral or positive association between LCS consumption and weight maintenance, some studies raised concerns that LCS intake might be linked to increased appetite, compensatory energy intake, and weight gain. Furthermore, recent studies discuss potential associations between LCS and cardiovascular disease, hypertension, gut microbiota changes, and increased overall mortality. These findings suggest that while LCS may be useful as a sugar substitute in the short term, their potential adverse health effects in the long term cannot be ruled out. The World Health Organization (WHO) did not recommend the use of non-sugar sweeteners for weight control in its 2023 guidelines [26]. This reflects that the evidence accumulated to date is not sufficiently conclusive regarding weight loss or improvements in metabolic health. The WHO recommendation carries significant policy implications, particularly for African nations. This is because, in a context where policies like sugar taxes are promoting LCS use through beverage reformulation, the international organization's guidance may conflict with national policies. In other words, while policy efforts to reduce sugar consumption through LCS are underway, uncertainty about long-term safety acts as a constraint on regulation and consumer perception [27]. A notable point in the African context is the near absence of region-specific evidence on the health effects of LCS. In South Africa, consumption of diet beverages and LCS increased following the introduction of a sugar tax, yet epidemiological data on how these products actually impact the metabolic health of the African population is lacking. Despite the expansion of *Stevia rebaudiana* cultivation in Kenya, studies linking *Stevia rebaudiana* product consumption to health outcomes among local residents are rarely reported [28]. Given the coexistence of undernutrition and overnutrition, LCS may yield positive effects for certain segments of the population but could also lead to unintended consequences for others. For instance, while middle-class urban populations may increase consumption of processed foods containing LCS, low-income groups often remain dependent on traditional high-carbohydrate diets, suggesting LCS health effects may vary by socioeconomic status. Furthermore, consumer perceptions and attitudes are closely linked to health outcomes [29]. Global research indicates that while many consumers perceive LCS as “artificial” and “potentially dangerous,” some accept it as a useful tool for weight management or diabetes prevention. In Africa, limited access to scientific information and insufficient education and promotion may further distort these perceptions. This implies that labeling regulations could cause confusion rather than effectively guiding healthier choices. Notably, South Africa's R3337 draft regulation proposes warning labels on LCS products, which could lead consumers to perceive LCS as equally dangerous as sugar [30]. Such policies may conflict with the public health goal of reducing sugar intake through LCS. Therefore, future research should include long-term epidemiological studies targeting African populations, analyses of health effects

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across socioeconomic strata, and consumer perception surveys. This is necessary to clearly determine what role LCS can play within the context of Africa's nutritional transition [21].

Policy landscape in Africa

The policy environment surrounding LCS in Africa is still in its early stages and exhibits fragmented and uneven patterns across countries. Rather than direct regulation, it has been shaped through indirect policies such as beverage taxation and front-of-pack labeling as part of sugar reduction strategies. South Africa's HPL is a prime example. It incentivized beverage manufacturers to reformulate products, reducing sugar content and using LCS like aspartame, sucralose and *Stevia rebaudiana* as alternative ingredients. While this achieved the policy goal of reducing sugar intake, it simultaneously increased LCS consumption, raising new uncertainties about long-term health effects [31]. Subsequently, the proposed R3337 regulation draft suggested mandating warning labels on products containing LCS, sending a conflicting signal to the trend promoted by the HPL. This highlights issues of policy inconsistency and consumer confusion (Figure 3).

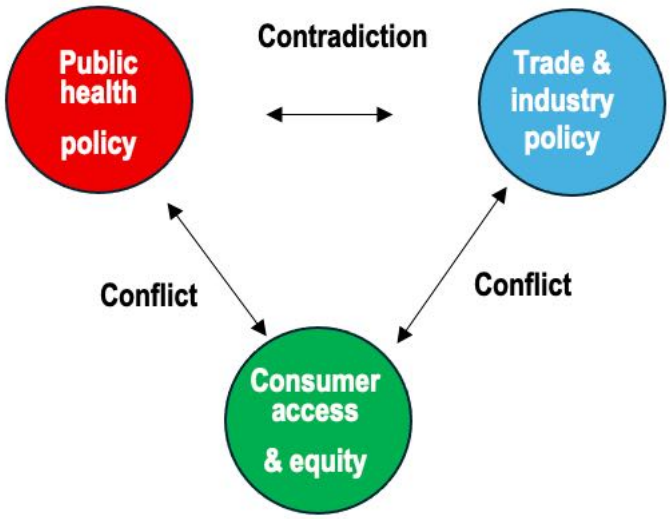

Figure 3: Key policy tensions between public health objectives, food industry reformulation strategies and consumer equity in South Africa and the global context

Kenya is taking a different approach. While the government encourages *Stevia rebaudiana* cultivation as part of its agricultural diversification and export strategy, this policy focuses solely on economic aspects and lacks linkage with health and nutrition policies connecting *Stevia rebaudiana* consumption to public health. Beyond South Africa and Kenya, other African nations have also initiated fiscal or

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regulatory measures addressing sugar consumption [32]. Nigeria introduced a ₦10 per liter excise tax on sugar-sweetened beverages in 2022, aiming to reduce obesity and diabetes prevalence while mobilizing resources for health programs [33]. Ghana followed with a 20% sugar tax in 2023, marking one of the region's most comprehensive efforts to integrate public health and fiscal policy [34]. These emerging initiatives demonstrate growing regional commitment, though implementation capacity and policy coherence remain uneven [35]. This case demonstrates that in Africa, LCS discussions are often confined to the agricultural and industrial dimensions [36]. Integrated regulation is also absent at the continental level. The African Union (AU) and regional economic communities (ECOWAS, SADC) have yet to establish LCS guidelines. Variations in national approval scopes and labeling standards constrain intra-regional trade and consumer protection. Notably, indigenous sweeteners like *Thaumatococcus daniellii* and *Pentadiplandra brazzeana*, despite international recognition, remain systematically excluded from policies in their African countries of origin. International guidelines present another layer of challenge. The WHO's 2023 guidelines discouraging LCS use for weight management purposes conflict with South Africa's policy direction, where HPL effectively promotes LCS usage. This creates a dilemma for national policymakers: how to balance international recommendations with local needs [37,38].

