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SCHOOL GARDENS AND THEIR SOCIOENVIRONMENTAL IMPORTANCE WORLDWIDE WITH A FOCUS ON BRAZIL AND AFRICA

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Abstract

School gardens connect food production, ecological processes and everyday learning within environments that can reach children, families and communities. Their increasing visibility, however, requires a distinction between demonstrated benefits and expectations that remain insufficiently tested. This critical narrative review examines the educational, nutritional, social and environmental importance of school gardens worldwide, with particular attention to Brazil and selected African contexts. Targeted searches of publicly accessible scholarly and institutional sources were combined with reference checking and thematic interpretation. International reviews and intervention studies were considered alongside Brazilian qualitative research, African trials and policy documents. The evidence supports school gardens as settings for experiential learning, food familiarity, participation and relationship building. Dietary effects are heterogeneous, and improvements in knowledge do not necessarily produce changes in food consumption or nutritional status. Brazilian research highlights care, dialogue and connections between food and nature, while studies from Burkina Faso and Tanzania illustrate the importance of resources and complementary interventions. Biodiversity conservation, waste reduction and climate adaptation are plausible contributions, but their magnitude requires direct measurement. A socioenvironmental perspective therefore shifts evaluation from the existence of a garden to the quality, equity and continuity of its use. School gardens are most defensible as publicly supported educational infrastructure integrated with food provision, teacher development and locally appropriate environmental management. Longitudinal and context-sensitive research is needed to determine which combinations produce durable benefits without increasing unpaid workloads or educational inequalities.

Keywords: Environmental education. Garden-based learning. Agroecology. Food and nutrition education. Environmental justice. School sustainability.

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1 Introduction

School gardens ("Hortas escolares"—in Portuguese) bring processes that often remain abstract in formal education into direct observation. Seed germination, soil formation, decomposition, pollination, seasonality and food preparation become events that students can investigate rather than simply memorize. A school garden is understood here as a cultivated space associated with a school and deliberately used for educational activities.

Vegetable beds are central to this review, although fruit trees, culinary herbs, flowers and habitat features can contribute to the same learning environment. The defining characteristic is its educational relationship with the school, not its size or agricultural productivity.

The international literature has examined school gardening through several lenses, including nutrition, academic learning, wellbeing and school development. Early conceptual work treated gardens as interventions that operate across relationships among students, families, schools and communities, rather than exclusively through individual food choices (OZER, 2007).

Subsequent reviews broadened attention to experiential education and identified considerable variation in research quality and reported benefits (BLAIR, 2009; OHLY et al., 2016). These findings make school gardens relevant to environmental scholarship, but they also caution against assuming that an attractive growing space automatically produces measurable social or ecological change.

A socioenvironmental approach asks how learning and environmental management interact with unequal access to land, water, food, time and institutional support. It also asks who contributes knowledge, who performs maintenance and who receives the harvest. These questions are particularly important when gardens are proposed for schools already facing material shortages. A garden may create opportunities to investigate the causes of food insecurity, but its existence does not resolve the economic conditions that limit a household's access to a healthy diet.

Brazil provides an instructive setting because school food and environmental education have national policy foundations, alongside diverse local initiatives and pedagogical traditions. Brazilian studies also bring relational and participatory dimensions into view, including how educators and children understand the links between cultivation, care and eating (COELHO; BÓGUS, 2016; DORIA et al., 2017).

Africa contributes equally important evidence, including controlled evaluations in Burkina Faso and Tanzania. These settings should be examined individually: Africa is a continent of distinct education systems, food cultures and agroecological conditions, and evidence from a small number of countries cannot represent it as a whole (Figure 1).

This review examines three questions. Which educational, nutritional and social contributions are supported by the available literature? How do institutional and environmental conditions shape these contributions in Brazil and selected African contexts? Which environmental claims and implementation priorities require stronger investigation?

Its contribution is a critical interpretation linking the evidence on students to questions of ecological management, public responsibility and equitable implementation.

2 Material and Methods

2.1 Review design and scope

A critical narrative review was undertaken to integrate heterogeneous research designs and policy sources. It was not designed as a systematic review or meta-analysis. No registered protocol, exhaustive database export, duplicate independent screening or formal risk-of-bias scoring was undertaken.

Accordingly, no numerical screening flow, pooled effect estimate or claim of comprehensive global coverage is presented. The geographical scope is international, with purposeful emphasis on Brazil and African examples; it does not constitute a census of school garden programmes.

