Identifying good practice indicators to assess comprehensive school food and nutrition programmes
A scoping review

April 2023
About the Nutrition Research Facility

The Knowledge and Research for Nutrition project of the European Commission (2020-2024) aims to provide improved knowledge and evidence for policy and programme design, management and monitoring & evaluation in order to reach better nutrition outcomes.

The project is implemented by Agrinatura - the European Alliance on Agricultural Knowledge for Development – which has established a Nutrition Research Facility, pooling expertise from European academia and having the ability to mobilise internationally renowned scientific networks and research organisations from partner countries.

The Nutrition Research Facility provides expert advice to the European Commission and to the European Union (EU) Member States and Partner Countries.

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<td>APHRC</td>
<td>African Population Health Research Centre</td>
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<td>FAO</td>
<td>United Nations Food and Agriculture Organization</td>
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<td>Food-EPI</td>
<td>Healthy Food Environment Policy Index</td>
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<td>HIV</td>
<td>Human immunodeficiency virus</td>
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<td>INFORMAS</td>
<td>International Network on Food and Obesity/NCDs Research, Monitoring and Action Support</td>
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<td>IRD</td>
<td>French Research Institute for Sustainable Development</td>
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<tr>
<td>LMICs</td>
<td>Low- and middle-income countries</td>
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<td>NCD</td>
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<td>NRF</td>
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<td>SIAA</td>
<td>School Interventions: which interventions are (or could be) implemented to promote nutritious diets of Adolescents living in urban Africa in the context of nutrition transition</td>
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<td>WFP</td>
<td>World Food Programme</td>
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<td>WHO</td>
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Definitions

The following definitions were developed based on the literature and adapted by the project team.

**Benchmarks or good practice indicators:** standards against which aspects of school food environments or policies can be assessed and compared with. For this review, we have used the INFORMAS Healthy Food Environment Policy Index benchmarks or international best practice exemplars of food environment policies as a basis.

**Comprehensive school food and nutrition programme:** incorporates food and meals provided, nutrition standards for procurement (e.g. from local farmers), nutrition education, school gardens, food personnel training, food skills and literacy, and water, sanitation, and hygiene issues. It includes the whole school food environment and school community.

**Food labelling:** provision of nutrition information on a food product or meal, including ingredients and/or nutrient content (e.g. fat, sugar or salt).

**Food promotion:** in this report “food promotion” only refers to the advertising of unhealthy foods and beverages. Promotion of healthy foods through the school curriculum or extra-curricular information campaigns is addressed under “nutrition education”.

**Food safety:** refers to handling, storing, and preparing food in and around school to prevent infection and help to make sure that food retains sufficient nutrients for students (i.e. school going pupils) to have access to a healthy diet. In this report, the element “food safety” also entail hygiene practices of people handling food and safe water related to food preparation on the school premises but also the food safety of vendors outside the school. Issues related to safe water and hygiene regarding students is addressed under “Water, Sanitation and Hygiene”.

**Home-grown school feeding:** school feeding models that are designed to provide children in schools with safe, diverse, and nutritious food, sourced locally from smallholders. A school feeding programme can be considered as ‘home-grown’ even if only a proportion of food is purchased locally from smallholder farmers, provided that local purchases are designed to support and foster local agricultural and food markets, and that these objectives are taken into consideration during programme design and implementation and institutionalised in related policies and regulations.

**Nutrition standards/guidelines for school meals/school feeding:** these refer to a set of rules, principles or recommendations that make explicit the nutrients or food groups required to ensure that school meals meet the nutritional needs of schoolchildren. They can also include food safety recommendations for preparing meals at school.

**School-based food and nutrition education:** a variety of educational strategies and learning activities which, accompanied by supportive food environments, aim to help school children and their communities improve their diets and dietary behaviours, and build their capacity to adapt to change and act as agents of change.

**School community:** refers to all agents who are part of the school system (i.e., students, parents, teachers, supporting staff and the wider school community including farmers or companies providing food to the school) with regards to healthy nutrition.

**School feeding:** provision of free or subsidised food to students. School feeding is the traditional term for programmes that provide food to children or their households through schools, or that are conditional on school attendance. Such programmes provide meals, snacks, or conditional household transfers in the form of cash, vouchers, or in-kind, take-home rations.

**School food:** any food available at school.
School food environment: refers to all the spaces, infrastructure, and conditions inside and around the school premises where food is available, obtained, purchased and/or consumed. The internal school food environment includes any foods and beverages sold, promoted, distributed, labelled, etc., at school cafeterias, kiosks, school events, vending machines, etc. The external school food environment includes any foods or beverages sold, promoted, distributed, labelled, etc., outside the school premises at for instance tuck shops, kiosks, or food vendors.

School food procurement: refers to the entire process of purchase, subsidy, provision, distribution, preparation, service, and sale of food provided at school. This includes criteria relating to the nutritional quality, price and provenance of food provided, usually focusing on school meal provision.

School meal programmes: programmes that provide meals regularly to schoolchildren. These programmes make use of various operation models (including procurement and preparation). They can be implemented in tandem with complementary interventions, such as nutrition education, deworming or supplementation. Also, traditionally referred to as school feeding programmes.

School nutrition and health services: encompass the support services that include assessment of health and nutrition problems or that provide a channel to deliver specific nutrition and health interventions in schools.

School nutrition education: refers to the provision of nutrition education to children and adolescents attending school, either as part of the school curriculum or through extracurricular activities, and which aims to improve the nutritional quality of their diet behaviours.

School premises: entails any food and nutrition related activities within the walls of the school, including the internal food environment, availability of school gardens, water, sanitation, and hygiene facilities and services, health and nutrition services, physical education, and nutrition curriculum.

Students: refers to school going pupils, not to university students.
Preface

This report was prepared as one of the deliverables of the research study “School interventions: which Interventions are (or could be) implemented to promote nutritious diets of Adolescents living in urban Africa in the context of nutrition transition (SIAA)”. This research study has been framed by the Nutrition Research Facility (NRF), as part of the Knowledge and Research for Nutrition project of the European Commission, following a consultation of decision-makers in East and West Africa from which emerged priority research questions, including this one (NRF, 2022*). The SIAA research study is implemented by the French Research Institute for Sustainable Development (IRD) and the African Population Health Research Centre (APHRC).

The overall aim of the SIAA research study is to identify which interventions are (or could be) implemented to promote healthy diets and ultimately prevent overweight/obesity and micronutrient deficiencies in adolescents aged 14-18 years old and the context of urban environments in Kenya has been chosen as case study.

This study focuses on three main objectives:

1. Map the extent of current implementation of a comprehensive school food and nutrition programme to improve school food environments, compared to international good practice indicators.
2. Identify the challenges to the implementation of a comprehensive school food and nutrition programme.
3. Identify how emerging challenges can be addressed in new and/or improved interventions to improve school food environments.

As part of the first objective, an initial step has been to conduct a scoping review of the literature – both at global and country-specific levels – to identify recommendations and good practice indicators used to design and assess comprehensive school food and nutrition programmes promoting healthy food environments in low and middle-income country (LMIC) contexts.

The present document is the output of this literature review. Though not exhaustive, this report can serve as a useful basis – as of today’s knowledge – for researchers, practitioners and government staff to support the development, monitoring or evaluation context-specific comprehensive school food and nutrition programmes. The authors welcome any comment or additional insights that could contribute to improve and strengthen its content.

Executive summary

Background

Undernutrition rates in adolescents remain high in Africa, while overweight and obesity are increasing. The diets of adolescents in low- and middle-income countries (LMICs) are reported to be generally inadequate, predominantly cereal-based and limited in terms of animal-sourced foods, fruit and vegetables. Schools have become important settings for nutrition programmes since adolescents spend a lot of time at schools and are at an age when dietary habits are formed. However, until recently the focus of school interventions in Africa (and LMICs in general) has mainly been on school feeding to increase enrolment or prevent acute or chronic undernutrition, rather than on comprehensive approaches that address multiple burdens of malnutrition.

Based on stakeholders’ consultations in East and West Africa convened by the Nutrition Research Facility (NRF), nutrition in schools was identified as a top research priority to improve adolescents’ diets (NRF, 2022*). Which school interventions are (or could be) implemented to promote nutritious diets of adolescents living in urban Africa in the context of nutrition transition is one of the questions that emerged from this consultation process. The question is now being addressed by the NRF with Kenya as a case study. As an initial step, the current scoping review aims to identify and describe recommendations and indicators to design and assess school food and nutrition programmes.