Therefore, LCS policies in Africa require an integrated approach that considers the interconnections between taxation, labeling, agriculture, consumer health, and international guidelines. If designed in a fragmented manner as currently implemented, limitations may arise not only in achieving health objectives but also in fostering industrial development and securing consumer trust [39].

Critical policy gaps and challenges

The policy environment surrounding LCS in Africa remains underdeveloped, with numerous gaps and challenges persisting [40]. The most fundamental issue is the lack of regional evidence. Research to date has primarily been conducted in high-income countries, with few clinical trials or epidemiological studies involving African populations. This lack of Africa-specific evidence limits the ability of governments to design context-appropriate interventions that reflect local dietary patterns, consumption behaviors, and affordability constraints. Despite the beverage industry's large-scale adoption of LCS following South Africa's HPL, data on how this change has impacted actual health indicators is scarce. Consequently, policy must rely on empirical estimates or external research, weakening the legitimacy and sustainability of regulations. Lack of policy consistency is another significant challenge [41]. While the HPL has encouraged LCS use, the R3337 draft regulation requires warning labels on products containing LCS, sending conflicting messages. This contradiction confuses both industry and consumers and could erode trust in

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health messages long-term. Consumer perceptions further limit policy effectiveness. While some view artificial sweeteners as risky, *Stevia rebaudiana* promoted with a "natural" image receives positive reactions [42]. However, low information accessibility across Africa often prevents clear understanding of the differences between sugar and LCS. Labeling regulations focused more on warnings than information provision could amplify this confusion. Greater policy integration is therefore essential, aligning fiscal tools like sugar taxes with labeling, agricultural, and trade policies to ensure coherent and consistent implementation across sectors. Industrial and political-economic factors also complicate policy implementation. The sugarcane industry remains a major economic pillar in many countries, creating structural barriers to LCS adoption. Simultaneously, multinational food corporations are expanding LCS product offerings, creating conflicts of interest between traditional sugar industries and emerging LCS sectors. This context heightens the risk that scientific discussions may be distorted or delayed by political and economic considerations [43]. Finally, the absence of continental-level institutions remains a problem. The AU and regional economic communities have failed to establish integrated regulations for LCS, and national standards also vary. This creates barriers to intra-regional trade and consumer protection, and is why indigenous sweeteners like *Thaumatococcus daniellii* and *Pentadiplandra brazzeana*, despite international recognition, are not utilized within African policies. Their commercialization remains constrained by limited processing capacity, lack of investment incentives, and insufficient trade and quality certification systems, which collectively hinder their scalability and market viability within the continent. Ultimately, Africa's LCS policy faces multi-layered challenges: lack of evidence, regulatory inconsistencies, low consumer awareness, industry interests, and the absence of continental-level institutions. These issues cannot be resolved through simple technical fixes alone; a comprehensive approach is needed, including strengthening research capabilities, policy coordination, consumer education and industrial restructuring [44].

FUTURE OPPORTUNITIES AND RECOMMENDATIONS

Overall direction and context

Low-calorie sweeteners in Africa remain in a period of policy and industrial transition [45], with several areas showing potential for future development. The spread of sugar taxes and product reformulation are already leading to increased LCS use [46], raising the critical question of how to link this to health and nutrition strategies. From a policy perspective, this transition requires clearer alignment between fiscal measures, nutrition objectives, and regulatory frameworks [47]. In conclusion, LCS in Africa sits at the intersection of health, agriculture, industry and policy. Future

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Volume 26 No. 2
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development could unfold across multiple dimensions: accumulating evidence, ensuring regulatory coherence, utilizing indigenous resources, raising consumer awareness, and coordinating with international guidelines [48]. How these elements combine will determine whether LCS moves beyond being merely a subject of controversy to become a meaningful strategy in the nutrition transition process [49]. Integrated, cross-sectoral governance will be critical for achieving this outcome. Low-calorie sweeteners are becoming a pivotal part of Africa's evolving food environment amid the dual pressures of dietary transition and rising noncommunicable diseases [50]. Fiscal measures such as South Africa's 2018 HPL have demonstrated that taxation can successfully reduce sugar intake while simultaneously driving reformulation toward LCS-containing products [51]. However, this transition exposes new governance, health, and equity complexities. These complexities highlight the need for continuous policy evaluation rather than one-time interventions.

Evidence gaps and research priorities

The lack of region-specific research is the most frequently cited challenge [52]. Evidence to date has primarily been accumulated in high-income countries, with scarce data directly targeting African populations [53]. Expanding long-term epidemiological studies, randomized controlled trials, and consumer perception surveys would enable more sophisticated assessments of LCS's actual health effects and social acceptability [54]. For instance, tracking how increased consumption of LCS-based beverages following HPL relates to obesity or diabetes incidence could support the rationality of policy design. Such evidence is essential to move beyond assumptions based on high-income settings and to inform context-specific policies. Short-term randomized trials generally support the benefits of LCS for energy balance and glycemic control, but longterm observational studies yield inconsistent results, with some linking frequent use to altered appetite regulation and cardiometabolic risk [55]. In the African context, where local evidence is limited, such uncertainty reinforces the importance of adopting balanced, risk-based policy approaches [56]. Future research should therefore prioritize longitudinal designs and representative sampling across diverse African populations.