2.2 Source identification and selection

Targeted web searches were conducted on 20 September 2026 to identify peer-reviewed publications and primary institutional documents. Queries used combinations or exact phrases involving school gardens, school gardening, garden based learning, nutrition, environmental education, Brazil, Burkina Faso, Tanzania and South Africa. Portuguese searches included *horta escolar*, *hortas escolares* and *educação alimentar*; exact-title searches were subsequently used to resolve relevant Brazilian publications.

Sources were accessed through publisher pages, PubMed and PubMed Central records, university repositories and official governmental or international-organization websites. Crossref records were used to check bibliographic metadata and DOI identifiers. This was web-assisted retrieval of selected literature, not a comprehensive search within Scopus, Web of Science or other subscription databases.



Figure 1. Socioenvironmental pathways associated with school gardens in Brazil and Africa. Conceptual illustration linking school gardening with education, community participation and environmental stewardship. The Brazilian panel emphasizes environmental and food education, connections with school feeding, and community knowledge. The African panel highlights integration with nutrition education, locally valued crops and knowledge, water access, and programme continuity. Shared opportunities include experiential learning, food and ecological literacy, cooperation, cultural recognition, inclusion, composting, soil care, water stewardship and habitat provision. Teacher preparation, safe soil and water, inclusive participation and sustained institutional support underpin these pathways. The panels illustrate complementary priorities rather than exclusive characteristics or uniform regional conditions.

Selection prioritized directly relevant research on school-associated gardens, established reviews, controlled interventions, qualitative investigations of participant experience and documents addressing implementation or policy. English- and Portuguese-language materials were considered.

Institutional accounts were retained when they illustrated programme organization or locally relevant cultivation practices, but were not treated as equivalent to independent impact evaluations.

Studies concerning community gardening without a school connection were not used to infer school-specific effects. When full text was unavailable, interpretation was limited to information verified in the accessible abstract or authoritative record; unavailable methodological details were not reconstructed.

2.3 Critical interpretation

The synthesis was organized around learning, food-related outcomes, social relationships, environmental processes and institutional continuity. Study designs and settings were considered when interpreting claims.

Randomized packages could support conclusions about the package tested, but not necessarily about its garden component. Qualitative findings were used to understand experience and possible mechanisms rather than to estimate prevalence or causal effects.

Existing reviews were treated as overlapping bodies of evidence, not as independent sets of primary studies to be added together. Policy intentions, documented outcomes and proposals developed in this review are distinguished throughout.

The resulting interpretation remains subject to selective retrieval, language restrictions, uneven geographical representation and publication bias. Evidence concerning Francophone and Lusophone African countries, North Africa and small island settings is especially incomplete. Environmental outcomes were less directly represented in the selected evidence than food-related and educational outcomes. Statements about monitoring and implementation below therefore include explicitly proposed research directions rather than claims that those outcomes have already been demonstrated.

3 Results and Discussion

3.1 International evidence and the importance of intervention design

A consistent feature of the literature is the difference between more immediate outcomes, such as vegetable recognition or willingness to taste, and more distant outcomes, such as sustained dietary change or improved health. Davis, Spaniol and Somerset (2015) found promising changes in dietary determinants but inconsistent changes in intake across programmes, alongside weaknesses in comparison designs. Savoie-Roskos, Wengreen and Durward (2017) likewise reviewed gardening interventions as potential contributors to fruit and vegetable intake, while emphasizing the need to interpret results in relation to intervention characteristics. A positive experience should therefore be understood as a possible step toward behavioral change, not proof of its completion.

Ohly et al. (2016) synthesized 40 articles and found that qualitative accounts described a wider range of benefits than quantitative evaluations convincingly established. Reported enjoyment and perceived developmental gains were meaningful, but many quantitative studies had methodological limitations. Chan, Tan and Gong (2022) subsequently reviewed 35 studies across 12 countries and found that outcomes depended on programme components, duration, parental involvement and participant characteristics. International reach in these reviews should not be confused with balanced representation of all world regions.

Controlled studies show why this distinction matters. In the United States, the Texas Sprouts trial included 16 elementary schools and combined a teaching garden with nutrition and cooking lessons. Vegetable intake frequency improved relative to controls, but obesity measures and blood pressure did not (DAVIS et al., 2021). In Australia, a study involving 127 students found improvements in several measures of vegetable identification and acceptance, without significant group-by-time differences in fruit or vegetable intake or quality of school life (MORGAN et al., 2010).