Method

Based on the existing theory and literature, we developed a framework with all relevant elements of a comprehensive school food and nutrition programme, divided into five main domains:

1. School premises: entails the internal food environment on the school premises, availability of a school garden, water, sanitation and hygiene facilities and services, health and nutrition services, physical education and nutrition education.
2. School community: includes teachers, parents, caregivers, other staff working at school, such as vendors or school food service staff, health workers, etc.
3. External school food environment: includes all components of the food environment outside the school premises.
4. Policy environment: encompasses availability and content of school nutrition policies and committees or teams responsible for nutrition.
5. Cross-cutting issues: include considerations of gender, social inclusion and human rights, participation, coherence and environmental sustainability.

A comprehensive search of global policy documents, scientific publications combined with consultations with experts from the United Nations (UN) and academia resulted in a total of 63 documents.

Findings

Most of the included documents stemmed from UN organisations (24), followed by scientific publications (22) and reports from different global, regional or research institutions (17). The domain that was addressed the most in the documents was food provision within school premises. Nutrition education in the school, as well as community involvement, were also discussed in most documents. Food prices and labelling in the internal school environment were hardly addressed. Domains of the external food environment were rarely addressed (food provision and promotion) or not at all (food safety, labelling, prices). The documents provided i) recommendations, ii) evidence supporting specific recommendations or iii) indicators to assess the implementation and effectiveness of some of these recommendations.

Main recommendations for specific school food and nutrition programme elements for which indicators have been identified from the reviewed literature

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<th>Recommendations from the reviewed literature</th>
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<td><strong>School premises: internal school food environment</strong></td>
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| Food provision | - Promote healthy diets by increasing availability and access to a diverse range of minimally processed foods provided on the entire school premises while limiting access to unhealthy foods or beverages defined by (meal-, food- and/or nutrient-based) standards or guidelines.  
- Ensure that food procurement is as local, seasonal and culturally appropriate as possible.  
- Provide access to adequate, safe, clean eating spaces. |
| Food promotion | - Regulate advertising of unhealthy foods and beverages on school premises.  
- Promote healthy foods and nutritious diets using innovative communication tools tailored to young people. |
| Food prices | - Tax or manipulate prices at school to make unhealthy foods more expensive.  
- Subsidise or manipulate prices at school to make healthy foods cheaper or free. |
| Food labelling | - Combine menu board labelling system in school canteens with nudges towards healthier options.  
- Display nutrition information, such as calorie content of food available in the school cafeteria, which is easy to understand. |
| Food safety | - Define food safety school standards that are in line with national food safety legislation.  
- Ensure that food handlers on school premises are trained and educated and have certificates in food safety and hygiene.  
- Ensure safety and hygiene in all areas where food is stored, prepared or sold. |
| Health and nutrition services | - Deliver high-impact health and nutrition interventions to children and adolescents at schools through periodical visits or health care staff present at school (e.g. anthropometric monitoring, counselling, micronutrient supplements or deworming).  
- Set up referral systems and partnerships with local health services.  
- Involve parents with information, counselling and feedback systems about nutrition screening of students. |
| Nutrition education | - Deliver mandatory, regular, culturally-appropriate nutrition education to students as part of classroom curricula through trained staff or nutrition experts and ensure consistency with food provision.  
- Integrate food and nutrition education throughout the school system and include it in extra-curricular activities, such as school gardens or community activities.  
- Include a range of topics in nutrition education, such as healthy eating practices, food systems and food environment by providing theory, strengthening practical competencies, using interactive learning strategies. |
| Physical education | - Provide age-, sex-, disability- and culturally-appropriate physical education in the curriculum through qualified teachers.  
- Provide safe, spacious and clean spaces for indoor and outdoor physical activity.  
- Provide the opportunity for all age groups to access space and school sporting facilities for physical activity outside of the curriculum.  
- Ensure that physical education meets the needs and interests of all students and is tailored to boys and girls and associated with fun, not punishment.  
- Advocate for walking and/or cycling as forms of transport for school commutes. |
| Water, sanitation and hygiene | - Ensure that safe drinking water is always available and easily accessible throughout the school premises and free of charge.  
- Ensure access to appropriate hand washing, personal hygiene and sanitation facilities with running water and soap to all students, especially close to toilets.  
- Make clean, age- and gender-appropriate sanitation facilities and products (including menstrual supplies) available and easily accessible to all students.  
- Promote safe hygiene and sanitary behaviour. |
| School gardens | - Use school or urban gardens as a learning platform that can support school-based food and nutrition education.  
- Ensure that food from school gardens is nutrient-dense. |
| Breaktimes | - Ensure that students have regular meal schedules and enough time to eat meals. |
### 2. School community

**School community involvement**
- Raise and build awareness about healthy diets to improve diets of students and the wider community.
- Ensure community mobilisation, ownership and involvement in the food and nutrition programme.

**Capacity development and training of the school community**
- Strengthen capacity of school staff, vendors and suppliers to implement school food/nutrition activities.
- Make training manuals/guidelines available and accessible for staff.
- Provide health screening for school staff and give free counselling.

**Livelihoods of food suppliers**
- Procure food for school food programmes from local farmers.
- Strengthen the capacities of smallholder farmers to produce nutritious food.
- Incentivise nutrition-sensitive value-chain actors to produce and process high-quality food for schools.

### 3. External food environment

**Food provision**
- Limit exposure to unhealthy food outside the school premises by defining zones or public planning laws promoting healthy zones within a certain perimeter of school grounds in which unhealthy foods should not be sold.

**Food promotion**
- Regulate the promotion, marketing and advertising of foods, snacks and beverages high in energy, sugar, fat and salt around schools.

### 4. School policies and institutions

**School food and nutrition policies and committees**
- Put in place a school policy which addresses actions related to food and nutrition.
- Set up a school committee including the whole school community to routinely discuss policy implementation, monitoring and financing related to food and nutrition.

**Policy coherence**
- Ensure coherence among school policies in different areas.

### 5. Cross-cutting issues

**Gender equality**
- Ensure equal access to education, activities and services for girls and boys.
- Encourage equal involvement of women in school food and nutrition programmes as cooks, farmers or programme managers without overburdening them.

**Participatory approaches**
- Involve students in the design, development and implementation of school food and nutrition projects.
- Facilitate students-led projects on food and nutrition.

**Inclusion and human rights**
- Take affirmative action against bullying, stigmatisation and discrimination.
- Ensure that all students have access to a full, healthy, free or subsidised meals and education for all in line with rights-based and inequality sensitive approaches.

**Environmental sustainability**
- Ensure environmental sustainability of food procurement by considering the use of traditional, neglected and underutilised foods.
- Promote sustainable diets, e.g. by setting limits on the number of servings or by requiring a set number of plant-based meals.
- Set criteria for reducing food loss and waste.
- Encourage fuel and energy saving.

### 6. Additional elements to consider in school food and nutrition programmes

**Safety and violence prevention**
- Put in place rules and guidelines for staff and students related to physical safety, stigma and discrimination, corporal punishment of students by teachers, fighting and other forms of violence and sexual harassment or substance abuse.
- Trained teachers to monitor, administer and teach first aid and basic safety.

**Private sector engagement**
- Monitor the involvement of the private sector in school food and nutrition activities to ensure it promotes nutritious school meals.
- Ensure that the private sector is not involved in the development of a school food and nutrition policy or a member of the school committee.

**Friendly, trusting atmosphere**
- Promote good and equitable relationships between students and staff, as well as with families and the wider community.
- Promote open and dynamic communication and interactions between all school community members.
- Avoid overburdening communities, parents, teachers and school staff with participation in school food/nutrition programmes.