Regulatory coherence and policy alignment

Regulatory consistency is also a key issue [57]. South Africa's HPL promoted LCS use, but the R3337 draft proposal had a contradictory effect by requiring warning labels [58]. Such inconsistencies can be interpreted as factors weakening policy coherence. Establishing a system where taxation, labeling, safety assessments, and advertising regulations operate complementarily could contribute to enhancing consumer trust. Greater inter-ministerial coordination and stakeholder engagement

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will be necessary to reduce regulatory fragmentation. However, this requires policy coordination across elements like research and development (R&D), regulatory approval processes, and public-private partnerships. Policy coherence also remains a major gap. Conflicting instruments such as taxes that encourage reformulation and draft regulations that propose warning labels create confusion for both consumers and manufacturers [59]. Regional coordination through the African Union and economic communities is urgently needed to harmonize labeling standards, safety assessments and trade policies [60]. Establishing shared regulatory baselines would also facilitate the safe commercialization and intra-African trade of indigenous sweeteners [61]. Such harmonization could also lower compliance costs for industry while protecting public health

Consumer awareness, labeling and equity

Consumer awareness and education also act as important variables. Many consumers tend to view LCS as artificial and dangerous ingredients [62], or conversely, assume they are safe based solely on a 'natural' label [63], a perception far removed from scientific facts. If labeling systems evolve to focus more on providing information rather than simple warnings, it could help increase consumer understanding and guide healthier choices [64]. Public education campaigns and transparent communication should therefore accompany any regulatory reform. Equity remains a central concern. Low-income consumers, who are most affected by sugar-related health risks [65], may not fully benefit from reformulated or LCS-based options if affordability, availability, or understanding are limited [66]. Information accessibility and literacy gaps further exacerbate this divide [67], suggesting that labeling reforms must focus on transparency rather than stigmatization. Instead of imposing broad warning labels on LCS, policymakers should prioritize informative labeling that clarifies sweetener types, purposes and safety thresholds [68]. Such approaches can enhance consumer trust and informed decision-making, which are crucial for equitable dietary change [69]. Complementary nutrition education programs could further reduce disparities in access to reliable information [70].

Indigenous sweeteners and local industrial development

At the same time, Africa's indigenous sweeteners *Stevia rebaudiana*, *Thaumatococcus daniellii*, and *Pentadiplandra brazzeana* offer promising agricultural and economic opportunities [71]. However, large-scale commercialization remains constrained by weak infrastructure, limited investment incentives, and fragmented regulatory standards [72]. Scaling these resources requires clear safety evaluations, harmonized approval processes, and public private partnerships that link agricultural producers, researchers, and industry

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stakeholders [73]. Developing local production capacity could reduce reliance on imported LCS and create regionally sustainable value chains [74]. Strategic support for smallholder farmers and local processors will be key to realizing this potential [75]. Africa's indigenous sweeteners present another opportunity [76]. Though *Thaumatococcus daniellii* and *Pentadiplandra brazzeana* have gained international recognition for safety and commercial potential, they remain underdeveloped within Africa [77]. Strategic development of these resources could position the continent not just as a consumer market but also as a supplier, potentially leading to agricultural diversification and strengthened local economies (Figure 4) [78].

