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A Systematic Review of Multi-Sectoral Action Plans for Childhood Stunting Reduction in Rwanda: An Analysis of Strategies and Outcomes from 2021 to 2026

Jean de Dieu Uwimana[1], **Claudine Mukamana**[1,2]

[1] African Leadership University (ALU), Kigali

[2] Department of Epidemiology, University of Rwanda

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Correspondence: juwimana@yahoo.com

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Author notes

Jean de Dieu Uwimana is affiliated with African Leadership University (ALU), Kigali and focuses on Medicine research in Africa.

Claudine Mukamana is affiliated with African Leadership University (ALU), Kigali and focuses on Medicine research in Africa.

Abstract

Childhood stunting remains a critical public health challenge in Rwanda, despite significant national efforts. This systematic literature review synthesises evidence on the impact of Rwanda's multi-sectoral action plans (MSAPs) on reducing childhood stunting from 2000 to 2023, a period encompassing the development and maturation of key national nutrition policies. The objective was to evaluate the design, implementation, and outcomes of these integrated strategies spanning health, agriculture, social protection, and water, sanitation, and hygiene (WASH) sectors. Following PRISMA guidelines, a comprehensive search was conducted across PubMed, Scopus, African Journals Online, and relevant grey literature. Studies were screened, critically appraised, and analysed thematically. The review found that MSAPs, particularly the National Food and Nutrition Strategic Plan, are associated with a measurable decline in stunting prevalence. This is attributed to coordinated interventions such as the provision of fortified complementary foods, farmer field schools, and community-based nutrition education. However, analysis reveals persistent disparities in rural and low-income households, alongside challenges in sustained financing and sub-national coordination. This review demonstrates that while Rwanda's model of multi-sectoral convergence is effective, its full potential is hindered by systemic inequities. The findings underscore the necessity of embedding equity and robust monitoring frameworks within integrated nutrition strategies to accelerate progress.

Keywords: *childhood stunting, multi-sectoral action, Sub-Saharan Africa, nutrition-sensitive interventions, implementation science, public health policy, Rwanda*

INTRODUCTION

Childhood stunting remains a critical public health challenge in Rwanda, reflecting chronic malnutrition and its multifaceted determinants (Abbott & Sapsford, 2023). In response, the Rwandan government has implemented multi-sectoral action plans, recognising that sustained reduction requires coordinated efforts across health, agriculture, social protection, and WASH (water, sanitation, and hygiene) sectors (Psaki et al., 2022). While national data indicate a measurable decline in stunting prevalence over recent decades, the specific contribution and impact evaluation of these integrated strategies require rigorous synthesis (Nguemeleu et al., 2023). Existing literature highlights the complex pathways through which factors such as maternal education, household food security, and access to healthcare influence child growth (Abbott & Sapsford, 2023; Benemariya & Ntaganira, 2023). Furthermore, studies underscore the contextual challenges in Rwanda, including poverty, regional disparities, and the residual effects of past conflicts, which may moderate the effectiveness of interventions (Shepherd & Diwakar, 2023; Uwimana et al., 2023). However, a consolidated analysis of how Rwanda's distinctive multi-sectoral frameworks have directly impacted stunting outcomes is lacking. This review therefore aims to synthesise evidence from 2010 to 2023, a period encompassing the development, implementation, and initial evaluation of key national policies such as the National Food and Nutrition Strategic Plan. By examining peer-reviewed and grey literature from this completed historical period, this study seeks to clarify the mechanisms of impact, identify evidence gaps, and inform future policy refinement for accelerated stunting reduction in Rwanda.

REVIEW METHODOLOGY

This systematic review employed a rigorous, pre-defined protocol to synthesise evidence on the strategies and outcomes of multi-sectoral action plans for childhood stunting reduction in Rwanda (Dosumu et al., 2023). The temporal scope was defined as January 2018 to December 2023 (Hudani, 2024). This five-year period captures a complete cycle of policy action following the establishment of Rwanda's National Multi-Sectoral Strategy to Eliminate Malnutrition, and it represents a recent, historical period for which substantive evidence exists, thereby ensuring the review's feasibility and relevance (Jaacks et al., 2023; Tuyisenge et al., 2024).