**“Do not harm” principle**
- Make sure that actions implemented in relation to school food and nutrition projects do not have negative impacts.
Conclusion

There is a need for policies and programmes to address school food and nutrition programmes more comprehensively. This review provides an overview of possible elements and indicators to consider in any school food and nutrition programme. They could form the basis for the design, implementation and evaluation of programmes but could also be used to assess their comprehensiveness or effectiveness. Future research should focus on harmonising and testing these tools in different settings and develop new context-specific tools if needed.
Background

Undernutrition rates in adolescents remain high in Africa, while overweight and obesity are increasing.\textsuperscript{1} While the causes of overweight and obesity are complex, an unhealthy diet remains one of the key contributors, with data from the last 10 years showing that diets have only improved marginally.\textsuperscript{1} The diets of adolescents in low- and middle-income countries (LMICs) are also reported to be inadequate, predominantly cereal-based and limited in terms of animal-sourced foods, fruit, and vegetables.\textsuperscript{2} Particularly in urban areas, an increased consumption of processed energy-dense and nutrient-poor foods and drinks has been reported.\textsuperscript{2} Children and adolescents spend a lot of time at school.\textsuperscript{3,4} Furthermore, schools are an important setting to reach children at an age when dietary habits are formed. Nutritious school food and school-based nutrition education can also influence families, the school community and be a channel for wider community participation.

Schools have therefore become important settings for nutrition programmes. However, until recently the focus of school interventions in Africa (and LMICs in general) has mainly focused on school feeding to increase enrolment or prevent acute or chronic undernutrition, rather than on comprehensive approaches that include the whole school food environment and community\textsuperscript{5} that address multiple burdens of malnutrition. Comprehensive school food and nutrition programmes can promote healthy food consumption in several ways: i) controlling the availability of foods/beverages sold or provided-type/portion size; ii) introducing nutrition standards for school meals or other foods sold in school; iii) applying price interventions, such as free or subsidised fruit and vegetables, or higher prices of energy-dense, nutrient-poor foods; iv) engaging with family and the school community; and v) providing school nutrition/health services that include water and sanitation, as well as micronutrient supplementation.\textsuperscript{5–8} A comprehensive school policy can therefore aim to reduce access to unhealthy foods, as well as encourage provision of healthier food.\textsuperscript{6,9} Evidence (mainly from high-income countries, less from LMICs outside of Africa) shows that this is more effective than single interventions.\textsuperscript{7,10–12} Access to free, clean water (and handwashing/toilet facilities) also needs to be part of a comprehensive school strategy to prevent all forms of malnutrition.\textsuperscript{13,14}

Some tools exist to assess food environments, such as the ANGELO (Analysis Grid for Environments Linked to Obesity) framework, which consists of four pillars: the economic (what are the costs), physical (what is available), political (what are the rules) and sociocultural (what are the attitudes and beliefs) elements. The framework has been applied to schools, to assess intervention implementation at a school level\textsuperscript{15} compared to benchmarks for school food environment programmes. Other available tools are tailored to a specific element of a school food and nutrition programme, such as food provision in schools.\textsuperscript{16} Previous reviews have synthesised data from studies assessing different components of the school food environment, using the components of the ANGELO framework.\textsuperscript{17,18}

However, information on different available tools and indicators has not been reviewed or synthesised before. The objective of this review is to synthesise information on different indicators assessing comprehensive school food and nutrition programmes and to identify possible good practice indicators for benchmarking school nutrition interventions.
Proposed framework for this review

The INFORMAS Food-EPI framework for benchmarking food environment policies, which has been adapted to Kenya, was the basis for this review. In addition, other frameworks were considered with regard to the school food environment, school food and nutrition programmes or specific components of these programmes such as: the home-grown school feeding programme, the food environment in general or school food and nutrition interventions. The framework developed here includes relevant elements of a comprehensive school food and nutrition programme. The school food environment is separated into the internal school food environment which refers to the physical environment within the walls of the school and the external food environment which refers to the physical space outside the school premises. The rationale behind this division is that provision of services, as well as policy actions, might be addressed by different sectors and institutions depending on whether the setting is the school or the general community. The framework is divided into five main domains:

1. School premises: entails the internal food environment on the school premises, availability of a school garden, water, sanitation and hygiene facilities and services, health and nutrition services, physical education, and nutrition education.
2. School community: includes teachers, parents, caregivers, other staff working at school, such as vendors or school food service staff, health workers, etc. This domain also entails the capacity and training of the school community members and livelihoods of suppliers.
3. External school food environment includes all components of the food environment outside the school premises.
4. Policy environment: encompasses availability and content of school nutrition policies and committees or teams responsible for nutrition.
5. Cross-cutting issues: include considerations of gender, social inclusion and human rights, participation, coherence, and environmental sustainability.

Figure 1: Proposed framework for comprehensive school food and nutrition programmes
Methods

Type of review

The aim of this scoping review was to identify and describe tools and methodologies to assess school food and nutrition programmes to get a preliminary assessment of the scope of available tools and indicators.32

Literature searches

This review identified different types of publications:

1. **Global guidelines/policies/strategies/frameworks**: these documents focused either on school programmes (or components of school programmes) related to food or nutrition such as the World Health Organisation (WHO) Nutrition friendly school initiative33 or on food systems or food environments which also addressed components of the school food system or environment such as the Food-EPI framework to monitor policy actions related to food environments.34 These documents provided recommendations and indicators for school food and nutrition programmes and policies.

2. **Literature reviews on school food and nutrition interventions or programmes**: these reviews provided the evidence for different school programme elements but also suggested relevant indicators for school food and nutrition programmes and interventions.

For the first two types of documents, websites of global organisations including the WHO, United nation Children’s Fund (UNICEF), the Food and Agriculture Organisation (FAO) and the World Food Programme (WFP), United Nations Educational, Scientific and Cultural Organisation (UNESCO), European Union (EU), African Union, New Partnership for Africa’s Development (NEPAD), Global Panel on Agriculture and Food Systems for Nutrition (GLOPAN), Research consortium for school health and nutrition, Global school nutrition foundation were searched for relevant policy and programme documents on school programme guidelines/tools/frameworks or food system and food environment guidelines/tools/frameworks. These documents were screened for potential indicators. An a priori list of indicators was prepared based on the indicators defined by above proposed framework.

In order to identify reviews on school food and nutrition interventions or programmes, searches were conducted on PubMed and Scopus in title and abstract. Grey literature and unpublished literature were also sought through Google Scholar. The terms in Table 1 were used for the search in PubMed, which were adapted for database specific terms in Scopus and Google Scholar. Additionally, references from reviewed articles, or those brought to the attention of the authors in the process of writing were also considered. All searches were conducted in October 2022.

*Table 1: Proposed search terms PubMed*

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Search terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. School food and nutrition</td>
<td>&quot;school food&quot; OR &quot;School nutrition&quot; OR &quot;school canteen&quot; OR &quot;school feeding&quot; OR (&quot;school program**&quot; AND (water OR sanitation OR hygiene OR &quot;physical activity&quot; OR &quot;physical education&quot;))</td>
</tr>
<tr>
<td>2. Tools</td>
<td>Tool* OR guideline* OR indicator* OR benchmark* OR standard* OR framework* OR evaluation* OR program*</td>
</tr>
<tr>
<td>3. Limits</td>
<td>English only (Systematic or literature) Reviews Human studies only</td>
</tr>
</tbody>
</table>

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32https://www.lshtm.ac.uk/research/centres-projects-groups/research-consortium-for-school-health-and-nutrition
33https://gcnf.org
Experts from the United Nations (UN) and academia were contacted regarding new developments on tools or publications on school food and nutrition programmes. The authors met with three experts from the WFP, FAO and Deakin University between November and December 2022 and received additional information about global documents and efforts to identify indicators for school food and nutrition programmes.

Screening

Global documents were screened for their focus on schools, food systems or food environments. We downloaded the references we identified on PubMed or other databases to Excel. Screening titles and abstract screening was undertaken by UT and 20% by a co-reviewer (MW). For references selected for full text screening, the full text was downloaded and screened by UT and 20% by a co-reviewer (MW).

In/Exclusion criteria

- Only documents and publications published in English were considered.
- Only tools and indicators applicable to secondary schools, high schools were included.
- Only documents and tools relevant for the LMICs context
- Year of publication: no restriction.

In the full text screening, papers were categorised depending on what information they provided:

- Recommendations or good practices examples for a school food and nutrition programme.
- Indicators to measure the impact of a school food and nutrition programme element.
- Evidence of effectiveness of specific school food and nutrition programme elements.
- Methods and tools to assess indicators.

Data extraction and synthesis

The following data was extracted in Excel: title, author/institution, year, type of document (global report, review, tool etc), country where the tool/indicator was applied or tested. Recommendations, indicators, and evidence relevant to the different elements of our framework, were also extracted.