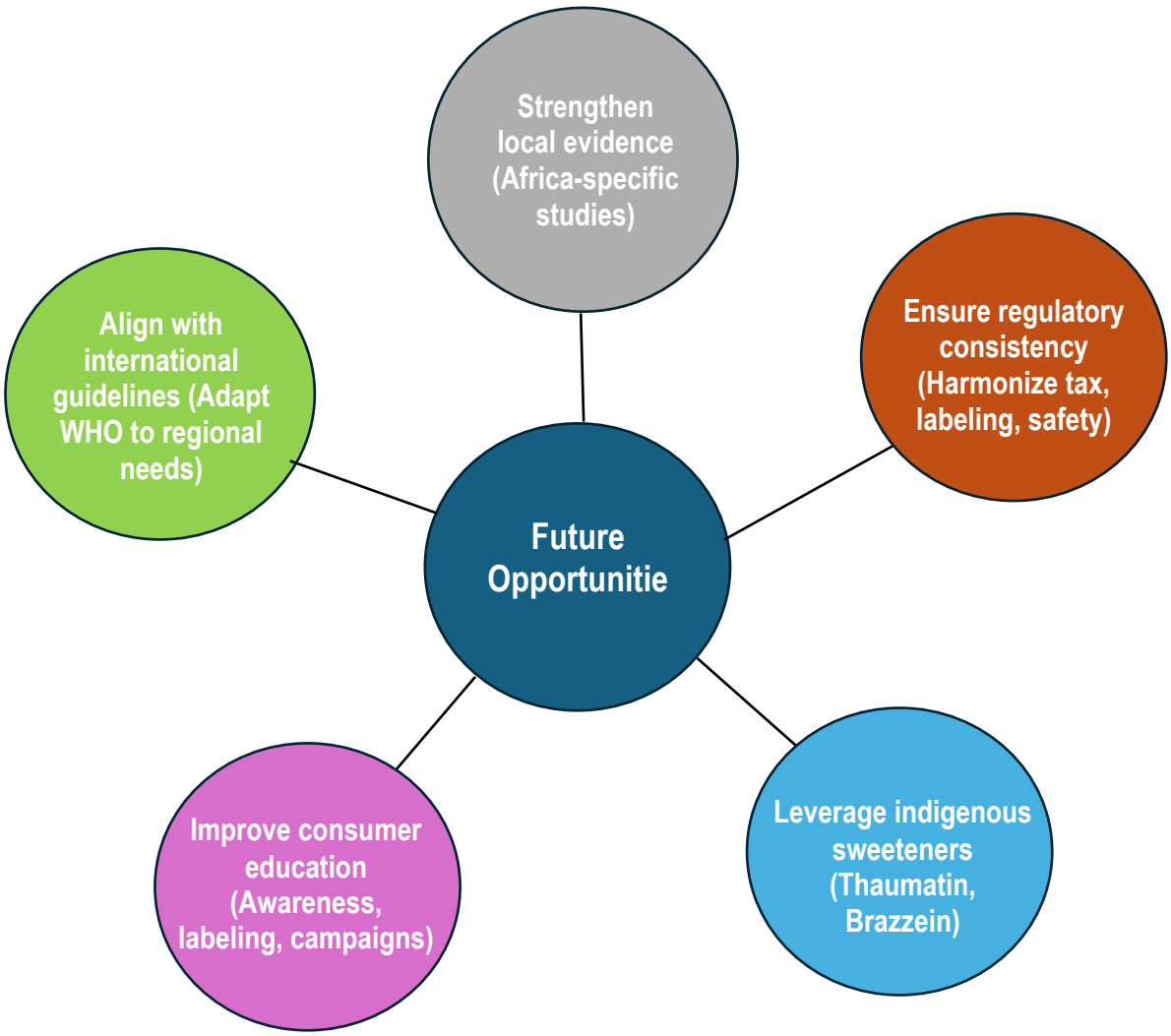

Figure 4: Future opportunities and recommendations for LCS in Africa

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SCHOLARLY, PEER REVIEWED
Volume 26 No. 2
February 2026
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International guidelines and regional needs

The relationship with international guidelines also warrants attention [79]. The WHO did not recommend LCS use for weight management in its 2023 guidelines [80]. This stance may conflict with the pressing need in Africa, where obesity and diabetes are rapidly increasing [81]. Therefore, a compromise approach, such as a risk-based approach, balancing regional needs with international recommendations, is likely to be discussed. This suggests that African policymakers may need to adapt global guidance rather than adopt it uncritically. The WHO's 2023 recommendation against using non-sugar sweeteners for weight management underscores the tension between global caution and Africa's urgent need for practical, affordable dietary interventions [82]. While South Africa provides a robust policy example, data from other African countries remain scarce, making it difficult to generalize outcomes or evaluate broader regional effects [83]. Expanding data collection beyond South Africa is thus a priority for regional policy learning.

Industry dynamics and governance

Finally, industry dynamics and political economic interests continue to shape the trajectory of LCS adoption. The traditional sugar sector, which remains a major economic driver in many African countries, often resists large-scale reform [84], while multinational beverage companies promote LCS products aligned with global health trends [85]. Transparent governance, clear conflict of interest disclosures, and sustained research funding are essential to prevent policy capture and ensure that decisions are guided by independent evidence [86]. Strengthening institutional safeguarding and transparency mechanisms will therefore be critical.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

Low-calorie sweeteners are playing an increasingly important role in Africa's nutrition and policy landscape amid dietary transitions and rising noncommunicable diseases. South Africa's 2018 Health Promotion Levy illustrates both the effectiveness of fiscal measures in reducing sugar intake and the unintended expansion of LCS use, highlighting emerging policy trade-offs. Although short-term studies suggest potential benefits for energy balance and glycemic control, long-term health effects remain inconclusive, as reflected in the WHO's 2023 recommendation against LCS for weight management. These uncertainties have contributed to fragmented policy approaches, including the coexistence of sugar taxation and proposed LCS warning labels, underscoring the need for more coherent, evidence-based governance. Equity considerations are equally critical, as low-income populations may not fully benefit from reformulated products due to affordability and limited consumer awareness. At the same time, Africa possesses significant agricultural and economic potential through indigenous sweeteners such as *Stevia rebaudiana*,

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Volume 26 No. 2
February 2026
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Thaumatococcus daniellii, and *Pentadiplandra brazzeana*. However, commercialization remains constrained by limited infrastructure, investment and trade capacity. Strengthening research, local production and consumer education supported by coordinated public private partnerships will be essential for developing a sustainable and equitable sweetener strategy. While recent initiatives in countries such as Nigeria and Ghana signal growing momentum, regional policy harmonization and long-term monitoring remain crucial to balance public health protection with inclusive economic development.

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Conflict of interest

The author declares no conflict of interest regarding the publication of this manuscript.

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Table 1: Major LCS types, properties, and approval status

Sweetener	Type	Sweetness (vs. sucrose)	Calories	Origin/Source	Approval status (Global/Africa)
Aspartame	Artificial	~200×	~4 kcal/g (negligible in use)	Synthesized from amino acids (aspartic acid, phenylalanine)	Widely approved; used in SA, limited in some African markets
Sucralose	Artificial	~600×	0 kcal	Chlorinated sucrose derivative	Widely approved; permitted in SA and several African countries
Acesulfame K	Artificial	~200×	0 kcal	Potassium salt of organic acid	Approved globally; presence in African beverages increasing
Saccharin	Artificial	~300–400×	0 kcal	Synthesized compound (benzoic sulfonimide)	Approved in many countries, older use declining
Stevia (steviol glycosides)	Natural	~200–300×	0 kcal	*Stevia rebaudiana* plant (cultivated in Kenya, others)	Approved globally; Kenya promoting cultivation/export
Thaumatin	Natural (protein)	~2000–3000×	0 kcal	*Thaumatococcus daniellii* (West Africa)	GRAS in US, approved EU; limited African commercialization
Brazzein	Natural (protein)	~500–2000×	0 kcal	*Pentadiplandra brazzeana* (Central Africa)	Research/early stage; not yet commercialized
Luo Han Guo (Monk fruit)	Natural	~150–200×	0 kcal	*Siraitia grosvenorii* (China)	Approved in Asia/US; limited African presence

Sources: Data compiled from Maluly *et al*., [3]; Roberts, [4]; Park and Kwon, 2 [5]; and FAO/WHO JECFA evaluations

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REFERENCES

1. **Mbogori T and W Mucherah** Nutrition transition in Africa: consequences and opportunities. *Global Journal of Transformative Education*. 2019; **1(1)**: 5–10. https://doi.org/10.14434/gjte.v1i1.26141

2. **Pienaar S and L Marriott** Implementation of a sugar tax in South Africa: a political lens. *SSRN Working Paper No. 4719595,* 2024. https://doi.org/10.2139/ssrn.4719595

3. **Maluly HDB, Johnston C, Giglio ND, Schreiner LL, Roberts A and EG Abegaz** Low- and no-calorie sweeteners (LNCS): critical evaluation of their safety and health risks. *Food Science and Technology*, 2020; **40**: 1–10. https://doi.org/10.1590/fst.00020

4. **Roberts A** The safety and regulatory process for low-calorie sweeteners in the United States. *Physiology and Behavior*, 2016; **164**: 439–444. https://doi.org/10.1016/j.physbeh.2016.04.031

5. **Park E and KH Kwon** Metabolic characteristics and health effects of low-calorie sweeteners focusing on the prevention of obesity and metabolic diseases. *Journal of Food and Nutrition Research*, 2025; **64**: 1–15.

