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Current Opinion in Environmental Sustainability

Review of policy action for healthy environmentally sustainable food systems in sub-Saharan Africa

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Many sub-Saharan African (SSA) countries are experiencing multiple burdens of malnutrition. Rising overweight/obesity coexist alongside persistent burdens of under-nutrition and multiple micronutrient deficiencies. Poverty and social inequity remain key drivers of unhealthy diets and malnutrition. Diets in SSA are increasingly transitioning towards unhealthy (energy-dense, nutrient-poor and unsafe) and environmentally unsustainable diets. Healthy, sustainable food systems are required to deal with these considerable challenges equitably, so policy action needs to balance the health, environmental and economic dimensions of diets and food systems. We review evidence in recent literature for which policy actions have the best chance of success in SSA by appraising their likely impact, relevance, cost/affordability and feasibility to help guide policymakers and researchers in their development and evaluation.

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Current Opinion in Environmental Sustainability 2023, **65**:101376

This review comes from a themed issue on **Sustainable Food systems**

Edited by **Maria J. Darias, Mafaniso Hara, Israel Navarrete** and **Eric O. Verger**

Available online xxxx

Received: 8 December 2022; Revised: 11 September 2023; Accepted: 26 September 2023

https://doi.org/10.1016/j.cosust.2023.101376

Introduction

Many sub-Saharan African (SSA) countries are experiencing multiple burdens of malnutrition, including diet-related non-communicable diseases (DR-NCDs). Rising overweight, obesity and DR-NCDs coexist alongside persistent and significant burdens of under-nutrition and multiple micronutrient deficiencies [1••]. Poverty and social inequity remain key drivers of unhealthy diets and malnutrition.

This multiple burden of malnutrition is driven largely by transitions to food systems that are increasingly unhealthy and environmentally unsustainable. Food systems have been conceptualised to encompass the entire range of activities involved in the production, processing, marketing, consumption and disposal of goods that originate from agriculture, forestry or fisheries, including the inputs needed and the outputs generated at each of these steps. Food systems contribute particularly to the burden of DR-NCDs by enabling the consumption of unhealthy foods that are highly processed, energy-dense and of low nutritive value. At the same time, food systems are the single-largest cause of global environmental change. For example, agriculture occupies about 40% of global land, and up to 30% of global greenhouse-gas emissions come from food production [2]. The unsustainable nature of global food systems and their impact on climate change creates a vicious cycle [3,4]. Unsustainable food systems contribute to climate change, which over time will affect food production and ultimately human health. In addition to health and environmental dimensions of sustainability, social equity needs to be also accounted for, including the affordability of food.

The food environment — the interface that mediates people's food acquisition and consumption within the wider food system [5••] — merits particular policy attention. This is because it is shaped by policy actions that span various sectors, including agriculture, nutrition, trade and health. Hence, identifying which policy actions are most likely to be successful that can sustainably improve food environments and the wider food system is crucial. In this paper, we discuss evidence from global recommendations of policy actions for equitable healthy (nutritious/safe), environmentally sustainable food systems, to appraise which of these policy actions have the best chance of success of preventing multiple forms of malnutrition in SSA.

In this paper, we review evidence in recent literature (mainly 2020 onwards) for which policy actions have the best chance of ensuring healthy environmentally sustainable and equitable food systems in SSA by appraising their likely impact, relevance, feasibility and cost/affordability, to help guide policymakers and researchers in their development and evaluation.

Methods

Selecting the shortlist of policy actions

We identified an initial list of 42 policy actions to orient food systems towards healthier diets, adapted from [6] and recommendations in 14 global reports/articles (Supplementary file 1). The following 5 specific criteria were applied to shortlist this policy subset for SSA: likely impact on improving nutrition/health, environmental sustainability and social equity and number of parts of the food system targeted, and whether government could implement changes. Environmental sustainability scoring was based on the balance between the following pathways (Figure 1): reducing versus increasing demand for food/biodiversity, animal source foods, ultra-processed foods or food waste. An overall score for all 5 criteria was produced by summing the scores (Table 1). All policy actions scoring ≥ 7 points and having ≥ 1 point for environmental sustainability were retained, leaving 13 policy actions for review (Table 2).