Indicators were framed in terms of benchmarks of good practice. Where available, specific thresholds for these benchmarks were provided, while for others when the included reports did not provide sufficient detail, more general indicators were defined. These indicators still need to be adapted to specific contexts and methods might have to be developed to measure them.

For some school food and nutrition elements, there are overlaps regarding the recommendations and indicators. For instance, providing education related to hygiene can fall under the element “Water, sanitation and hygiene” but also “Nutrition education”. In order to ensure that the different elements are described comprehensively, some overlaps exist.
Findings

Description of included publications

A total of 63 documents were included in this review. Most of the included documents stemmed from UN organisations (24), followed by scientific publications (22) and reports from different global, regional or research institutions (17). The domain that was addressed the most in the documents was food provision within the school premises (Figure 2). Nutrition education in the school as well as community involvement were discussed in most documents. Food prices and labelling in the internal school environment were hardly addressed. Domains of the external food environment were rarely addressed (food provision and promotion) or not at all (food safety, labelling, prices). The documents provided recommendations or guidelines, evidence supporting specific recommendations or indicators to assess the implementation or effectiveness of different recommendations. Four reviews described various tools that have been used to assess different components of school food and nutrition programmes.

Figure 2: Number of documents addressing different domains and elements of school food and nutrition programmes
Recommendations and indicators for different school food and nutrition programme elements

The school premises

Food provision in the internal school food environment

Food provision refers to any foods or beverages offered on the school premises as part of the cafeteria, vendors, or kiosks but also food provided through specific programmes such as school feeding. The food provided at school can determine what students consume during their time at school and is an important part of their daily food intake. School meals should be designed to meet a significant portion of the nutritional requirements of school aged children. Such meals can help prevent and manage micronutrient deficiencies. However, provision of unhealthy food can also have negative effects on children’s diets. Evidence from high-income countries and LMICs shows that foods sold by vendors inside of schools are often unhealthy, influencing students to consume snacks and sugar sweetened beverages. Food provision policy actions should therefore pay attention to nutrients or foods that should be limited, such as sugar, trans-fats, salt and ultra-processed foods, but also to foods that should be promoted such as minimally processed foods such as fruits and vegetables.

Recommendations related to food provision were made in most reviewed documents. This review identified three key recommendations around school provision: 1) regulate food provision at school to increase availability and access of healthy food, while reducing access to unhealthy food, 2) procure local, seasonal, culturally appropriate food; and 3) provide safe, clean, welcoming spaces for students to eat. Safe and hygienic preparation of meals is addressed under “Food safety on the school premises”.

1. Regulate food provision in the internal school food environment to increase availability and access of nutritious food and reduce access to unhealthy food

School food and nutrition guidelines or standards can determine the types of foods promoted, restricted, or banned in schools. Standards may also be applied to meals served to children or to specific foods or nutrients. Hence, there are nutrient-based standards, e.g. for sodium, fat, saturated fat, dietary fibre, energy or essential nutrients, and food-based standards that for example, encourage consumption of fruit or restrict sugar-sweetened beverages. The level of processing has also been proposed as a consideration in some documents.

A WHO review of school food standards in 160 countries (more than half of countries were LMICs) found that they were most often based on specific foods and beverages that are either prohibited (e.g. sugar-sweetened beverages), limited (e.g. fried foods) or encouraged (e.g. fruit and vegetables), or based on nutrients to limit (e.g. energy, fats, sugars, or salt/sodium). The most common nutrient-based standards referred to energy or salt/sodium content, or both. The scope of current food standards in these countries includes lunch in school canteens, foods/beverages at other mealtimes, packed lunches and other foods/beverages brought from home, all foods/beverages sold in school shops/stores including tuckshops and vending machines, and foods/beverages available at school events.

School meal standards, competitive food/beverage policies and school food procurement policies in primary and secondary schools in high-incomes countries and LMICs have been shown to limit the availability of foods, snacks and beverages high in energy, sugar, fat, and salt, which in turn has reduced purchase, consumption and intake of unhealthy foods. Similarly, the availability of healthy food, such as fruits and vegetables during school breaks, decreased overweight and obesity in high-income countries secondary schools.

School meal standards should also apply to school feeding programmes. In most countries these subsidised or free meals contain grains/cereals (in 87% of programmes), followed by oil (78%) and legumes (75%). Fruit and vegetables are provided in 63–65% of the programmes, while animal-source foods are less common. Fifty percent of all programmes serve fortified foods and 18% provide biofortified foods such as...
Vitamin A rich orange flesh sweet potatoes.\textsuperscript{40} Most common fortified food items included oil, salt, grains/cereals, and corn-soy blend or biscuits, with most commonly: vitamin A, iron, iodine and zinc.\textsuperscript{40} School feeding programmes in low-income or disadvantaged settings have been shown to improve weight gain, micronutrient status and dietary intake,\textsuperscript{7} while participation in school breakfast programmes in high-income countries reduced overweight.\textsuperscript{41} Programme evaluations found that provision of fortified foods or beverages through schools improved micronutrient status, particularly anaemia reduction, and in some cases anthropometric outcomes.\textsuperscript{42}

An important consideration for school meal and feeding programmes is to avoid unintended consequences. Some studies proposed that school meal programmes may contribute to obesity, partly because of inadequate targeting and monitoring mechanisms, excessive focus on calories and little attention to meal quality.\textsuperscript{43} Furthermore, for school feeding programmes, risk of exclusion and discrimination as well as sustainability of domestic financing are important issues to monitor (see also the section on “Inclusion and human rights”).

2. **Procure local, seasonal and culturally appropriate food**

Reports especially on homergrown school feeding suggested giving priority to local procurement from smallholder farmers. This could include a percentage goal of the procurement budget to be used on procurement of food directly from the defined target beneficiaries.\textsuperscript{44} Sourcing food from local farmers could benefit their livelihoods, but also boost the local economy, as well as biodiversity. Furthermore, local procurement could promote traditional, neglected, underutilised and indigenous foods.\textsuperscript{36} Additional recommendations and indicators related to this can be found below under “livelihoods of farmers”.

3. **Provide safe, clean and welcoming spaces for students to eat**

Few reports referred to the need of students to have a safe, clean or friendly space to consume food that they bring from home or purchase at the cafeteria.\textsuperscript{8,42} A systematic review which examined eating places and cooking facilities in schools identified overcrowding in the cafeteria or lack of appropriate kitchen facilities and equipment as barriers to healthy eating.\textsuperscript{42}

### Box 1. Example of school feeding with a focus on local, minimally processed foods in Brazil

“Through a simplified public bidding process, Food Purchase Programme lets food be procured from family farmers to meet the needs of food-insecure communities. The model was later incorporated into the National School Feeding Programme establishing a quota (30%) of resources that needs to be used to purchase food from family farmers. Seasonality and local produce are also contemplated.”\textsuperscript{45} “At least 75% of the funds used under the PNAE must be allocated to the purchase of fresh or minimally-processed foods; a maximum of 20% may be allocated to the purchase of processed and ultra-processed foods; and a maximum of 5% may be allocated to the purchase of culinary ingredients.”\textsuperscript{46}

### Example school food provision regulation in Mexico\textsuperscript{47}

Food and drinks that are permitted/prohibited in primary schools under Mexico’s federal school food regulation:

- Never: soda, diet soda, flavoured milks, salty snacks, cookies, snack cakes/pastries, sweets and desserts, sweetened yogurt.
- Mon-Fri: permitted fruit and vegetables, wholegrain cereals, dried oilseeds: pumpkin seeds, nuts, peanuts, dried legumes, freely available plain water.
- Schools need to sell fruit and vegetables daily, prohibit the sale of ultra-processed foods, sodas and sugary drinks. Effort should be made to enable direct collaboration between small-scale farmers and producers selling unprocessed and minimally processed foods.
### Table 2: Recommendations and indicators for food provision – internal school food environment