6. **Sylvetsky AC, Blau JE and KI Rother** Understanding the metabolic and health effects of low-calorie sweeteners: methodological considerations and implications for future research. *Reviews in Endocrine and Metabolic Disorders*. 2016; **17(2):** 187–194. https://doi.org/10.1007/s11154-016-9344-5

7. **Ashwell M, Gibson S, Bellisle F, Buttriss J, Drewnowski A, Fantino M and C La Vecchia** Expert consensus on low-calorie sweeteners: facts, research gaps and suggested actions. *Nutrition Research Reviews*. 2020; **33(1)**: 145–154. https://doi.org/10.1017/S0954422419000283

8. **Fernandes MC, Jodalli PS, Saeed DW, Gaunkar R, Almalki S, Gowdar I and A Nagarsekar** Effectiveness of sugar taxation policies in Asia and Africa: a systematic review. *Frontiers in Oral Health***.** 2025**; 6:** 1520861. https://doi.org/10.3389/froh.2025.1520861

9. **Myers A, Fig D, Tugendhaft A, Mandle J, Myers J and K Hofman** Sugar and health in South Africa: potential challenges to leveraging policy change. *Global Public Health*. 2017; **12(1)**: 98–115. https://doi.org/10.1080/17441692.2016.1170867

10. **Lombard M and A Koekemoer** Conceptual framework for the evaluation of sugar tax systems. *South African Journal of Accounting Research*. 2020; **34(1)**: 63–90. https://doi.org/10.1080/10291954.2019.1667637

11. **Prasad R** Sweeteners: from ancient to modern times**.** *Asian Agri-History***.** 2018**; 22(4).**

12. **Poshala KK** Artificial sweeteners: a review. International Journal of Engineering Science and Computing, 2020; **10**: 27416–27421.

13. **Sukhmani G, Yogesh G, Shalini A, Vikas K, Anil P and K Ashwani** Natural sweeteners: health benefits of stevia. *Foods and Raw Materials*. 2018; **6(2)**: 392–402. https://doi.org/10.21603/2308-4057-2018-2-392-402

14. **Kant R** Sweet proteins–potential replacement for artificial low-calorie sweeteners. *Nutrition Journal*. 2005; **4(1)**: 5. https://doi.org/10.1186/1475-2891-4-5

15. **Bertscher A, London L and M Orgill** Unpacking policy formulation and industry influence: the case of the draft control of marketing of alcoholic beverages bill in South Africa**.** *Health Policy and Planning***.** 2018**; 33(7):** 786–800. https://doi.org/10.1093/heapol/czy049

16. **Dong L and I Rashkova** Healthy food consumption: challenges and the path forward. In: Responsible and sustainable operations: the new frontier. *Cham*. Springer Nature Switzerland. 2024; 119–143. https://doi.org/10.1007/978-3-031-60867-4_9

17. **Kruger P, Abdool Karim S, Tugendhaft A and S Goldstein** An analysis of the adoption and implementation of a sugar-sweetened beverage tax in South Africa: a multiple streams approach. *Health Systems and Reform***.** 2021**; 7(1):** e1969721. https://doi.org/10.1080/23288604.2021.1969721

18. **Essman M, Taillie LS, Frank T, Ng SW, Popkin B and EC Swart** Taxed and untaxed beverage intake by South African young adults after a national sugar-sweetened beverage tax: A before-and-after study. *PLoS Medicine*, 2021; **18**: e1003574. https://doi.org/10.1371/journal.pmed.1003574

19. **Stacey N, Edoka I, Hofman K, Swart EC, Popkin B and SW Ng** Changes in beverage purchases following the announcement and implementation of South Africa's Health Promotion Levy: an observational study. *The Lancet Planetary Health*, 2021; **5(4)**: e200–e208. https://doi.org/10.1016/S2542-5196(21)00006-8

20. **Sherman M and H Weston** Fizz fight: how soda taxes affect Coca-Cola's business strategy. *Journal of Legal Studies in Business,* 2019; **22(1)**: 31–56. https://ssrn.com/abstract=3505724

21. **Scarborough P, Adhikari V, Harrington RA, Elhussein A, Briggs A, Rayner M and M White** Impact of the announcement and implementation of the UK Soft Drinks Industry Levy on sugar content, price, product size and number of available soft drinks in the UK, 2015–19: a controlled interrupted time series analysis. *PLoS Medicine* 2020; **17**: e1003025. https://doi.org/10.1371/journal.pmed.1003025

22. **Simbanegavi W** Expediting growth and development: policy challenges confronting Africa. *Journal of Development Perspectives*. 2019; **3(1–2)**: 46–79. https://doi.org/10.5325/jdevepers.3.1-2.0046

23. **Waliszewski W, Sinclair F and K Steele** Morphological and AFLP diversity in Thaumatococcus daniellii, the source of the protein sweetener thaumatin. *Genetic Resources and Crop Evolution*, 2012; **59(7)**: 1467–1478. https://doi.org/10.1007/s10722-011-9771-9

24. **DellaValle DM, Malek AM, Hunt KJ, Peter JVS, Greenberg D and BP Marriott** Low-calorie sweeteners in foods, beverages, and food and beverage additions: NHANES 2007–2012. *Current Developments in Nutrition*. 2018; **2(12)**: nzy024. https://doi.org/10.1093/cdn/nzy024