Neither result justifies declaring gardens ineffective; instead, they identify which outcomes changed during the observed period.

A more recent study in Alabama examined nutrition education in schools with and without existing gardens. Its findings associated gardens with favorable dietary patterns, but garden presence itself was not the randomized exposure, and garden use intensity was not captured (SANCHEZ et al., 2025). This illustrates the importance of distinguishing a garden's presence from students' actual participation and from other characteristics of motivated schools. Similarly, a cluster-randomized evaluation in Nepal expanded the geographical reach of intervention research, while retaining a combined approach involving gardens and complementary educational activities (SCHREINEMACHERS et al., 2017).

Realist interpretation adds a complementary question: through which processes might an intervention work? Holloway et al. (2023) identified curriculum integration, experiential activity, family participation, supportive authority figures and cultural context among relevant mechanisms. Their synthesis focused on interventions associated with positive outcomes, which is useful for developing explanations but cannot establish an unbiased overall probability of success. Together, these sources support attention to programme design rather than a universal expectation attached to the label school garden.

3.2 Learning science and understanding food systems

The educational value of a garden depends on the questions students are allowed to ask and the evidence they learn to interpret. Blair (2009) reviewed potential academic and developmental benefits while identifying weaknesses in evaluation. The practical implication developed here is that garden activities should include observation, explanation and reflection, rather than rely on participation alone. Students who plant seeds without discussing variation, measurement or uncertainty may gain practical experience without developing an understanding of ecological processes.

For example, a class could compare soil moisture in mulched and unmulched beds, recording rainfall and watering before interpreting differences. Another could observe flower visitors using fixed observation periods, recognizing that insect counts vary with temperature, time and weather. These are proposed teaching designs, not experimental results from this review. Their merit lies in making causal reasoning and sampling limitations visible. Failed germination or crop loss can become useful evidence when students examine competing explanations instead of treating every unsuccessful harvest as an educational failure.

Food systems learning can connect these observations to decisions beyond the school gate. The educational sequence from cultivation to preparation and consumption is central to FAO's garden materials (FAO, 2005, 2010). Building on that approach, lessons can ask where seeds originate, how food prices are formed, why some ingredients are seasonally available and what happens to uneaten food. Such questions connect science with geography, mathematics and social studies. They also prevent environmental education from becoming a narrow instruction to consume differently without considering whether healthier options are accessible.

Cooking and tasting activities may strengthen these connections, but their educational value also depends on cultural recognition. A locally familiar leafy vegetable can support discussion of household recipes, language and intergenerational knowledge. An unfamiliar crop may broaden experience, provided it is introduced without portraying local foods as inferior. The central pedagogical issue is not whether a crop is fashionable, but whether its selection serves a clear learning purpose and fits the available growing conditions.

3.3 Brazilian experiences and institutional opportunities

Brazilian qualitative research provides evidence about meanings and relationships that standardized nutrition questionnaires may miss. Coelho and Bógus (2016) interviewed educators, staff and school heads in three public schools in Embu das Artes, São Paulo. Their analysis associated participation with exchange of experience, practical learning and stronger connections with food, nature and other people. These findings describe participants' interpretations; they do not demonstrate a national effect or quantify changes in children's diets. Their significance lies in showing that a garden can influence the educational relationships surrounding food, including among adults.

Doria et al. (2017) examined children's perspectives using a draw-and-tell approach with 49 students aged ten and eleven. Their analysis connected the experience of an agroecological school garden with participation, empowerment, equity, sustainability and personal skills. The study supports attending to children's own interpretations of an intervention rather than relying exclusively on teachers' reports. Because both this study and the educator research arose in Embu das Artes, they should not be presented as geographically independent evidence of nationwide effectiveness.

Brazil's policy framework offers opportunities to connect these experiences to continuing educational practice. Law No. 9,795 establishes environmental education as an integrated and permanent component of education. Its consolidated text incorporates provisions introduced in 2024 concerning climate change, biodiversity and socioenvironmental risks (BRASIL, 1999). A garden can provide a setting for these themes, but the law does not establish that every school garden fulfills them. Pedagogical planning must identify what students will investigate and how learning will be assessed.