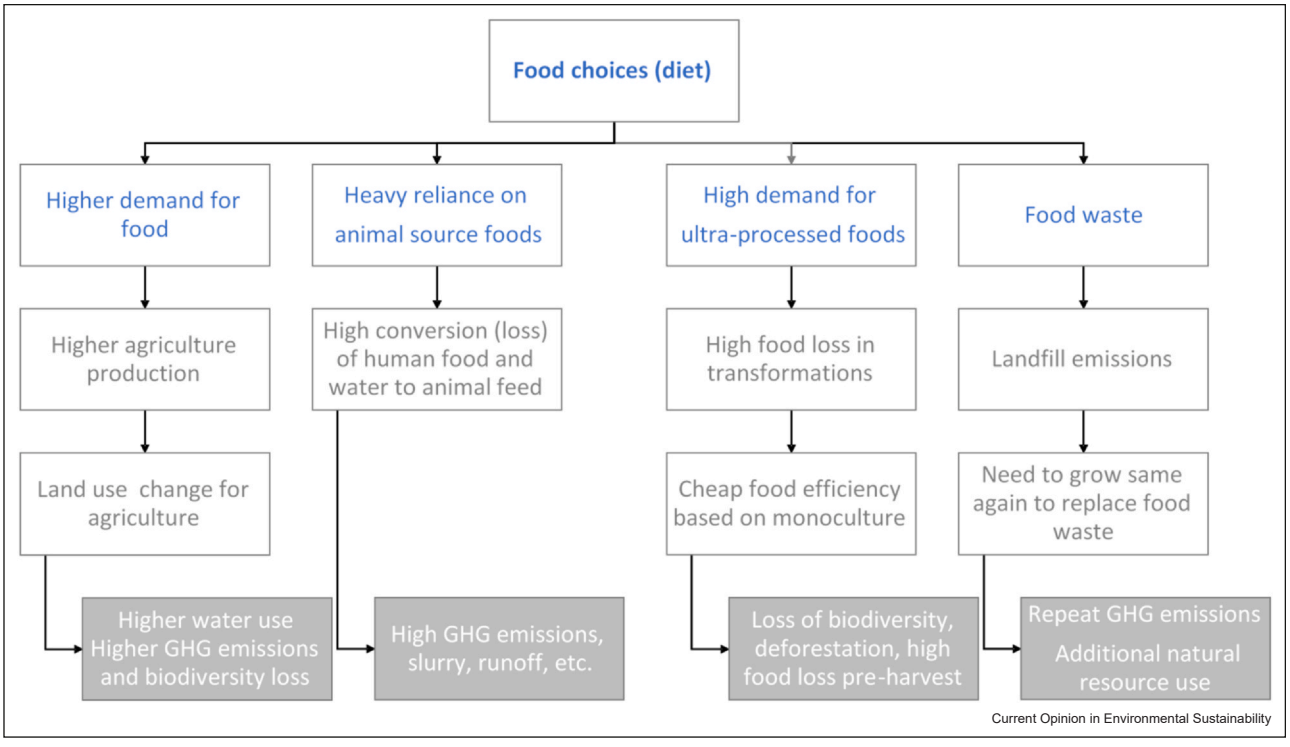
Type and scope of review

We undertook a narrative literature review incorporating international reports and scientific literature. We looked for evidence in the literature for how successful these 13 policy actions would be in SSA with respect to five groups of criteria (detailed in Table 3): i. *Expected impact* on the healthiness and environmental sustainability of diets, ii. *Expected reach* to disadvantaged population groups, including social equity; iii. *Relevance to the African context* in terms of healthiness and sustainability of current food consumption/availability patterns; iv. *Cost and affordability* of policy actions to assess economic viability and v. *Feasibility* of implementing the policy actions in SSA.

Published scientific literature and global nutrition reports

We searched for evidence at the level of SSA, Africa, low- and middle-income countries (LMICs) and then globally for the 13 policy actions, until we found evidence. The need to incorporate evidence from outside of Africa was useful in informing the potential impact of the different policy actions, where data were lacking from within Africa. However, including insights from further afield is a drawback due to differing contexts. We searched for recent systematic reviews in MEDLINE and Google Scholar as a starting point. We then undertook hand-searches of reference lists of these reviews

Figure 1



Pathways of impact for diet on environmental sustainability. *(integrating evidence from [3–6,21,53]).

Table 1

Criteria used to select the policy subset for the review.