25. **Sylvetsky AC** Metabolic effects of low-calorie sweeteners: a brief review. *Obesity*. 2018; **26(S1)**: S25–S31. https://doi.org/10.1002/oby.22008

26. **Witkowski M, Weeks TL and SL Hazen** Gut microbiota and cardiovascular disease. *Circulation Research*. 2020; **127(4)**: 553–570. https://doi.org/10.1161/CIRCRESAHA.120.316242

27. **Stanner SA and A Spiro** Public health rationale for reducing sugar: strategies and challenges. *Nutrition Bulletin*. 2020; **45(3)**: 253–270. tps://doi.org/10.1111/nbu.12460

28. **Yeates N and R Surender** Southern social world-regionalisms: the place of health in nine African regional economic communities. *Global Social Policy*. 2021; **21(2)**: 191–214. https://doi.org/10.1177/1468018120961850

29. **Owuor S, Brown A, Crush J, Frayne B and J Wagner** The urban food system of Nairobi, Kenya. Report No. 06, 2017. Available at: https://hungrycities.net/publication/no-6-the-urban-food-system-of-nairobi-kenya/ *Accessed September 2025.*

30. **Remme U and M Blesl** A global perspective to achieve a low-carbon society (LCS): scenario analysis with the ETSAP-TIAM model. *Climate Policy*. 2008; **8(Suppl 1):** S60–S75. https://doi.org/10.3763/cpol.2007.0493

31. **Vergunst R and L Swartz** A report on the impact of the Living Conditions Studies (LCS) on disability in southern Africa. *Development Southern Africa,* 2020; **37(2)**: 247–258. https://doi.org/10.1080/0376835X.2019.1676992

32. **Thow AM, Abdool Karim S, Mukanu MM, Ahaibwe G, Wanjohi M, Gaogane L and K Hofman** The political economy of sugar-sweetened beverage taxation: an analysis from seven countries in sub-Saharan Africa. *Global Health Action.* 2021; **14(1):** 1909267. https://doi.org/10.1080/16549716.2021.1909267

33. **Ifeanyichi M, Dim C, Bognini M, Kebede M, Singh D, Onwujekwe O and R Friebel** Can sugar taxes be used for financing surgical systems in Nigeria? A mixed-methods political economy analysis. *Health Policy and Planning.* 2024; **39(5)**: 509–518. https://doi.org/10.1093/heapol/czae018

34. **Pienaar S and L Marriott** Implementation of a sugar tax in South Africa: a political lens. *SSRN Working Paper No. 4719595,* 2024. https://doi.org/10.2139/ssrn.4719595

35. **Myers A, Fig D, Tugendhaft A, Mandle J, Myers J and K Hofman** Sugar and health in South Africa: potential challenges to leveraging policy change. *Global Public Health.* 2017; **12(1):** 98–115. https://doi.org/10.1080/17441692.2016.1170867

36. **Kaltenbrun TA, Du Plessis LM and S Drimie** A qualitative analysis of perceptions of various stakeholders on nutrition-sensitive agricultural interventions, including the taxation on sugar-sweetened beverages (SSBs), to improve overall health and nutrition in South Africa**.** *BMC Public Health***.** 2020; **20(1):** 1342. https://doi.org/10.1186/s12889-020-09435-y

37. **Joseph JA, Akkermans S, Nimmegeers P and JF Van Impe** Bioproduction of the recombinant sweet protein thaumatin: current state of the art and perspectives. *Frontiers in Microbiology*. 2019; **10**: 695. https://doi.org/10.3389/fmicb.2019.00695

38. **Bahorun T, Aruoma OI and VS Neergheen-Bhujun** Phytomedicines, nutraceuticals, and functional foods regulatory framework: the African context. In: Nutraceutical and functional food regulations in the United States and around the world. Academic Press, 2019: 509–521. https://doi.org/10.1016/B978-0-12-816467-9.00032-0

39. **Ndulo ND The African Continental Free Trade Area:** local content requirements as a means to addressing Africa's productive capacity constraints. *Michigan Journal of International Law***.** 2022**; 43:** 61**.** https://doi.org/10.36642/mjil.43.1.african

40. **Musa IK** Priority issues of least developed countries in Africa. *Irrigation and Drainage*. 2009; **58(S1)**: S39–S51. https://doi.org/10.1002/ird.482

41. **Naicker S, Naicker A and E Singh** Non-nutritive sweeteners: consumer awareness and inclusion in food and beverage products in South Africa. *South African Journal of Clinical Nutrition***.** 2024**; 37(1):** 30–37. https://doi.org/10.1080/16070658.2022.2159580

42. **Khan R and V Aroulmoji** Low calorie high-intensity sweeteners. *International Journal of Advanced Science and Engineering*. 2018; **5**. https://doi.org/10.29294/IJASE.5.2.2018.934-947

43. **Andrade L, Lee KM, Sylvetsky AC and SI Kirkpatrick** Low-calorie sweeteners and human health: a rapid review of systematic reviews. *Nutrition Reviews*. 2021; **79(10)**: 1145–1164. https://doi.org/10.1093/nutrit/nuaa122

44. **Myers A, Fig D, Tugendhaft A, Myers JE and KJ Hofman** The history of the South African sugar industry illuminates deeply rooted obstacles for sugar reduction anti-obesity interventions. *African Studies***.** 2017**; 76(4):** 475–490. https://doi.org/10.1080/00020184.2017.1394470

45. **Kaziboni L and S Roberts** Industrial policy for a just transition to a green economy – the importance of regional food value chains in Southern Africa. SARCHI Working Paper, 2022. https://www.competition.org.za/s/sarchi-wp-2022-01-kaziboni-and-roberts-february-2022-1.pdf *Accessed September 2025.*