Law No. 11,947 provides an institutional basis for school feeding and food and nutrition education through the National School Feeding Programme, known as PNAE (BRASIL, 2009). Within this framework, gardens can help students understand ingredients and food production, while nutrition professionals and school food workers connect learning to meals. Garden harvests should be treated as a possible complement to planned food provision. Their educational value should never depend on reducing public responsibility for adequate meals or replacing procurement from producers.

Implementation must also acknowledge Brazil's internal diversity. The proposals in this review include seasonal planning and drainage assessment for humid environments, water budgeting for semiarid schools, and evaluation of land history and soil suitability in densely occupied urban areas. These are context-sensitive design considerations, not comparative findings establishing one regional model as superior. In Indigenous, quilombola and other traditional-community schools, communities should participate in decisions about culturally relevant plants, knowledge sharing and educational objectives. Local knowledge should be recognized as a contribution to the curriculum rather than extracted merely to enrich an externally designed project.

A practical institutional model would combine a school-level educational plan with municipal technical support, recurring maintenance resources and opportunities for educators to share experience. Universities and agricultural extension services could assist with soil interpretation, species identification and evaluation, while keeping decision-making accessible to the school community. The crucial question for expansion is whether support survives staff turnover and the end of short-term projects. Counting newly installed beds offers little information about this continuity.

3.4 African evidence and the limits of generalization

The Burkina Faso evaluation is particularly useful because it challenges the assumption that improved knowledge necessarily changes diet. Schreinemachers et al. (2019) studied school gardens combined with nutrition education in a repeated cluster-randomized design involving 30 schools and 1,760 children aged eight to fourteen. They reported improvements in knowledge of sustainable agriculture and food and nutrition, but no significant increase in fruit and vegetable consumption.

This finding supports separating educational effects from nutritional effects. It also cautions against transferring expectations developed in well-resourced settings into contexts where households may lack the means to act on new knowledge.

In Tanzania, Wang et al. (2024) evaluated the Meals, Education, and Gardens for In-School Adolescents programme in six secondary schools in Dodoma. The analytical sample included 534 adolescents. Schools received either a package comprising meals, nutrition education, gardens and community workshops, a partial package without school meals, or a control condition. The intervention packages were associated with favorable diet-quality and overweight or obesity outcomes. However, the comparison does not isolate gardening, and the small number of school clusters limits broad generalization. The study supports integrated approaches rather than attribution of its effects to cultivation alone.

These two trials differ in age groups, settings and intervention packages. Their results are therefore not a direct ranking of countries or educational systems. Together, they suggest that knowledge, food availability and household participation need to be studied as related but distinct pathways. They also show why school gardens should be evaluated against the outcome they are equipped to influence. A small demonstration plot may be appropriate for learning even when it cannot supply a meaningful proportion of meals.

South Africa illustrates an institutional connection between gardening and school nutrition. The government describes school vegetable gardens involving parents, learners and communities as one component associated with the National School Nutrition Programme (SOUTH AFRICA, n.d.). This establishes policy recognition, not independent proof of garden effectiveness. Programme evaluation should distinguish meal delivery from garden participation and examine how responsibilities are distributed. Otherwise, improvements associated with a feeding programme may be incorrectly attributed to gardens, or gardens may be assigned food-production expectations that exceed their resources.

Community-led cultivation offers a complementary perspective. Slow Food's account of work in Tanzania describes school gardens cultivating familiar leafy foods, including sweet potato and cowpea leaves, within broader networks of local food knowledge (SLOW FOOD FOUNDATION FOR BIODIVERSITY, 2016). As an organizational account, it illustrates choices and priorities rather than providing a causal evaluation. Its relevance is that locally valued crops and associated knowledge can shape educational objectives. The appropriate crop portfolio must still be determined locally, including attention to food safety and preparation requirements.

African school garden strategies should therefore begin with specific questions about reliable water, seasonal calendars, school meals, teachers' preparation and community preferences. Where water collection is already burdensome, irrigation plans should not silently transfer extra work to girls or other groups. Where agriculture is familiar to students, school gardening should add scientific inquiry and meaningful choice rather than duplicate routine labor. The proposals developed here also favor local-language materials and participation by African educators and researchers in the design of comparative studies. Evidence gaps should invite locally led research, not be mistaken for an absence of knowledge or practice.

3.5 Social relationships wellbeing and environmental justice

The social importance of gardens includes opportunities for students to cooperate, explain observations and see their contributions become visible. In Denmark, Malberg Dyg and Wistoft (2018) connected students' reported wellbeing with outdoor experience, relationships and care for living organisms. They also observed that not every student thrived in the relatively open garden setting and that long-term effects were not established. The implication is that outdoor activity should be designed for varied needs, not assumed to be universally comfortable or beneficial.