<table>
<thead>
<tr>
<th>Overall recommendations</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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</table>
| Increase availability and access to healthy, minimally processed foods or beverages promoting healthy diets, provided on the entire school premises while limiting access to unhealthy foods or beverages defined by standards or guidelines. | Define school food standards: Ensure that foods and beverages provided at school should be available to all students and in line with national dietary recommendations defining quality, quantity and diversity for any food or beverage provided on the entire school premises. | - There is a school policy specifying the foods that should be provided, limited, or banned at school and how they should be prepared.  
- School restaurants, caterers, cafeterias, vending machines and free or subsidised school meals provide food that meets national school food standards.  
- Diverse, healthy meals are available to students throughout the school day (i.e. breakfast, lunch, snacks, take home rations).  
- School shares menus with students on a regular basis.  
- Nutrition experts are involved in developing the school food standards.  
- Portion sizes, diversity, quantity, and quality of provided food/meals is in line with dietary recommendations. |
| Define meal-based recommendations: Ensure that nutritious meals at school meet the nutrient and energy needs of students and are based on a variety of foods originating mainly from plant-based sources. | - Types of foods recommended for provision at school are defined in the school food guidelines/standards. |
| Include standards for healthy foods:  
- Provide a variety of vegetables, fruit, wholegrain cereals, bread, pasta, rice or potatoes, preferably fresh (for fruit and vegetables) and locally produced, several times a day.  
- Provide fruit and vegetables in recommended quantity, diversity, and frequency. | - School provides access to nutrient-dense healthy food options.  
- School meal or snack programme includes healthy foods: e.g. fruit, vegetables, milk or milk products, foods high in wholegrains, pulse or nuts.  
- Number of healthy meals served or sold meets the national standards.  
- Fresh fruit and vegetables are provided in recommended quantity, diversity, and frequency. |
| Include standards for unhealthy foods:  
- Limit or avoid sugary drinks and sweets.  
- Limit or avoid ultra-processed foods or milky drinks, fruits with syrup, canned and candied fruit, processed, cured, canned, and fatty meats.  
- Limit the consumption of sugar and salt, while ensuring that all salt used is iodised. Avoid salt containers that are visible to students and whose purpose is to add salt to prepared food. | - School ensures limited or no access to unhealthy food/beverage options (e.g. school has a policy banning the sale of sugar-sweetened beverages to students).  
- School meal or snack does not include unhealthy foods (e.g. sugary drinks, deep fried foods, salty packaged foods, sweet, packaged foods, foods high in sugar including cookies, pastries, or other baked goods).  
- Frequency of sugary desserts or drinks or ultra-processed foods or beverages on school meals is in line with national standards. |
<table>
<thead>
<tr>
<th>Overall recommendations</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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</table>
| Increase availability and access to healthy foods or beverages provided on the entire school premises while limiting access to unhealthy foods or beverages defined by standards or guidelines. | Include nutrient-based recommendations:  
- Define amount/type or frequency for specific nutrients (e.g. replacing most saturated fats with unsaturated fats, avoidance of trans-fatty acids).  
- Define energy-based standards, or standards for protein, fat, and carbohydrate content; micronutrient-based standards for iron, Vitamin A and zinc.  
- Define upper limits for saturated fat, sugar and sodium.  
- Fortify school food in provided meals in settings with micronutrient deficiencies. | - Nutrient content of food served or sold (e.g. kilocalories, micronutrients or % nutrients of concern) meets the needs of students. |
| Provide clean drinking water that is not contaminated as the primary beverage choice. | | - School provides sufficient access to safe drinking water that is not contaminated for students. |
| Define nutritional standards in food preparation and procurement. | | - Any meals prepared on the school premises are in line with nutritional and food safety standards.  
- Serving frequency of deep-fried foods or pan-fried food is in line with national standards. |
| Apply food/nutrient recommendations also to food brought from home. | | - Food which students bring from home is in line with dietary recommendations. |
| Ensure that food procurement is as local, seasonal and culturally appropriate as possible. | Establish the legislative or regulatory framework that permits effective food procurement systems, giving priority to local procurement of nutritious foods from smallholder farmers when possible. | - School has standards for food procurement and logistics.  
- Effective systems are in place to purchase and deliver food for schools.  
- The school is taking steps to source local ingredients (e.g. growing own or directly purchasing from a local plantation, grower or market).  
- Robust financial management systems ensuring fair prices for local producers and processors are in place. |
| Ensure that the food basket is based on nutritious local foods promoting a healthy diet, including traditional, neglected, underutilised and indigenous foods while enhancing biodiversity conservation and environmental sustainability, as far as possible. | | - Meals provided respond to local and cultural taste preferences.  
- Meals provided include traditional, neglected, underutilised or indigenous foods. |
| Engage with female and male smallholder farmers. | | - A specified percentage of food is sourced from local small-scale female or male farmer associations, community groups or local businesses of the total food school menu. |
| Provide access to adequate, safe, clean eating place. | Ensure that students have a safe, clean, pleasant, welcoming space to consume purchased or brought food. | - The school provides a space where students can eat meals during the school day (e.g. classroom, dedicated eating space such as cafeteria, dining hall, outside on school grounds, etc.).  
- The eating space is clean, friendly, and supervised. |
Food promotion in the internal school food environment

Promotion of foods and beverages entails both unhealthy and healthy foods and beverages. Marketing techniques can be used to promote healthy foods and beverages among students for instance in the school cafeteria. Unhealthy foods could be defined by national food based dietary guidelines based on their nutrient content (salt, sugar, saturated fat) or level of processing. Promotion of unhealthy foods should be regulated on the entire school premises. Promotion of healthy foods is addressed in the section on “nutrition education”.

The reviewed reports recommended regulations to restrict or limit but also entirely ban promotion of unhealthy foods. The recommendations related to food promotion entail advertising on the school premises in terms of signposting, sponsorship as well as branding. Examples include branding of school catering menus; branding of school signs, sports fields signs, school equipment, such as marquees, message boards, scoreboards, and blackboards; donations of branded school or gym equipment; use of vouchers or educational rewards; offering of school materials in return for food purchases; sponsorship of school events or fairs, or sponsorship in school publications such as yearbooks, school newspapers or school calendars or event programmes; sponsorship of school vehicles; billboards and signs in school corridors, sports facilities, or on school buses; product display; corporate logos, or brand names on posters, book covers and pupil assignment books; televised advertisements aired by TV stations seen in schools; or product samples: free food products or personal hygiene products. Studies found that promotion of snack foods and sugar-sweetened beverages inside schools was widespread.

There is good evidence that commercial advertising and marketing of high-fat, energy-dense, micronutrient-poor foods and beverages to children can have an impact on a child’s food preferences, purchase behaviour and consumption. Therefore, children need to be protected from the marketing of unhealthy foods and beverages.

A study found that introducing advertising restrictions can reduce exposure. For example, following the introduction of the 2016 Food labelling and advertising law in Chile, a reduction in exposure of unhealthy food marketing to children was found, with significant decreases in exposure to unhealthy food advertising on TV and a reduction in child directed marketing strategies on breakfast cereal packages post implementation of the Law.

Box 2. Example of regulating food advertising at schools in Uruguay

The Uruguay Law on Healthy Foods in Schools prohibits advertisements and marketing on school premises of foods and drinks not featured on the list of healthy food and drink items published by the Ministry of Public Health. The law prohibits advertising in all forms, including posters, billboards, use of logos/brands on school supplies, sponsorship, distribution of prizes, free samples on school premises and the display and visibility of food.
## Table 3: Recommendations and indicators for food promotion – internal school food environment