Criteria	Scoring process	Score (max)[a]
Criteria 1: What impact could the action have on nutrition and health?	1 point attributed for each of 5 pathways that policy could impact: availability, accessibility, affordability, appeal and safety.	Maximum of 5 points
Criteria 2: What impact could the action have on environmental sustainability?	Scoring was based on the balance between the following trade-offs: reducing versus increasing demand for food/biodiversity, animal source foods, ultra-processed foods or food waste.	A score of ≥ 1 was required for inclusion in the final policy list, that is, environmental benefits exceeded any trade-offs.
Criteria 3: Could the action have an impact on improving equity (SES, gender and/or children)?	The actions were appraised for their likely impact on facilitating equity of access to a nutritious diet for each of SES/gender/children.	Maximum of 3 points
Criteria 4: Which part(s) of the food system would the action target?	1 point was given for each component of the food system that the different policies target: food supply, food environment, individual factors and consumer behaviour.	Maximum of 4 points
Criteria 5: Does the action require government involvement in developing, implementing and/or monitoring policies to ensure healthy and sustainable food systems?	Each policy action was categorised as Yes/No to whether it relied mainly on government/public decision-making. This was seen as a measure of feasibility.	Yes = 1, No= 0

[a] All policy actions scoring ≥ 7 points and having ≥ 1 point for Criteria 2 were retained.

and also for subsequent included literature. We also identified recent (2019–2021) global nutrition reports that met our inclusion criteria for citing research evidence, having a peer-review process, tackling nutrition and environmental sustainability of diets in a global and/or LMIC context and proposing specific actions on

Table 2

Policy actions included in the review (adapted from [5]).

Action
Trade
1. *Design trade policies* to prioritise sustainable food systems that supply nutritious, safe foods over less-nutritious processed foods (high in fats, sugars and salt), taking account of the benefits of local and international supply chains in different contexts, the protection of smallholder farmers, food price stability and the availability of complementary policies.
Supply chain infrastructure actions
2. *Maintain and upgrade markets* selling nutritious foods to low-income communities and ensure they have access to infrastructure to enhance food safety and reduce food losses, including available clean water, public toilets and waste removal.
Financial actions
3. *Redirect agriculture subsidies* from staple crops to increasing production of more nutritious foods (fruit, vegetables, nuts and seeds and pulses).
4. Focus *social protection programmes* such as cash transfer, food voucher and food delivery on increasing the availability, affordability and appeal of nutritious foods and limiting the appeal of foods high in fats, sugars and salt.
5. *Implement taxes* to decrease affordability and incentivise reformulation of sugary drinks and foods high in fats (especially saturated and trans-fats), sugars and salt.
Public institution actions
6. Implement *comprehensive school food programmes*, incorporating food and meals, nutrition standards, nutrition education, school gardens, food personnel training, food skills and literacy.
7. Adopt a *public food procurement policy* that applies nutritional guidelines (limiting sugar, fat and salt) to food procured for public institutions and prioritises purchasing from smallholders, local, family and/or sustainable food producers.
Business incentives
8. *Provide incentives to fast-food outlets, street food vendors and food service trucks* (including investment funds and technical support) to reformulate their recipes, sell and promote nutritious and sustainable foods in place of foods high in fats, sugar and salt.
Regulations and laws
9. Set *mandatory limits in processed packaged foods* on trans-fats, sugar, salt/sodium and/or saturated fat.
10. *Regulate health claims on foods* and require *nutrition labelling* on packages/menus to indicate if foods are high in calories, fats (including saturated and trans-fats), sugars and/or salt and/or in positive nutrients
11. *Restrict all forms of marketing, advertising and in-store promotions*, toys, giveaways or other incentives of high fat, sugary/salty foods and beverages, particularly to children.
12. Use *zoning laws* to restrict numbers of large-scale/formal 'fast food' (unhealthy) outlets and vendors in select geographic areas.
National guidelines
13. Align all food system policies and programmes with *culturally appropriate FBDGs* that integrate health and environmental sustainability and widely communicate the guidelines to the general public.

Table 3

Criteria applied to each of the policy actions to appraise likely 'success' in Africa.

Criteria	Criteria definition
Impact on diets	Will it work? Expected impact on improving/ensuring the healthiness and environmental sustainability of diets and food systems.
Reaching vulnerable groups	Will it reach disadvantaged population groups? For example, lower SES and adolescent girls/women, children to ensure social and gender equity.
Relevance to Africa	Is it relevant to the African context in terms of healthiness and sustainability of current food consumption/ availability patterns and food systems?
Cost and affordability	Is it affordable? Cost and affordability of the different policies to assess economic viability. This includes costs or economic consequences resulting from implementing or rolling out the policy, to the state, local authorities and health services.
Feasibility	Can it be implemented? politically, technically and in terms of legislation, human capacity and technically co-operation of agencies, across departments and sectors, supported by government and so on; acceptability by citizens — social, cultural and individual acceptability.

food systems or food environments. These reports were screened to identify the evidence/literature they had utilised to make their recommendations (Supplementary Table 1). While there exist a number of specific SSA country-focussed nutrition reports, we do not include them in this review as they did not meet the above criteria.