Qualitative reports of confidence or belonging should be respected as evidence of experience, while remaining distinct from clinical mental-health outcomes. Ohly et al. (2016) identified perceived benefits for some children who did not flourish in conventional classroom activities, but noted gaps in quantitative support. Garden programmes should therefore offer varied roles: observation, drawing, seed organization, recording, cooking where appropriate, or physical cultivation. Participation should not be defined solely by a student's capacity to dig, carry water or tolerate particular sensory conditions.

Environmental justice provides a useful evaluative perspective developed in this review. Distributive questions concern which schools obtain safe land, shade, water and sustained support. Procedural questions concern who selects crops, allocates tasks and decides how harvests are used. Recognition concerns whether local foods, languages and knowledge are treated with respect. An affluent school's ability to recruit volunteers may make its garden easier to sustain, but that advantage is not evidence that less-resourced communities care less about environmental education.

Community participation should consequently be supported without treating unpaid work as unlimited.

Family members and school food workers can contribute valuable experience, but participation should be compatible with livelihoods and existing responsibilities. Routine records of maintenance time, task allocation and decision-making can make otherwise invisible costs visible. These proposed indicators also allow programmes to recognize contributions that are not captured by harvest weight or the number of planting events.

3.6 Environmental contributions and claims that require measurement

School gardens can make environmental relationships observable, but environmental learning and environmental improvement are different outcomes. A class may develop a more accurate understanding of decomposition even when the quantity of waste composted is small. Conversely, a productive garden may operate without students learning much about nutrient cycling. These distinctions should be maintained when evaluating a programme's socioenvironmental importance.

Biodiversity is a clear example. Diverse planting and reduced disturbance can potentially provide resources for pollinators and other organisms, yet counting cultivated species is not equivalent to demonstrating conservation benefit. The present review proposes repeated observations of plant diversity, flower availability, selected invertebrate groups and management practices. Comparisons should account for season, garden area and surrounding habitat. Claims about native biodiversity require reliable identification and attention to whether introduced plants create ecological problems. No effect size for school-garden biodiversity enhancement can be derived from the evidence assembled here.

Composting can similarly serve both a teaching and a management function. Evaluation should distinguish food waste prevention from treatment of unavoidable organic residues. Suggested measures include the mass of suitable material diverted, contamination rates, the amount of compost actually used and the labor required. These indicators would make it possible to investigate benefits rather than infer them from the presence of a compost bin. Planting and harvesting records could also help students connect nutrient inputs with outputs and understand why material cycles are rarely completely closed.

Water management deserves comparable attention. A garden cannot be called water-efficient solely because it uses mulch, drip irrigation or collected rainwater. The relevant questions include total water use, crop performance, maintenance and competing demands. For teaching purposes, comparing water use under clearly documented conditions may be more valuable than pursuing maximum production.

In drought-prone settings, a smaller seasonal garden may be educationally appropriate; in high-rainfall settings, drainage and protection from contaminated runoff may require more attention.

Climate education provides a further connection. UNESCO's curriculum guidance advocates scientifically accurate, action-oriented and justice-centered learning (UNESCO, 2024). Gardens can support locally grounded investigations of heat, rainfall and adaptation, but a single hot season or failed crop does not establish a climate trend. Students should distinguish short-term weather records from longer climatic patterns and connect observations with appropriate regional data. This approach can build critical climate literacy without overinterpreting school-level observations.

Claims about climate mitigation need even greater care. Growing food nearby does not establish a lower total carbon footprint, because construction materials, purchased inputs, pumping, crop losses and the counterfactual food supply all matter. This review therefore proposes that carbon claims require explicit boundaries and life-cycle comparison. In most educational programmes, the immediate and defensible contribution may be learning how to evaluate environmental trade-offs, while any mitigation benefit remains an empirical question.

3.7 Governance safety and continuity

Implementation should begin with a clearly defined educational purpose and an assessment of whether the site can support it. FAO's manual and teaching toolkit emphasize that school gardens are principally learning environments, with production linked to instruction (FAO, 2005, 2010). This orientation allows smaller projects to remain worthwhile and discourages unrealistic demands for food self-sufficiency. A practical plan should identify available time, water, responsible adults, maintenance arrangements and how activities connect to lessons.