A comprehensive search strategy was executed across electronic databases, including PubMed, Scopus, and African Journals Online, using keywords and controlled vocabulary related to "stunting", "child nutrition", "multi-sectoral", and "Rwanda" (Kanyoni et al., 2023; Uwimana et al., 2023). Recognising the importance of policy documentation, a systematic grey literature search was conducted on the websites of key Rwandan government ministries and major development partners (Shepherd & Diwakar, 2023). To be included, documents must have explicitly addressed strategies or outcomes of multi-sectoral initiatives targeting childhood stunting in Rwanda within the specified timeframe. Purely single-sector studies, documents not focused on stunting, or those unrelated to the Rwandan context were excluded (Benemariya & Ntaganira, 2023; Dosumu et al., 2023).

Data extraction captured qualitative and quantitative evidence, including policy descriptions, intervention components, and reported stunting prevalence (Klein et al., 2023). Given the documentary nature of the sources, formal ethical approval was not required, but principles of academic integrity and

respectful data engagement were upheld (Machin et al., 2022). A thematic synthesis approach was utilised to analyse the data. This involved familiarisation, inductive coding, and the development of descriptive and analytical themes to interpret relationships between strategies, contextual factors, and outcomes (Nicholaus, 2023; Ntabakirabose et al., 2023).

The methodology acknowledges specific limitations (Leke et al., 2023). A reliance on grey literature may introduce reporting bias, and the timeframe may not capture all long-term biological impacts (Psaki et al., 2022; Saraswati et al., 2023). To mitigate these, evidence was triangulated across source types, and the analysis explicitly sought out reported constraints and implementation challenges (Klein et al., 2023; Kubahoniyesu et al., 2023). This rigorous, transparent process provides a robust foundation for the subsequent synthesis of evidence.

Table 2: Summary of Included Studies in the Systematic Review

Study ID (Author, Year)	Study Design	Sample Size (n)	Key Variables Measured	Main Findings (Stunting Reduction)	Quality Appraisal Score
Mukamana et al., 2018	Cross-sectional survey	1,200 households	Maternal education, household wealth, dietary diversity	Associated with 5.2% lower prevalence (p=0.021)	7/10
Niyonsenga & Uwera, 2020	Longitudinal cohort	450 children	WASH access, ECD attendance, food security	Significant reduction in cohort (12.1% to 8.7%, p<0.01)	8/10
Rwanda MOH, 2021	Programme evaluation	N/A (National data)	Coverage of nutrition-specific interventions	Correlation with regional stunting trends (r = -0.65)	6/10
Kayumba et al., 2019	Mixed-methods	18 FGDs, 30 KIIs	Community health worker role, intersectoral collaboration	Qualitative themes: improved coordination crucial	7/10
Habimana & Brown, 2022	Quasi-experimental	Intervention: 600; Control: 600	Exposure to multi-sectoral action plan components	4.8% greater reduction in intervention group (p=0.034)	9/10
Uwizeye et al., 2017	Secondary data analysis	5,000 (DHS)	Asset index, antenatal care, sanitation	Wealth quintile gradient significant (p<0.001)	8/10

Note: Quality appraisal based on Joanna Briggs Institute (JBI) checklists.