46. **Ricardo CZ, Corvalán C, Taillie LS, Quitral V and M Reyes** Changes in the use of non-nutritive sweeteners in the Chilean food and beverage supply after the implementation of the Food Labeling and Advertising Law. *Frontiers in Nutrition*, 2021; **8**: 773450. https://doi.org/10.3389/fnut.2021.773450

47. **Ngqangashe Y, Goldman S and A Schram** A narrative review of regulatory governance factors that shape food and nutrition policies. *Nutrition Reviews*, 2022; **80(2)**: 200–213. https://doi.org/10.1093/nutrit/nuaa073

48. **Atun R, Davies JI, Gale EA, Bärnighausen T, Beran D, Kengne AP and M Werfalli** Diabetes in sub-Saharan Africa: from clinical care to health policy. *The Lancet Diabetes and Endocrinology*. 2017; **5(8)**: 622–667. https://doi.org/10.1016/S2213-8587(17)30181-X

49. **Hess TM, Sumberg J, Biggs T, Georgescu M, Haro-Monteagudo D, Jewitt G and JW Knox** A sweet deal? Sugarcane, water and agricultural transformation in Sub-Saharan Africa**.** *Global Environmental Change***.** 2016**; 39:** 181–194**.** https://doi.org/10.1016/j.gloenvcha.2016.05.003

50. **Glatzel K, Ameye H, Hülsen V and M Qaim** Changing food environments in Africa's urban and peri-urban areas: implications for diets, nutrition, and policy. ZEF Working Paper Series, 2024; 235. https://doi.org/10.2139/ssrn.4719595

51. **Manyema M, Veerman LJ, Chola L, Tugendhaft A, Sartorius B, Labadarios D and KJ Hofman** The potential impact of a 20% tax on sugar-sweetened beverages on obesity in South African adults: a mathematical model. *PLoS ONE,* 2014; **9**: e105287. https://doi.org/10.1371/journal.pone.0105287

52. **Correia M, Papapietro K and V Fuchs-Tarlovsky** Challenges in clinical nutrition research in Latin America: a narrative review. *Clinical Nutrition ESPEN*, 2025; **49**: 105–113. https://doi.org/10.1016/j.clnesp.2025.02.9821

53. **Archibald A, Dolinsky V and M Azad** Early-life exposure to non-nutritive sweeteners and the developmental origins of childhood obesity: global evidence from human and rodent studies. *Nutrients*, 2018; **10(2)**: 194. https://doi.org/10.3390/nu10020194

54. **Mashoko L, Mbohwa C and VM Thomas** LCA of the South African sugar industry. *Journal of Environmental Planning and Management*. 2010; **53(6)**: 793–807. https://doi.org/10.1080/09640568.2010.495491

55. **Peters J C and J Beck** Low calorie sweetener (LCS) use and energy balance. *Physiology and Behavior*, 2016;**164**: 524–528. https://doi.org/10.1016/j.physbeh.2016.03.024

56. **Lombard M and A Koekemoer** Conceptual framework for the evaluation of sugar tax systems. *South African Journal of Accounting Research*, 2020;**34**: 63–90. https://doi.org/10.1080/10291954.2019.1698566

57. **Swithers SE, Bonanno GR, Figueroa J, Welsh JA and AC Sylvetsky** Dietary and health correlates of sweetened beverage intake: sources of variability in the National Health and Nutrition Examination Survey (NHANES). *Nutrients*. 2021; **13(8)**: 2703. https://doi.org/10.3390/nu13082703

58. **Karim S, Frank T and P Kruger** A human-rights-based approach to front-of-package labelling in South Africa. Obiter, 2025; **46(1)**: 1–23. https://doi.org/10.17159/93gbxm22

59. **Poponcini L** Global supply chains: opportunities and challenges for Africa. Global Trade and Customs Journal, 2024; **19(1)**: 7–8.

60. **Molnar G and SB Godefroy** Review of mechanisms for food safety-related SPS measures within African regional economic communities (RECs): paving the way for a continent-wide food safety coordination effort. *Food Control*, 2020; **115**: 107206. https://doi.org/10.1016/j.foodcont.2020.107206

61. **Olivetti E, Collins J, Odjo S and D Laborde Debucquet** Intra-African agricultural trade: recent trends and nutritional content. *Africa Agriculture Trade Monitor* 2023, Chapter **3**: 69–104. https://hdl.handle.net/10.2499/9781737916475_3 *Accessed September 2025.*

62. **Goodman S, Vanderlee L, Jones A, White C and D Hammond** Perceived healthiness of sweeteners among young adults in Canada. *Canadian Journal of Dietetic Practice and Research*, 2020; **81(4)**: 194–201. https://doi.org/10.3148/cjdpr-2020-030

63. **Carvalho TEM de, Waisenberg A, Sato P, Mais LA, Martins AP, Jaime PC and N Khandpur** Consumer perceptions of non-caloric sweeteners and the content of caloric and non-caloric sweeteners in ultra-processed products in Brazil. *Ciencia and Saude Coletiva*, 2022; **27(5)**: 1989–2002. https://doi.org/10.1590/1413-81232022275

64. **Egnell M, Ducrot P, Touvier M, Allès B, Hercberg S, Kesse-Guyot E and C Julia** Objective understanding of Nutri-Score front-of-package nutrition label according to individual characteristics of subjects: comparisons with other format labels. *PLoS ONE*, 2018; **13(7)**: e0202095. https://doi.org/10.1371/journal.pone.0202095

65. **Vorster H, Kruger A, Wentzel-Viljoen E, Kruger H and B Margetts** Added sugar intake in South Africa: findings from the Adult Prospective Urban and Rural Epidemiology cohort study. *The American Journal of Clinical Nutrition*, 2014; **99(6)**: 1479–1486. https://doi.org/10.3945/ajcn.113.079594

66. **Hatch AR, Sternlieb S and J Gordon** Sugar ecologies: their metabolic and racial effects. *Food, Culture and Society*, 2019; **22(4)**: 595–607. https://doi.org/10.1080/15528014.2019.1638140