Safety is integral to programme design, especially where children handle soil or consume produce. The proposed minimum approach is to assess land-use history, investigate credible contamination concerns, use suitable water and growing materials, and establish supervised hygiene and tool practices with appropriate local technical support. The absence of visible contamination does not establish soil safety. Food tasting should account for allergies and preparation requirements, and unidentified wild plants should not be incorporated into meals. These are operational considerations, not evidence that school gardens are inherently hazardous.

Continuity also depends on organizational decisions. Who waters during holidays? Who repairs a failed irrigation connection?

What happens when the most experienced teacher changes schools? An annual budget should recognize replacement materials and coordination time, rather than treat installation as the entire cost. Davis, Spaniol and Somerset (2015) identified sustainability as a recurring concern, while Holloway et al. (2023) highlighted the interaction between supportive adults, curriculum and family engagement. These findings support testing institutional arrangements that distribute responsibility while maintaining accountability.

Partnerships can provide technical assistance and opportunities for learning across schools. However, external support should fit an agreed educational plan, including transparent decisions about donated products and promotional activities. A sponsor's contribution should not determine what students are taught about environmental impacts or food quality. Schools also need a reasonable exit strategy if a partner withdraws. This is particularly relevant when expansion depends on equipment or consumables that cannot be maintained locally.

3.8 A research agenda for Brazil-Africa and international comparison

Future research should move beyond the binary distinction between schools with and without gardens. At minimum, studies should report garden type and area, lesson frequency, actual student participation, instructor preparation, crop selection, water access, links with cooking or meals, and the duration of follow-up. A garden that is present but rarely used is a different exposure from a programme with weekly structured inquiry. Recording these differences would improve interpretation across regions and reduce misleading comparisons.

The most useful evaluation designs depend on the question. Cluster-randomized or carefully matched studies can examine educational or dietary effects while accounting for school-level influences. Qualitative work can explain why participants value or avoid particular activities. Ecological monitoring requires repeated observations over appropriate seasonal periods, and economic evaluation should include staff and volunteer time. Mixed approaches are especially useful when positive outcomes coexist with substantial burdens or unequal participation.

Brazilian research would benefit from designs that extend beyond a small number of municipalities and include schools in contrasting ecological and institutional settings. African research would benefit from broader country coverage, including contexts poorly represented in this review, while maintaining local leadership and relevant measures. Comparative projects should test shared questions without imposing identical crops, lesson plans or definitions of successful participation.

Common reporting standards can coexist with locally determined educational priorities. Long-term follow-up is needed to determine whether changes in food acceptance, ecological understanding or collaborative behavior persist. Evaluations should also include discontinued projects and documents on why they ended.

Excluding unsuccessful gardens would exaggerate feasibility and hide the institutional conditions that require investment. Cost-effectiveness should compare plausible alternatives, such as different combinations of gardens, classroom education, food provision and teacher training, rather than assume that gardens are the cheapest option.

Finally, children and communities should help define meaningful outcomes. A school may value the ability to identify local foods, explain water use or participate confidently in collective decisions, even if production remains modest. These outcomes can be studied rigorously without reducing all benefits to a single score. The central research task is to connect clearly described activities with specific outcomes, identify who benefits, and establish the resources required for those benefits to continue.

4 Conclusions

School gardens have global importance as settings where education, food and environmental relationships can be investigated together. The most defensible evidence concerns opportunities for experiential learning, food familiarity and participation, alongside dietary improvements in some interventions. Effects are heterogeneous, and changes in knowledge, intake, health and environmental conditions must not be treated as interchangeable.

Brazilian studies emphasize care, dialogue and connections among people, food and nature. Evidence from Burkina Faso and Tanzania shows both the limits of knowledge-centered expectations and the promise of integrated interventions, without establishing a universal model for Africa. Across settings, adequate resources, inclusive pedagogy and institutional continuity are central considerations.

School gardens should be supported as educational infrastructure that complements reliable school food provision and public environmental responsibilities. Their ecological and climate contributions require direct evaluation. The priority is to sustain locally meaningful programmes and strengthen evidence about long-term outcomes, unequal burdens and environmental performance, rather than equate expansion in garden numbers with socioenvironmental success.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Conceptualization: DAC; Data curation: DAC, JMLS; Formal analysis: DAC; Methodology: DAC; Project administration: DAC; Writing (primary and review): DAC, JMLS; Validation: DAC, JMLS.

DECLARATION OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

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