Findings: the likely impact, reach, relevance, cost and feasibility of policy actions in sub-Saharan African

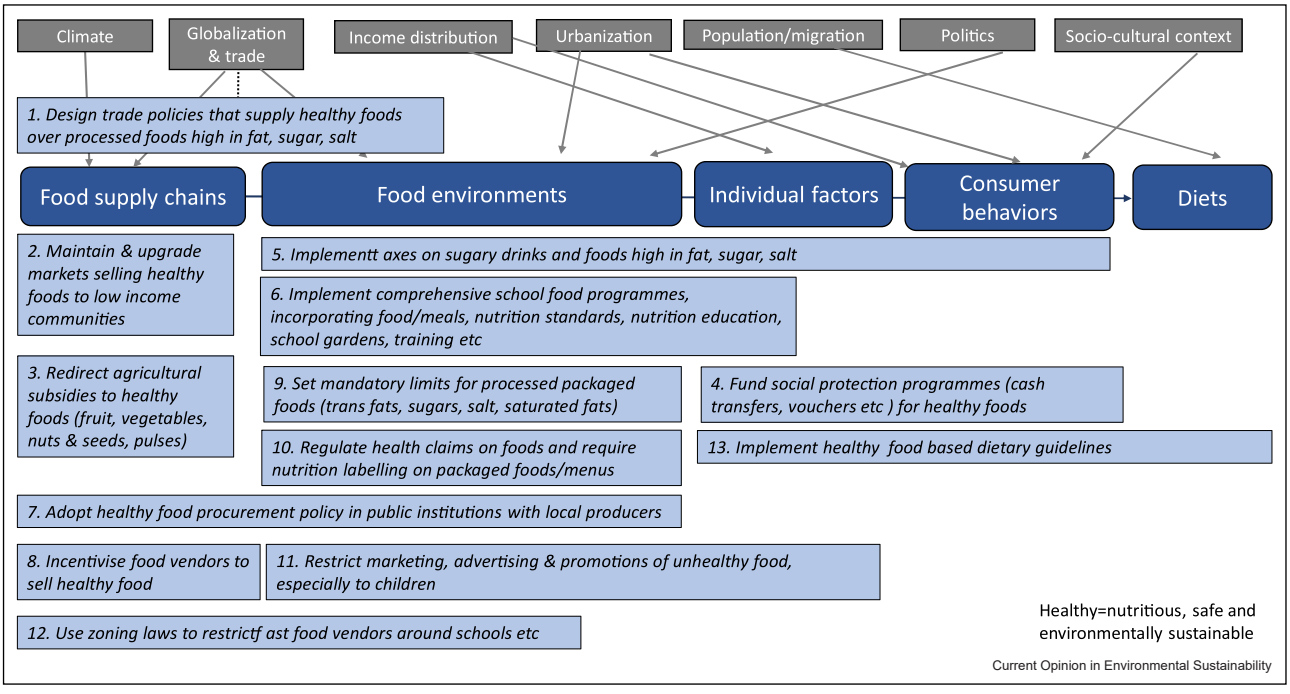
Mapping policy actions onto the different parts of the food system (Figure 2) illustrates that they are most likely to act on improving the food supply and food environment as entry points, with less policies focusing directly on individual factors, consumer behaviours or diets.

The findings from the scientific literature are integrated below in terms of their likely impact, reach relevance, cost and feasibility.

Likely impact of policy actions on healthy, sustainable diets in sub-Saharan African

We found recent evidence for the impact on nutrition on 6 policies: school food programmes, taxing unhealthy

Figure 2



Policy actions for SSA with most evidence for success across the food system.

food/beverages, subsidising healthy foods, controlling food/beverage marketing, implementing food-based dietary guidelines (FBDGs) and social protection measures. While some evidence came from within Africa, most was from high-income countries (HICs).

Firstly, there is widespread and consistent evidence that comprehensive school food policies can promote healthy food consumption by controlling the availability of food/beverages, introducing nutrition standards for school meals, offering free or subsidised fruit and vegetables, by engaging with family and the school community and by providing school nutrition/health services that include water and sanitation [7•–9]. Evidence showing that bundled interventions are more effective than single interventions is mainly from HICs or LMICs outside of Africa [7•,10,11]. Current research evidence in schools in Africa (and LMICs in general) mainly focuses on school food provision, but the moderation aspects (sugar, fat, salt and fibre) of school meals are insufficiently addressed [7•,8,10].