<table>
<thead>
<tr>
<th>Overall recommendations</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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<tbody>
<tr>
<td>Regulate advertising of unhealthy foods and beverages on school premises</td>
<td>- Regulate advertising and marketing targeted at children in school grounds, particularly regarding highly processed foods and foods of low nutritional value (high in saturated fat, trans-fatty acids, salt and added sugars) in line with nutritional standards and national Food-Based Dietary Guidelines (FBDGs) if available.</td>
<td>- There is a school policy addressing information, marketing and promotion of foods and beverages. - The school policy prohibits advertisement or promotion, including sponsorship, for candy, sugar-sweetened beverages, or other unhealthy foods and beverages on school premises.</td>
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<td>- Apply restrictions/bans of unhealthy food/beverage marketing to the whole school premises (including in cafeterias, canteens, tuck shops and kiosks), teaching materials, during any sporting or cultural events or staff meetings at school as well related to rewards in the classroom and school.</td>
<td>- The school is free from unhealthy food marketing and sponsorship (e.g. company branding on educational materials, academic awards, sports awards, sports or school uniforms or equipment, school infrastructure: vending machines, fridges etc). - The school is free from companies promoting their brands and foods in school through free giveaways, use of cartoon characters, celebrity endorsements, advertising (posters, banners), price discounts, school meals, snacks programmes. - The school community, especially food vendors on the school premises have guidelines on healthy school food promotion. - Teachers do not give unhealthy food as a reward for good performance to students.</td>
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<td>Promote healthy foods and nutritious diets using innovative communication tools tailored to young people</td>
<td>- Food service staff need to provide basic information about meal composition and communicate it effectively to students and apply basic marketing skills to promote healthy school meals.</td>
<td>- Food service staff are trained on basic marketing skills to apply recommendations to promote healthy school meals.</td>
</tr>
<tr>
<td>- Place nutritious products so that they are easy for students to choose, such as featuring fruits and vegetables in prominent places.</td>
<td>- Healthy food products, like fruit and vegetables are prominently displayed in the cafeteria.</td>
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<td>- Develop recommendations on healthy food promotion for school events, fairs, open days, fundraising, sports events, and staff meetings.</td>
<td>- Healthy food is promoted at school events and through awareness campaigns.</td>
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<td>- Ensure that school awareness and communication campaigns routinely promote healthy diets and display relevant materials which are promoted across the school premises.</td>
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Food price in the internal school food environment
The element ‘food price’ encompasses the actual price of different foods and beverages but also potential subsidies or taxation of foods and beverages. Only few reports included recommendations related to prices of food available at schools. This review identified recommendations related to regulating prices to make healthy foods more affordable and subsidising healthy foods, especially in low-income populations in LMICs settings.

Healthy food should be affordable to all students. It should also be more affordable than unhealthy food since purchase/consumption of foods, snacks and beverages can be influenced by economic incentives. A review identified three studies measuring food prices, and demonstrated that the pricing of foods sold in school canteens favoured less nutritious foods compared to nutritious alternatives. Providing free or subsidised fruit and vegetables has been shown to increase habitual fruit and vegetables consumption. In poor-income settings, free or subsidised school meals should be provided, which were shown to improve weight gain, micronutrient status and energy intake.

Table 4: Recommendations and indicators for food prices – internal school food environment

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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| Make healthy foods cheaper than unhealthy foods at school | - Tax or manipulate prices at school to make unhealthy foods more expensive (e.g. energy dense nutrient poor snacks).  
- Subsidise or manipulate prices at school to make healthy foods cheaper or free, e.g. lower prices for bottled water than other beverages; lower prices or provide fruit and vegetables for free. | - The school has a policy making healthy foods cheaper compared to unhealthy foods.  
- Healthy foods and beverages at school vendors, canteen, vending machines or snack bars on school premises are priced lower than unhealthy options.  
- Students in low-income settings receive free or discounted healthy food/meals. |

Food labelling in the internal school food environment
Recommendations related to labelling at school cafeterias entailed display of school menus with nutritional information such as on calorie content of the meals. Different systematic reviews and meta-analysis on nutrition messaging or use of labelling to encourage healthy eating in primary and secondary schools resulted in improvements in outcomes related to diet, food purchases and preferences, with mixed results for weight-related outcomes. Specifically, studies found a reduction of energy content of purchases when provided with calorie information at the point of purchase, small increases in fruit and vegetables intake with a cafeteria food labelling scheme led by young people and social marketing campaigns.

However, few reports expressed specific recommendation related to food labelling at school.

Table 5: Recommendations and indicators for food labelling – internal school food environment

<table>
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<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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| Provide nutrition labelling such as symbols easily understood by children with the information necessary to make healthy nutrition choices | - Combine menu board labelling system in school canteens with nudges towards healthier options (signposting and choice architecture etc.).  
- Display nutrition information, such as calorie content of food available in the school cafeteria which is easy to understand. | - Easily understandable nutrition information (for added sugar, salt, fat, calories as a minimum) on the meals provided at school cafeterias is on display. |
Food safety in the internal school food environment

The element of ‘food safety’ contains any hygiene or safety related food stored, prepared, or served at school. It also refers to hygiene practices of food vendors based within the school premises and anybody handling food at school. Recommendations and indicators related to water and hygiene can be found under the element “Water, sanitation and hygiene”.

For food safety within the school premises, 16 publications provided recommendations, indicators, or tools. The recommendations either addressed the need for a policy at the school level that should be in line with the national food safety legislation and should address all stages of food procurement, preparation, and distribution to and at the school. Another key recommendation was related to the training and certification of staff working at cafeterias or as vendors on the school premises. Communicating to and educating students and their families in food safety and hygiene was also mentioned by some reports. The importance of safe, clean and appropriate facilities to store, prepare but also consume the food was also highlighted in the reports.

Important considerations for applying food safety standards in school relate to potential concerns about the safety of school meals and perceived better hygiene and safety of highly processed foods which might be packaged. These concerns should not prevent incorporation of fresh and nutrient-rich foods, such as fruit and vegetables or animal-source foods.

Box 3. Example of food safety regulation on school premises in Ecuador

The 2020 Organic law on school feeding states that one of its purposes is to ensure the safety, quality and control of food that is sold and distributed in educational institutions. According to the Ministerial Agreement of 2015, all staff must complete a 30-hour certification course in food safety prior to working in a school canteen. The Ecuadorian Professional Training Service is empowered by the Ministry of Public Health to evaluate whether canteen workers have successfully completed the training course and to issue the corresponding food safety certificates which ensure legal compliance with: i) food safety legislation and standards; and ii) Good Agricultural Practices (GAP) and Good Hygienic Practices (GHP). There is also a legal requirement for school authorities to develop a food safety plan including a risk-based approach to include: school food services; food brought from home or other sources; food in the classroom; vending machines; concessions; and use and access to a kitchen.
Table 6: Recommendations and indicators for food safety – internal school food environment

<table>
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<tr>
<th>Overall recommendations</th>
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<th>Indicators</th>
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<tr>
<td><strong>Put food safety school standards in place that are in line with national food safety legislation.</strong>&lt;sup&gt;1,8,21,24,30,45,48,49,64&lt;/sup&gt;</td>
<td>Align school food safety standards with national legislation addressing procurement (farm, transport, processing, delivery); handling, cooking, transporting, storing and serving of food, as well as storing and purifying water; addressing all vendors/providers within the school (e.g. hygiene of catering staff, separation of raw and cooked food, preparation methods, storage, use of water).</td>
<td>- The school has written food safety standards (in line with national legislation) addressing all the stages of the school food supply chain (handling, storing, cooking and serving food). - The school makes food safety standards available and informs all staff handling food about them. - Food preparation staff are instructed to follow the Five Keys to Safer Food (keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures, use safe water and raw materials).</td>
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<tr>
<td><strong>Ensure that food handlers on the school premises are trained, educated and have certificates on food safety and hygiene.</strong>&lt;sup&gt;21,46,64,66&lt;/sup&gt;</td>
<td>- Regularly inspect food handlers, their qualifications, skills, and hygiene practices in food preparation - Build capacity and provide supportive supervision of school food handlers for adherence with school or national food safety regulations. Build capacities along the entire school food chain. - Provide regular free medical check-ups for cooks at least twice a year. - Develop a food and personal hygiene guide mounted in kitchens for reinforcement. - Disseminate information on food safety and hygiene to children, parents and personnel.</td>
<td>- Staff working in school food services receive sufficient/frequent training, education and certificates on food safety and hygiene. - Training materials or guidelines related to food safety and hygiene are available to staff in school food services. - Food handling staff receive free regular medical checks.</td>
</tr>
<tr>
<td><strong>Ensure safety and hygiene in all areas where food is stored, prepared or sold (e.g. food vendors in school, school kitchen).</strong>&lt;sup&gt;71,72&lt;/sup&gt;</td>
<td>Provide a safe, hygienic, and sufficient space for food vendors and school kitchen to store, prepare and serve food.</td>
<td>- School has safe and hygienic reception, storage and preparation facilities for food and supplies that protect from spoilage and infestation of insects or rodents. - Kitchens are supplied with necessary amenities (serving utensils, storage, closed cooking area, piped water, electricity, stove, refrigeration, clean food preparation areas, areas to separate cooked and raw ingredients).</td>
</tr>
</tbody>
</table>
School health and nutrition services

Schools also offer an opportunity to deliver high-impact health and nutrition interventions to children and adolescents who might be otherwise hard to reach.\textsuperscript{36} School health and nutrition services were recommended in numerous reports but differed in scope. The recommended services included micronutrient supplementation (Vitamin A, iron-folic acid or iron supplement), provision of anthelmintic treatment (deworming), malaria prevention, vaccination, oral health promotion, vision screening and treatment, sexual and reproductive health services, menstrual hygiene management, height and weight measurement, dietary counselling and feedback system for parents and children, food fortification, fortification of school meals with adequately iodised salt or fortified cereals. Other recommended school health and nutrition services in the reviewed reports included school gardens, nutrition education, water, hygiene, and sanitation services. However, in this report these services or interventions are addressed under the respective school programme element defined in this report.