67. **Saeed S and R Masters** Disparities in health care and the digital divide. *Current Psychiatry Reports*, 2021; **23(9)**: 52. https://doi.org/10.1007/s11920-021-01274-4

68. **Marks AB** Defining "healthy" on food labels: one step forward, two steps back. *Indiana Journal of Global Legal Studies*, 2024; **31(1)**: 47–78. https://doi.org/10.2979/indjglolegstu.31.1.03

69. **Guthrie J, Mancino L and C Lin** Nudging consumers toward better food choices: policy approaches to changing food consumption behaviors. *Psychology and Marketing*, 2015; **32(5)**: 501–511. https://doi.org/10.1002/mar.20795

70. **Katurakes N, Hood DD, Berger M, Costa DM, Duffin RA and D Simon-Dawkins** How NCCCP outreach efforts help reduce cancer disparities. *Oncology Issues*, 2011; **26(3)**: 34–39. https://doi.org/10.1080/10463356.2011.11883593

71. **Sievenpiper JL, Purkayastha S, Grotz VL, Mora M, Zhou J, Hennings K and K Germana** Dietary guidance, sensory, health and safety considerations when choosing low and no-calorie sweeteners. *Nutrients*, 2025; **17**: 793. https://doi.org/10.3390/nu17050793

72. **Dragomir N, Grigore D and E Pogurschi** Beyond sugar: a holistic review of sweeteners and their role in modern nutrition. *Foods*, 2025; **14(18)**: 3182. https://doi.org/10.3390/foods14183182

73. **Feyaerts H, Van den Broeck G and M Maertens** Global and local food value chains in Africa: a review. *Agricultural Economics*, 2020; **51(1)**: 143–157. https://doi.org/10.1111/agec.12546

74. **Andreoni A** A generalized linkage approach to local production systems development in the era of global value chains, with special reference to Africa. In The Quality of Growth in Africa, 264–294, 2019. Columbia University Press. https://doi.org/10.7312/fosu19150-013

75. **Aliber M and R Hall** Support for smallholder farmers in South Africa: challenges of scale and strategy. *Development Southern Africa*, 2012; **29(4)**: 548–562. https://doi.org/10.1080/0376835X.2012.715441

76. **Zeleza T** African sugar in the world market**.** *Journal of Eastern African Research and Development***.** 1988**; 18:** 1–23**.**

77. **Waliszewski W, Oppong S, Hall J and F Sinclair** Implications of local knowledge of the ecology of a wild super sweetener for its domestication and commercialization in West and Central Africa. *Economic Botany*, 2005; **59(3)**: 231–243. https://doi.org/10.1663/0013-0001(2005)059[0231:IOLKOT]2.0.CO;2

78. **de Jesús-Pires C, Ferreira-Neto JR, Pacifico Bezerra-Neto J, Kido EA, de Oliveira Silva RL, Pandolfi V and AM Benko-Iseppon** Plant thaumatin-like proteins: function, evolution and biotechnological applications. *Current Protein and Peptide Science*. 2020; **21(1)**: 36–51. https://doi.org/10.2174/1389203720666190129120629

79. **Saab KR, Kendrick J, Yracheta JM, Lanaspa MA, Pollard M and RJ Johnson** New insights on the risk for cardiovascular disease in African Americans: the role of added sugars. *Journal of the American Society of Nephrology*. 2015; **26(2)**: 247–257. https://doi.org/10.1681/ASN.2014030278

80. **Hassapidou M, Vlassopoulos A, Kalliostra M, Govers E, Mulrooney H, Ells L and T Brown** European Association for the Study of Obesity position statement on medical nutrition therapy for the management of overweight and obesity in adults developed in collaboration with the European Federation of the Associations of Dietitians. *Obesity Facts*. 2023; **16(1)**: 11–28. https://doi.org/10.1159/000528083

81. **Ha A, Kengne A, Bentham J, Zhou B, Peer N, Matsha T, Bixby H, Di Cesare M, Hajifathalian K, Lu Y, Taddei C, Bovet P, Kyobutungi C, Agyemang C, Aounallah-Skhiri H, Assah F, Barkat A, Romdhane H, Chan Q and JC Mbanya** Trends in obesity and diabetes across Africa from 1980 to 2014: an analysis of pooled population-based studies. *International Journal of Epidemiology,* 2017; 46(5): 1421–1432. https://doi.org/10.1093/ije/dyw292

82. **Wazir M, Verma H, Singh J, Singh P and S Passey** The battle of natural sweeteners: A comprehensive guide to monk fruit and stevia. *Current Research in Nutrition and Food Science Journal*, 2025; **13(1)**: 24-45. https://doi.org/10.12944/CRNFSJ.13.1.2

83. **McCreedy N, Shung-King M, Weimann A, Tatah L, Mapa-Tassou C, Muzenda T, Govia I, Were V and T Oni** Reducing sugar intake in South Africa: learnings from a multilevel policy analysis on diet and noncommunicable disease prevention. *International Journal of Environmental Research and Public Health*, 2022; **19(18)**: 11828. https://doi.org/10.3390/ijerph191811828

84. **Buur L, Mondlane C and O Baloi** Strategic privatisation: rehabilitating the Mozambican sugar industry. *Review of African Political Economy*, 2011; **38(128)**: 273–290. https://doi.org/10.1080/03056244.2011.582762

85. **Dubb A, Scoones I and P Woodhouse** The political economy of sugar in Southern Africa – introduction. *Journal of Southern African Studies*, 2017; **43(3)**: 447–470. https://doi.org/10.1080/03057070.2016.1211805

86. **Alexander E, Yach D and GA Mensah** Major multinational food and beverage companies and informal sector contributions to global food consumption: implications for nutrition policy. *Globalization and Health*, 2011; **7**: 26. https://doi.org/10.1186/1744-8603-7-26