Evidence for the expected impact of taxation comes from reviews integrating evidence in LMICs, which indicate that well-designed taxes can reduce purchase/consumption of unhealthy foods/beverages [12–15]; most evidence is for sugar-sweetened beverages (SSBs). Taxation can also encourage reformulation of high-sugar/salt/fat products [12]. There is also evidence that food subsidies can be effective in promoting healthy diets [16]. Plentiful evidence [8] from HICs demonstrates that food marketing influences food preferences, purchase behaviour and pester power/purchase requests (of children) [17]. Although a recent scoping review synthesising 55 studies, mainly in HICs, found limited evidence of whether exposure to outdoor food marketing influences eating behaviour [18].

A modelling study of FBDGs of 85 countries worldwide (including SSA) has predicted that adopting national FBDGs could lead to reductions of an average of 15% in premature mortality from DR-NCDs and a reduction in greenhouse gas emissions of 13% [19]. However, the impact of introducing FBDGs within Africa is likely to be less, as the expected reduction in mortality was only estimated at 6% because of the higher communicable disease burden. There is also evidence from systematic reviews that social protection measures (mainly cash transfers) can improve nutritional outcomes, especially those tied to nutrient-rich food [20–23]. However, evidence in SSA for impact on consumption of nutritious-diverse diets appears to be sparse and inconsistent [21].

On the contrary, less recent evidence was found for impact of 7 policies: food procurement, trade regulations, food labelling, setting mandatory nutrient limits in processed packaged foods, upgrading market infrastructure, incentives to fast-food or street food vendors and zoning policy. Some of the evidence comes from within Africa, but it is mainly from HICs. The lack of evidence does not mean that they would not have an impact, but may be due to the challenge of demonstrating causality of policy impacts that are intertwined with other food system components.

There is some evidence that trade regulation can reduce imports of 'unhealthy' foods/beverages, for example, higher tariffs on sugar and confectionery products and fats/oils can reduce obesity [24]. However, evidence for the impact of trade on dietary outcomes is limited. A meta-analysis of 114 articles on the impact of front-of-pack labels found that although labels help consumers identify healthier products, their impact in changing behaviours is limited [25]. Whilst nutrition labelling may have insufficient impact on dietary behaviours, it could stimulate product/menu reformulation [5••]. Whilst there is convincing evidence that consumption of highly processed energy-dense/nutrient-poor foods, has negative impacts on diet quality and health globally and in Africa [26–28••], we found limited evidence of whether mandatory fat/sugar/salt limits in processed packaged foods impact on diet.

We found a lack of evidence on three policies that tackle the retail food environment. Firstly, we did not find evidence to indicate that providing incentives to fast-food or street food vendors would encourage reformulation of recipes or sales of more nutritious foods in Africa. Evidence for whether incentives to fast-food or street food vendors would work mainly comes from HICs, where evidence is from the formal fast-food sector. We found no evidence of studies assessing the impact of zoning policy in SSA. Evidence of studies assessing impact is inconclusive, coming mainly from the United States/United Kingdom, one systematic review of 31 studies [29] found mixed evidence of the impact of the proximity/density of food outlets around schools on children's weight.

Reach of policy actions to vulnerable groups in sub-Saharan African

A number of policies could reach vulnerable groups, with evidence identified in particular for school programmes, social protection measures, upgrading markets in low-income communities, subsidies on fruit and vegetables and public procurement policy.

Agricultural subsidies on nutritious foods can make these foods cheaper, which can benefit people on low incomes [30]. Whether subsidising healthy foods is more equitably fiscal than taxing unhealthy foods is debatable. Evidence for which socio-economic groups are reached by taxation is contentious, with some authors citing a greater proportional impact on health of low-income

populations in HICs [13•,14]. In LMICs, higher socioeconomic status (SES) groups tend to consume more SSBs, and other highly processed foods and beverages compared with lower SES groups [31], so the impact of the tax on lower-income populations is harder to predict. Introducing mandatory limits on fats, sugar and salt in processed foods could reach lower- income groups, who are increasing their purchase of processed food in SSA [28••]. Literature rarely considered which population groups might be affected by trade regulations, but it seems likely that the most vulnerable will be disproportionately affected in negative ways [8].