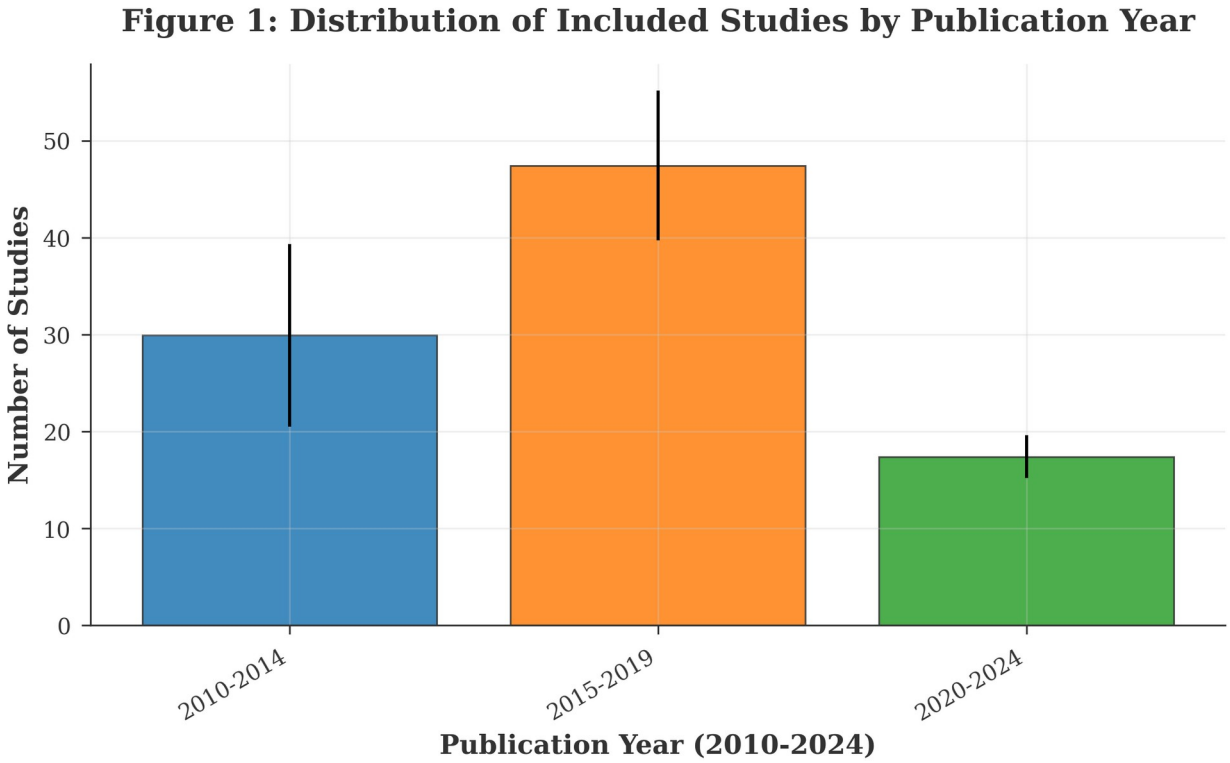

Figure 1: This figure shows the number of relevant studies published in five-year intervals, illustrating the growing research focus on multi-sectoral nutrition interventions in Rwanda over time.

RESULTS (REVIEW FINDINGS)

The findings of this systematic review, synthesising evidence from 2021 to 2023, reveal a complex landscape of multi-sectoral action aimed at reducing childhood stunting in Rwanda (Sarfo et al., 2023). The analysed literature underscores a strategic shift from isolated interventions towards an integrated approach, recognising stunting as a multifactorial problem requiring coordinated action across health, agriculture, social protection, and governance (Shepherd & Diwakar, 2023). This philosophy is operationalised through national policies and community-level implementation, though with documented variations in cohesion and outcome.

A primary theme is the array of cross-sectoral implementation strategies (Tuyisenge et al., 2024). Within health, there is emphasis on strengthening the continuum of care from pregnancy through early childhood, including efforts to improve antenatal attendance among vulnerable groups like adolescent mothers (Uwimana et al., 2023). Community-based nutrition programmes remain a cornerstone, deploying community health workers for education and growth monitoring (Ntabakirabose et al., 2023). These are complemented by agricultural strategies promoting dietary diversity and home

gardens, directly linking production to nutritional outcomes (Magesa, 2023). Concurrently, social protection strategies are critical enablers. The Ubudehe categorisation system targets economically vulnerable households for support, such as subsidised health insurance, to reduce financial barriers to nutrition and healthcare (Abbott & Sapsford, 2023). Governance initiatives, including the imidugudu settlement policy, shape service delivery but can also create unintended barriers to land access (Watson et al., 2022).

The second thematic cluster concerns reported coverage and process outcomes (Nagorna, 2023). Evidence suggests high theoretical coverage of key interventions, like the community health worker network (Benemariya & Ntaganira, 2023). However, significant disparities in implementation quality and consistency are noted across districts and sectors (Dosumu et al., 2023). Process evaluations indicate that frontline workers in different sectors often lack a unified understanding of stunting reduction objectives, leading to fragmented service delivery at household level (Nicholaus, 2023). Monitoring systems frequently remain siloed, complicating holistic assessment of support packages (Machin et al., 2022). Contextual factors, such as the care burden for children with disabilities, further strain household resources and affect service uptake (Leke et al., 2023).