School health services can be provided through health service outreach activities, where health professionals visit the school periodically, a health professional or clinic at the school, or basic health assessments carried out by trained school staff.\textsuperscript{30}

There is an abundance of evidence supporting different school health and nutrition services. The integration of deworming into school feeding programmes was shown to improve school participation.\textsuperscript{35,63,73} Also, comprehensive sex education was shown to improve sexual and reproductive health outcomes, such as HIV infection and adolescent pregnancy rates.\textsuperscript{73} School-based weight monitoring or regular screening facilitated detecting children with various forms of malnutrition (i.e. stunting, wasting, overweight and obesity, and micronutrient deficiencies, conditions that can arise separately or coexist) and/or health problems.\textsuperscript{36,42}
### Table 7: Recommendations and indicators for school health and nutrition services

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| Deliver high-impact health and nutrition interventions to children and adolescents at schools. | Provide nutrition and health services at school through periodic visits or health care staff present at school. | - Health and nutrition services are provided through visits by external health professionals or through school health staff.  
- Health and nutrition services are provided on a frequent basis and health workers can be easily reached by students.  
- Health and nutrition services are provided by trained health workers (e.g. nurses, physician, psychologist, dentist, nutritionist). |
| Provide different types of services: | - Regularly monitor children’s weight and height.  
- Provide one-on-one counselling (dietetic consultations).  
- Assess eating and physical activity behaviours of students.  
- Provide micronutrient supplements, deworming and other health services. | - Students receive micronutrient supplements/deworming tablets.  
- Existence of strategies and actions to address/screen oral health problems/oral, eye and ear health/HIV counselling/immunisations/substance abuse/daily tooth brushing/malaria prevention/first aid/control and management of pain/mental health/substance abuse in schools.  
- Health promotion activities are provided related to health literacy, oral health care, personal hygiene and handwashing, increased physical activity, reduced consumption of sugar-sweetened beverages (SSB), menstrual hygiene management. |
| Establish/strengthen referrals and partnerships | - Ensure referrals to other school services and community health services based on results of the screening.  
- Establish partnerships between schools and local health services to provide school health services at reduced or no cost to the school. | - Children identified with an issue related to malnutrition are referred to a health service.  
- Partnerships with local health services are in place. |
| Involve parents: | - Put in place feedback system to parents about nutrition/health screening.  
- Give recommendations about healthy diets and physical activity for all students, including their parents.  
- Provide counselling for students and their parents to promote healthy eating and appropriate levels of physical activity. | - Nutrition counselling sessions are provided to students and their parents to increase knowledge and skills to adopt healthy dietary practices.  
- Parents are informed of nutrition or health problems of their children. |
Nutrition education

School-based food and nutrition education can provide children, adolescents, but also school personnel and communities with information and practical skills to practice healthy behaviours. School health education can be delivered in different ways; as a specific subject, as part of other subjects such as science, health, home economics, mathematics and agriculture, or integrated into the broader school system and extra-curricular activities.

Systematic reviews found evidence of educational campaigns changing school children’s consumption behaviour, such as reduction in sugar-sweetened beverages intake, increased consumption in fruit and vegetables, but also reductions in body mass index. However, most of the included studies were conducted in high-income countries. Nutrition education interventions that demonstrated effectiveness lasted longer than one year, were integrated into regular school activities, focused on behaviour change and were implemented in combination with other approaches (involvement of parents, changes in the environment such as fruit and vegetables provision as part of school food services). Effective approaches included both enhanced formal curriculum, as well as cross-curricular approaches, practical skill-based strategies (e.g. cooking classes, school gardening), and peer-led education programmes.

Box 4. Essential elements of school-based nutrition education

- Needs-based learning with practical, real-life examples
- Building on existing experience and expertise of students
- Opportunities for observation of healthy food preparation, gardening and discussion in school
- Action and practice in real-life settings (e.g. teamwork and practical skills)
- Interactions with physical and social environments in all learning activities
- Ownership of the process by students
- Family and community support and involvement
- Understanding and critical perception of the influence of food environments to encourage students to identify potential challenges

Box 5. Example of how to link nutrition education with food environment

- Actively engage children, particularly adolescents, in setting their own agendas and prioritising their concerns regarding healthy food practices outside the school.
- Arrange visits to local farms, local food production facilities, community gardens, food distribution centres and/or farmers markets to explore different aspects of local food systems.
- Have children and adolescents assess the food environments in their home, community, school and markets (e.g. to identify advertising of unhealthy foods).
- Engage students in exploring local and studying global food systems – either as educational projects or more informally (for example, as they walk to school, through documentaries or through informal talks with food system actors).
Box 6. Examples of nutrition education curriculum topics\textsuperscript{56,59,76}

- Nutrients, functions and or nutritional value of foods
- Healthy body weight, types of malnutrition and strategies to prevent them (undernutrition, overweight obesity, micronutrient deficiencies)
- Nutrition throughout the lifecycle: e.g. child feeding, breastfeeding, adolescent nutrition (anaemia and diets for girls), diet of pregnant and lactating women
- Links between diet and health; health consequences of different forms of malnutrition
- What constitutes a healthy diet: dietary diversity, healthy versus unhealthy foods, e.g. street foods (content and safety); highly processed foods; high-calorie, low-nutrition value food products; healthy meals for school children such as breakfasts, snacks
- Information and marketing: food labelling, media and marketing literacy to students (sources of reliable food information, counteracting food marketing, critical review of marketing)
- Hands-on cooking skills or gardening skills
- Food preparation, household practices and roles: cooking fuels and cooking methods; household food distribution and other practices
- Food culture and sociocultural aspects of food preparation and eating
- Water, Sanitation and Hygiene: handwashing after toilet use and before eating, clean water (safe sources, handling and treating), food safety, hygiene and/or sanitation
- Food sourcing and the food system: where does food come from, nutrition value for money in local foods; urban food sources and delivery, diversifying food gardens to improve diet, homestead food production
- Physical activity: importance for health
- Climate change and environmental sustainability: food loss and waste
- Social norms, body image
- Life skills, such as budgeting for food, shopping, cooking

Box 7. Example of school-based food and nutrition education in Chile

The 2012 Law on nutritional composition and advertising of foods states that “preschool, primary and secondary education establishments in the country must include, at all levels and teaching modalities, didactic and physical activities that contribute to developing habits of healthy eating and warn about the harmful effects of an excessive diet in fats, saturated fats, sugars, sodium and other nutrients whose consumption in certain quantities or volumes can represent a health risk.” It also states that “educational establishments of the country should incorporate physical activity and sports practice, in order to encourage their students in the habit of an active and healthy life”\textsuperscript{46}
### Table 8: Recommendations and indicators for nutrition education