For labelling on packaged foods to work, consumers need to be educated to improve nutritional knowledge and to understand food labels [8], but it needs to be accompanied by population literacy if it is to reach the poorest and women, who are more likely to be illiterate, with literacy rates of 59% women versus 72% of men in SSA (World bank, 2020 literacy data).

Upgrading markets could have a positive impact on social equity because economic access is a major obstacle to purchasing safe (and nutritious) food, therefore, ensuring that food is safer for everyone will contribute to reducing these inequalities. Poorer people use markets for more of the food they purchase and consume in SSA than wealthier citizens. In addition, street food vendors in markets tend to live on very low, precarious incomes and are predominately women [32]. Within SSA, zoning regulations for large-scale fast-food outlets would be more likely to impact on higher-income groups, who use these outlets more. However, zoning regulations around schools is a priority in social equity terms given that it is targeting children. Indeed, school-based interventions have the potential to reduce social inequalities as they can reach poorer children and free or subsidised school meals are an indirect social protection measure. There is evidence that procurement policies could have social equity benefits by ensuring business/income generation for local (potentially low-income and/or female) farmers or enterprises meeting fair trade criteria and ensuring employment in local communities; procurement policy through a comprehensive school programme can also reach vulnerable school-going children with healthy food [9,33].

Relevance of policy options in sub-Saharan African

Only one of the policy actions lacked evidence for its relevance in Africa (public procurement) beyond the school setting. In Africa, the vast majority of food served in public settings or purchased by government funds is probably in schools, so contextualised evidence is limited. Evidence was found for the relevance of the other 12 policy actions in the SSA context. A number of these actions are relevant because they address the challenge of changing diets and nutrition transition evident in SSA. Many studies in Africa have identified the cost of food as a major driver on dietary behaviour [34], making initiatives to reduce the cost of healthier foods, such as subsidies and social protection measures extremely relevant, considering evidence from SSA that healthy diets are unaffordable for many [35]. The majority of food is provided by the informal sector in SSA [28••], hence it is highly relevant to improve market infrastructure to provide clean water and hand washing facilities to make food safer for a large proportion of the population [36]. Incentives to fast-food and street vendors appear relevant, considering evidence that many fast-food/street food vendors increasingly sell unhealthy foods/beverages [28••,37]. Low incomes and a busy urban life push many consumers towards fast food, therefore, zoning regulations are relevant, considering evidence of the rapid spread of international fast-food outlets [38].

Introducing mandatory nutrient limits on processed foods and regulating health claims/nutrition labelling is therefore also pertinent, given the rapid spread of processed packaged foods in SSA [28••,39]. Actions to disincentivise unhealthy food consumption through taxation are relevant because there is widespread consumption of unhealthy foods/beverages [40]. Indeed, availability of SSBs is widespread in SSA, with a large proportion of adolescents consuming them daily [41]. Related is the pertinence of advertising controls on SSBs, which are heavily advertised in SSA [37,42–44]. Advertising controls on high-fat, sugary/salty foods is also relevant as fast-food consumption is spreading rapidly [28••]. Less-explicit marketing activities also need addressing that is often introduced under the guise of corporate social responsibility initiatives by transnational food companies [39].

Trade regulations that incorporate nutritional quality, and implementing FBDGs, are clearly relevant, considering the increasing consumption of (imported) unhealthy foods and multiple burdens of malnutrition in SSA [28••]. Lastly, school nutrition programmes are highly relevant, considering the vulnerability of children and their right to good nutrition and the presence of multiple forms of malnutrition in children/adolescents in SSA. Although school meals are relatively widespread in SSA, more research is needed on their nutritional quality [10].

Cost and affordability of policy actions in sub-Saharan African

The best evidence we found for cost-effectiveness was for taxation policy and school programmes, and for mandatory limits on processed foods. Schools are economically efficient platforms for delivering interventions, as they provide pre-existing infrastructure. Indeed, the WHO integrates schools into two of its best-buys and recommended actions: i. reducing salt in public

institutions (includes schools) [45]; and ii. nutrition education to increase fruit and vegetables, including schools. In SSA, school meals provision often lacks stable funding [8].