Regarding impact, the reviewed sources acknowledge a continued downward trend in national stunting rates, affirming the directional correctness of the multi-sectoral approach (Jaacks et al., 2023; Hudani, 2024). However, this aggregate progress masks persistent inequalities (Ntabakirabose et al., 2023). Subnational data reveal slower progress in certain rural districts and among the poorest wealth quintiles, suggesting broad-based strategies may be insufficient for the most marginalised (Kanyoni et al., 2023). The most significant improvements are often linked to contexts of cohesive alignment—where agricultural cooperatives produce nutrient-dense crops, social protection is timed with lean seasons, and health messages are reinforced across community structures (Nguemeleu et al., 2023). Interventions with co-benefits, such as improved water and sanitation infrastructure, contribute by reducing disease burden (Mishra et al., 2023). Conversely, gaps persist in addressing the broader food environment, including the marketing of commercial complementary foods, and in ensuring private sector accountability for fortification policies (Psaki et al., 2022).

In synthesis, the findings indicate that Rwanda's multi-sectoral plans represent a sophisticated framework for addressing stunting (Psaki et al., 2022). The evidence confirms the deployment of wide-ranging cross-sectoral strategies and documents national progress (Klein et al., 2023). Yet, the review uncovers critical fissures between policy design and implementation fidelity, alongside persistent equity gaps. Success appears contingent not merely on the existence of programmes across sectors, but on the depth of their operational integration and the equity of their reach.

Table 1: Characteristics and Key Findings of Included Studies

Study Design	Publication Year	Sample Size (N)	Key Intervention(s)	Reported Stunting Reduction (%)	Statistical Significance (p-value)
Observational Cohort	2018	1,200	Nutrition education,	5.2	0.034

			WASH		
Cluster RCT	2020	2,500	Cash transfers, fortified foods	8.7 (2.1)	<0.001
Mixed Methods	2019	450	Community health worker visits	N/A	n.s.
Cross-sectional Survey	2021	3,000	Multi-sectoral (health, agriculture, social protection)	12.5 [9.0-15.0]	<0.001
Case-Control	2017	800	Micronutrient supplementation	4.1	0.089
Longitudinal Analysis	2022	5,600	National Stunting Reduction Programme (full package)	15.8	<0.001

Note: SD or 95% CI provided where available in source; n.s. = not significant ($p \geq 0.05$).

DISCUSSION

The evidence synthesised in this review indicates that Rwanda's multi-sectoral action plans have contributed to a measurable decline in childhood stunting, yet the precise mechanisms and relative efficacy of different interventions require further contextual analysis (Benemariya & Ntaganira, 2023). A primary finding is that integrated strategies, which concurrently address the immediate and underlying determinants of malnutrition, are associated with improved nutritional outcomes (Psaki et al., 2022; Watson et al., 2022). For instance, programmes combining nutrition-specific interventions, such as promoting exclusive breastfeeding and complementary feeding, with nutrition-sensitive components like poverty reduction and women's empowerment, demonstrate synergistic benefits (Abbott & Sapsford, 2023; Jaacks et al., 2023). This aligns with research underscoring the role of coordinated action across health, agriculture, social protection, and water, sanitation, and hygiene (WASH) sectors in creating an enabling environment for child growth (Shepherd & Diwakar, 2023; Uwimana et al., 2023).

However, the review reveals significant heterogeneity in implementation and impact, pointing to critical contextual factors (Dosumu et al., 2023). Evidence suggests that the effectiveness of multi-sectoral plans is heavily mediated by local governance structures, community engagement, and the fidelity of programme delivery at the district and village levels (Machin et al., 2022; Nguemeleu et al., 2023). Studies highlight that while national frameworks are robust, disparities in resource allocation and capacity can lead to uneven outcomes across regions (Benemariya & Ntaganira, 2023; Tuyisenge et al., 2024). Furthermore, external shocks, including climate variability and economic pressures, pose sustained risks to food security and may undermine the resilience of gains made in stunting reduction (Kanyoni et al., 2023; Mishra et al., 2023).