The WHO estimates taxing SSBs is a cost-effective intervention in LMICs [45], although others have cautioned against generalising cost-effectiveness to different contexts [46]. Concerns about economic consequences of taxation have been raised, with lobbying from industries that would be impacted financially by a tax [13•], which may reduce political feasibility. The desire to support the economic competitiveness of the sugar industry and protect employment is a potential economic constraint to implementing taxation in SSA. However, strategies to develop positive public opinion towards SSB taxation have been identified, thanks to advocacy from Civil Society and academics in SSA [13•,47]. Advocacy is crucial to garner political feasibility from potential strong opposition. There are economic concerns that governments may have to account for, as processed food offers employment in food processing, wholesale, transport and retail sectors, especially for women and adolescents [28••].

Mandatory nutrient limits on processed packaged foods encompasses three interventions that the WHO recommends: firstly, to reduce salt intake through reformulation. Secondly, the elimination of trans-fats through legislation. Lastly, reformulation so that trans-fats and saturated fats are replaced with unsaturated fats [45]. The WHO recommends that governments implement nutrition labelling to stimulate reductions in energy, fats, sugars and sodium [45].

There is a lack of evidence on the cost-effectiveness of a number of policy actions on nutritional outcomes: trade policy, marketing or advertising controls, zoning restrictions or implementing FBDGs. We found no evidence on cost of providing incentives for fast-food outlets/street vendors, but we highlight the need to consult with street food vendors on the economic impact of such a policy, as the majority are from low-income households. We did not find evidence on the cost of upgrading markets in Africa. However, there are potential economic benefits for vendors as customer numbers rise as they are attracted to safer street food vendors [32]. If the introduction of safer markets reduces foodborne diseases, this is likely to have an impact on economic output through reducing the days lost to illness and use of healthcare.

There was less evidence available for initiatives to make healthier foods more accessible. The FAO estimates that cash transfers may be more cost-efficient than 'in-kind' transfers because of the cost of procurement and logistics in distributing food [30]. The WHO recommends that governments implement subsidies to increase intake of fruit and vegetables, which is supported by modelling data of impressive benefits for health, environment and economic sustainability if subsidies are realigned to sustainable healthy diets [21]. Lastly, it has been estimated that the economic value from a population adopting FBDGs could amount to 10–25% of national gross domestic product [19], with roughly 10–13% in the African region. Increasing investment in some of the other policy actions that require or implement FBDGs would have an even greater economic value and impact on nutritional and environmental sustainability.

Feasibility of policy actions in sub-Saharan African

Two policy actions were identified as the most feasible: social protection measures and school programmes. Politically, social protection measures are feasible for two reasons. Firstly, social protection is well-entrenched in many SSA countries. Secondly, there are efforts to make different programmes nutrition-sensitive, with legal recognition on the right to food in many SSA countries. There is evidence of political feasibility of school nutrition programmes, albeit with a focus on school meals. Local, regional and national government need resources to work together to implement school nutrition policies.

Three policies have particular challenges regarding feasibility: public procurement policy (including that in schools), incentives for fast-food outlets and street vendors and zoning laws. A public procurement regulatory framework, including identifying legal mechanisms, has been identified as essential [33] to ensure compliance for maximum impact. This may prove challenging in SSA contexts with unregulated food systems. Technical feasibility of implementing zoning restrictions may be hindered by the required legislation and the human capacity and resources for implementation. One technical challenge of incentives to fast- food/street food vendors is it requires monitoring of their compliance.

Other policies are likely to be feasible under certain conditions and circumstances: trade regulations, upgrading markets and introducing subsidies/taxation. There is evidence that trade policy is politically feasible in Ghana/Kenya, with evidence of intention or action to design trade policies with nutritious goals [47,48]. There are also indications of legal and technical feasibility. Implementation of trade regulations will require strong government infrastructural capacity, clear policy framing, coherence across sectors and public support [8,47,48] and a commitment to prioritise public health alongside economic objectives, as political will may be constrained by economic policies and industry lobbying [28••]. In LMICs, targeted subsidies on fruit or vegetables are rare compared with staple foods [30]. Policymakers in SSA identify a lack of convincing evidence of impact on health of introducing SSB taxes in their country as an

obstacle to implementation [13•]. Evidence that taxation can be implemented comes from countries where large food processors dominate, unlike in most of SSA, where informal food processing/retail are still widespread [28••], thereby reducing the feasibility of enforcing a tax.

Politically, there is evidence that maintaining and upgrading markets is feasible, but complying with local authorities' regulations might be infeasible for small vendors; there is evidence from Kenya [49] that such regulations are likely to have limited impact due to weak institutional capacities for monitoring. Participatory research consulting with market users and food vendors is recommended to find ways to effectively improve infrastructure [21,32], working alongside civil society to represent the interests of the least powerful [50].

Several policy actions require food composition tables or nutrition profiling systems for their implementation: advertising/marketing controls, food labelling, FBDGs and limits on processed packaged foods and taxation/subsidies. Effective implementation of advertising and marketing controls requires robust planning, technical capacity and resources. Ideally, accurate and comprehensive food composition data need to be available to develop nutrient profiling models adapted at country-level, to identify foods for taxation/subsidies and provide information on the nutrition content of school meals. Under half of SSA countries have food composition tables, whilst useful they do not include all foods (especially processed foods) and lack data on target nutrients (sugars/saturated fat) [40]. However, the introduction of an African nutrient profiling model [51] has enhanced feasibility, as broad food groups are already categorised for prohibiting marketing if thresholds exceed values. Whilst this provides a list of example foods that fit into each category, these need refining to include foods commonly consumed within a country. The use of lobbying [39] and complexity arguments from industry [52] challenges the political feasibility of advertising controls by undermining regulation of unhealthy foods/beverages.

Labelling can have a positive impact if it stimulates reformulation or reduces portion size to remain within limits. However, as taste and convenience are strong drivers of food choice within the African region [28••,34], industry may not necessarily see the financial benefit of reformulation in the absence of mandatory regulations. Other challenges to feasibility relate to inadequately resourced administrative infrastructure and a fragmented food-processing industry of many informal small and medium enterprises in SSA (around 80%), as well as large African-led companies and transnational industry [28••].

A review of FBDG implementation in Africa found that only seven of the 47 countries in the WHO Africa region have developed FBDGs [53], with none addressing environmental sustainability. Financial, technical and human resources were identified as a major barrier to implementation. Other factors reducing feasibility included a lack of collaboration among sectors, conflicting agendas between public health and market economies, food industry lobbying and the challenge of counteracting prolific marketing of unhealthy foods/beverages [54].

Conclusions

We reviewed evidence to appraise a subset of 13 policy actions that were considered as having the best chance of leading to healthy environmentally sustainable food systems in SSA. We considered recent evidence that sheds light on their expected impact, reach, relevance, cost/affordability and feasibility in SSA. Ensuring financial access to a nutritious and safe diet that benefits the most socially and economically deprived communities needs to be integrated across policy action and in settings that reaches these groups (e.g. in informal markets, schools). Considering the environmental and economic sustainability of policy action, alongside nutrition and health, is a challenge that needs to be seized if SSA countries are to be successful in shifting towards sustainable food systems.

To this end, a complementary mix of low and high agency policy actions have been identified that, based on the available evidence, are likely to have been most successful in SSA. All of these actions have the potential to contribute towards healthy sustainable food systems, but together, they will have a greater combined effect. Low agency interventions require individuals to invest fewer individual personal and psychological resources, and several of these emerged as priorities in SSA: food marketing restrictions, school food procurement, upgrading informal markets, mandatory product nutrient reformulation, zoning regulations for fast-food vendors, social protection programmes, taxation on unhealthy foods and subsidies on healthy foods and trade policy that prioritise nutrition. These need to be accompanied by actions that require greater agency to access, understand and apply information, through enhancing nutrition literacy and skills, that is, implementing FBDGs, introducing incentives to street food vendors to provide healthier foods, providing front-of- pack labelling and regulation of health claims. Comprehensive school food programmes can reach diverse socio-economic groups and incorporate both low (e.g. school food standards/procurement) and high agency components (e.g. nutrition education), hence their broad appeal.

Funding
The work was funded by the International Development Research Centre (IDRC) through a co-funding partnership with the Rockefeller Foundation. Two of the authors are employed by the IDRC (GH/SO) who contributed to discussions on the scientific scope and methodology developed by MH/SK for the review, as well as giving feedback on content.

CRediT authorship contribution statement
Michelle Holdsworth: Conceptualisation, Methodology, Data curation, Formal analysis, Writing – original draft. **Simon Kimenju:** Conceptualisation, Methodology, Formal analysis, Writing – review & editing. **Greg Hallen**: Funding acquisition, Conceptualisation, Writing – review & editing. **Amos Laar**: Validation, Writing – review & editing. **Samuel Oti**: Funding acquisition, Conceptualisation, Methodology, Project administration, Writing – review & editing.

Data Availability
No data were used for the research described in the article.

Declaration of Competing 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 paper.

Supporting information
Supplementary data associated with this article can be found in the online version at doi:10.1016/j.cosust.2023.101376.

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- •• of outstanding interest

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