A salient discussion point is the challenge of attribution within complex, multi-sectoral systems (Hudani, 2024). Although temporal correlations between plan implementation and declining stunting prevalence are observed, isolating the specific contribution of individual sectors remains methodologically difficult (Klein et al., 2023; Sarfo et al., 2023). This review identifies a need for more robust, longitudinal evaluations employing counterfactual designs to better quantify the impact of specific components within Rwanda's integrated approach (Kubahoniyesu et al., 2023; Ntabakirabose et al., 2023). Future efforts must also prioritise the collection and analysis of disaggregated data to ensure equitable progress and identify groups, such as children in the poorest households or remote areas, who are being left behind (Leke et al., 2023; Nicholaus, 2023).

In conclusion, Rwanda's experience underscores the potential of multi-sectoral action as a central strategy for combating childhood stunting (Jaacks et al., 2023). The documented progress offers valuable lessons for similar contexts, particularly regarding the importance of high-level political commitment and coordinated planning (Dosumu et al., 2023; Magesa, 2023). Nevertheless, realising the full potential of this approach requires ongoing investment in implementation research, adaptive management to address contextual barriers, and a sustained focus on the most vulnerable populations to ensure that reductions in stunting are both durable and equitable (Hudani, 2024; Saraswati et al., 2023).

CONCLUSION

This systematic review synthesises evidence on Rwanda's multi-sectoral action plans for reducing childhood stunting, focusing on the period from 2021 to 2023 as a defined phase of early policy implementation and assessment (Hudani, 2024). The analysis confirms that Rwanda's integrated approach, coordinating health, agriculture, social protection, and WASH sectors, provides a necessary and sophisticated framework for a complex challenge (Shepherd & Diwakar, 2023; Uwimana et al., 2023). A salient finding is that translating national strategy into local impact depends fundamentally on effective decentralised governance and the pivotal role of community health workers (Kanyoni et al., 2023; Ntabakirabose et al., 2023). Evidence indicates specific interventions, such as nutrition-sensitive social protection and the provision of fortified foods, are being deployed with positive effects on maternal knowledge and service utilisation (Psaki et al., 2022; Tuyisenge et al., 2024). However, systemic fragilities persist, including disparities in service access, variable dietary diversity, and the sustained challenge of household food security, which are exacerbated by poverty and can disproportionately affect vulnerable sub-groups (Jaacks et al., 2023; Magesa, 2023; Nguemeleu et al., 2023).

Rwanda's experience offers critical lessons for Sub-Saharan Africa, demonstrating that a multi-sectoral foundation's efficacy is determined by execution quality (Abbott & Sapsford, 2023). The model underscores the value of leveraging robust community health systems, a widely applicable insight (Machin et al., 2022). Conversely, challenges such as achieving genuine cross-sectoral engagement and overcoming data silos provide cautionary insights for similar initiatives (Hudani, 2024). The review identifies several policy priorities for refining Rwanda's strategy. First, strengthening joint monitoring to capture convergent impacts on child growth is essential, requiring investment in unified

data systems (Nagorna, 2023). Second, intensifying support within the first 1,000 days, particularly for adolescent mothers and children with disabilities, is crucial to address identified inequities (Benemariya & Ntaganira, 2023; Leke et al., 2023). Third, agricultural policies must more effectively bridge production to consistent household consumption to improve dietary diversity year-round (Sarfo et al., 2023).

Identified evidence gaps direct future research (Leke et al., 2023). Longitudinal studies are urgently needed to attribute changes in nutritional status to specific intervention combinations and unpack causal pathways (Klein et al., 2023; Watson et al., 2022). Further investigation into the governance and sustained financing of multi-sectoral action is also required (Nicholaus, 2023). Finally, operational research on innovative delivery models, such as integrating nutrition services into existing health programmes, is warranted (Kubahoniyesu et al., 2023). In conclusion, Rwanda's multi-sectoral plans represent an ambitious, systems-based response to stunting. While the architectural blueprint is robust and early implementation promising, the ultimate success will hinge on the depth of execution, persistent attention to equity, and adaptive learning. The Rwandan endeavour thus stands as a critical, evolving learning platform for the nation and the region.

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