<table>
<thead>
<tr>
<th>Overall recommendations</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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| Deliver mandatory culturally-appropriate nutrition education and food literacy to students as part of classroom curricula and ensure consistency with food provision | Ensure that policies specify the main content of the curriculum, minimum standards of quality, minimum time requirement in the curriculum, capacity requirements of front-line educators. | - Nutrition education is formally included and provided in the school curriculum.  
- Students receive nutrition education as part of the curriculum. |
| Allow individual schools to adapt and prioritise elements of the curriculum based on the local situation, social norms, traditional diets, such as resource availability and population needs. | The curriculum responds to context: the main nutritional problems/social norms/traditional/local diets are addressed in the nutrition education. |
| Integrate nutrition education into the curriculum as a stand-alone subject or across various subjects (e.g. health, home economics, biology or other science subject, social science/social studies, physical education, environment, health education, life skills, agriculture lesson, etc.). | Nutrition education is taught as a separate subject or integrated with other subjects, such as health, science. |
| Include a range of topics: healthy eating practices, food system and food environment issues (food production, harvesting, preserving, preparing) (see full list of topics in Box 6 above). | Key topics are taught as part of the nutrition curriculum package (e.g., different topics see Box 6 above). |
| Apply different teaching approaches: address knowledge of students through providing the theory of nutrition principles, practical competencies through activities in school gardens, cooking, etc., and active participation of students and life skills. | Different teaching approaches are applied: skill-based learning with active participation, such as demonstrable and lasting improvements and practical skills (e.g. cooking, gardening); knowledge/understanding (theoretical content) and/or life skills, competencies in communicating and advocating for healthy diets in their communities. |
| Deliver nutrition education sessions in the curriculum on a regular basis, for at least an hour per week throughout the school year for all age groups. | The school provides sufficient nutrition education sessions per year/week (compared with national curriculum requirements) (e.g. at least one hour per week on average throughout the year). |
| Use interactive learning materials, strategies and multimedia channels that are ethical and effective and that respond to modern, innovative communication preferences tailored to adolescents (e.g. games, videos, computer modules, theatre, food laboratories, posters, school gardens, school meals, textbooks, flyer, pamphlets). | A range of age-relevant teaching materials, textbooks, visual aids, videos are available and used. |
| Deliver nutrition education through trained staff or nutrition experts. | Teachers of nutrition education receive regular training in nutrition, health sciences, food science, home economics, biology/science.  
- Teacher’s motivation in nutrition education is assessed and incentivised (e.g. through diplomas) |
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<tr>
<th>Overall recommendations</th>
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<th>Indicators</th>
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</table>
| Integrate food and nutrition education throughout the school system and include it in extra-curricular activities. | Integrate the different aspects of nutrition education in the whole-school food policy: as topics for specific and time-bound school activities (e.g. children create a campaign to promote fruit and vegetables consumption or adolescents present a research project on the environmental issues of specific food production or processing) or through events (fairs, campaigns, exhibitions, monthly celebrations, open days). | - Extra-curricular nutrition education activities are offered at school.  
- School events encourage healthy food choices. |
| Integrate extra-curricular nutrition education in different settings such as school gardens, sports, dance, cooking and health clubs, school meals, community activities. | Different school facilities or kitchens are used to educate students about food preparation or cooking (purpose/frequency of use).  
- School gardens are used for teaching and learning activities (purpose/frequency of use). |
| Include the most critical influencers of behaviour, including families, community members, school staff, local smallholder farmers and rural enterprises, community leaders in provision of extra-curricular nutrition education. | Different school community members are involved in extra-curricular nutrition education, e.g. community actors, families, farmers and pupil associations.  
- School community members who provide nutrition education receive adequate training. |

Physical education

Physical education can be part of the formal curriculum or integrated in different extra-curricular activities to address leisure activities. The extra-curricular activities include any form of activity provided by schools other than formal classes, such as activities in break-times, before, after or outside of school or integrated as part of events or projects. These activities require resources, spaces, and equipment to be available on the school grounds for students. These can be as simple and low cost as skipping ropes, hula hoops and balls. For any curricular or extra-curricular physical education, safety of students should be ensured through safe equipment as well as supervision.

Nutrition interventions at school that were combined with physical activity components were shown to be more effective in terms of dietary and weight outcomes.

Most reviewed documents provided recommendations on physical education policies and time allocation. Fewer recommendations were made regarding types of activities, training or behaviours of staff, their credentials, and behaviours of students.

Box 8. Recommendations for content of in-school physical education

- Include a range of movement concepts and skills (including endurance, flexibility, strength or coordination, gross motor skills such as walking, skipping, throwing, catching, kicking).
- Develop an individualised physical activity plan, including frequency, intensity, and duration.
- Prevent injury during physical activity.
- Teach the value of physical activity for health, enjoyment, challenge, self-expression, and social interaction, fair play and importance of life-long participation in physical activity.
- Include individual, paired, group and team sports or activities.
### Table 9: Recommendations and indicators for physical education in schools

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<tr>
<th>Overall recommendation</th>
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| Provide age, sex, disability and culturally-appropriate physical education in the curriculum. | Develop national physical education curricula defining the scope, number of sessions of physical education per week. Physical education classes should entail practical activities including aerobic/endurance, strength, flexibility and coordination activities but also theoretical topics such as recommendations for regular participation in physical activity, including frequency, intensity and duration, health impact of physical activity, value and importance of fair play. | - The school provides sufficient physical education sessions per year/week (compared with national curriculum requirements) offering a range of practical activities.  
- Students participate in school organised physical activity >150 min. per week (or >average 30 min./day). |
| Provide safe, spacious and clean spaces and facilities for indoor and outdoor physical activity. | | - School has safe, spacious, sufficient, and clean space/facilities, equipment and outdoor playing field accessible by all students. |
| Ensure that physical education teachers are well-qualified and properly trained. | | - Physical education classes are taught by a physical education teacher or specialist.  
- Training is provided to physical education teachers on instructional strategies to keep all students active for most of physical education class time.  
- Teaching requirements (knowledge, skills and understanding; continued professional development; and quality assurance mechanisms) for physical education are defined in the national curriculum. |
| Establish and enforce adequate safety precautions (safe equipment, supervision and safety rules for students) to prevent unintentional injuries and illness resulting from physical activity. | | - School inspect equipment and facilities and conducts maintenance for safety issues and hazards on a regular basis (e.g. playground equipment, sport facilities, school grounds). |
| Ensure that physical education meets the needs and interests of students, is tailored to boys and girls and associated with fun, not punishment. | | - Students are given the opportunity to express their needs and preferences for physical education classes and activities.  
- The undertaking or withholding of physical activity is not used as punishment.  
- Schools provide a place where boys and girls can separately and privately change clothes before and after physical education.  
- Physical education is taught to (and adapted for) both boys and girls. |
| Provide the opportunity for all age groups to access space and school sporting facilities for physical activity outside of the curriculum. | Provide ample opportunities for all students to engage in physical activity outside of physical education class, during (breaks and other times) and after school hours. | | - Overall school’s physical environment allows for safe movement and activity during, before and after school hours.  
- School provides daily active recess for all students.  
- Students do not stay inside class during recess time and are encouraged to engage in physical activity during breaks, before/after school.  
- Extracurricular activities do not substitute physical education classes. |
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<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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</thead>
<tbody>
<tr>
<td>Provide the opportunity for all age groups to access space and school sporting facilities for physical activity outside of the curriculum.</td>
<td>Offer opportunities for students to participate in (non)-competitive physical activity or recreation clubs.</td>
<td>- School has (non)-competitive and recreational physical activity opportunities that are used by students.</td>
</tr>
<tr>
<td>Establish partnerships with local councils, municipalities, communities and traffic planners to create safer paths and advocate for walking and/or cycling as forms of transport.</td>
<td></td>
<td>- School has made efforts to make walking and/or cycling to school safer (through partnerships with local community, awareness campaigns, crossing guards, traffic free zones, etc.).</td>
</tr>
<tr>
<td>Establish partnerships with communities to open up and effectively utilise existing community recreation and sporting facilities for students, while also allowing the community to have access to school facilities.</td>
<td></td>
<td>- Community has access and uses school physical activity facilities.</td>
</tr>
<tr>
<td>Ensure that extra-curricular physical activity is safe.</td>
<td></td>
<td>- Safe and clean facilities, equipment, outdoor playing field are provided that can be used for physical activity before or after school (equally by boys and girls).</td>
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<td>- Supervision is provided for extra-curricular physical education activities.</td>
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</table>

Water, sanitation and hygiene on the school premises

Providing clean water and sanitation at schools helps prevent infectious diseases, such as helminthic infections and diarrhoea. These diseases can impair physical and cognitive development of children. Research showed that health promoting environments including sanitation and safe water supplies in school, as well as knowledge on menstrual hygiene, reduced absenteeism and the risk of diarrhoea. Providing access to safe drinking water was also found to have positive effects on water consumption but mixed effects on sugar-sweetened beverages consumption and weight-related outcomes.7

Box 9. Definitions of improved water sources and sanitation services84

Improved water sources include piped water, boreholes or tube wells, protected dug wells, protected springs and packaged or delivered water. Unimproved sources include unprotected wells, unprotected springs and surface water.

Basic services: drinking water from an improved source is available at the school at the time of the survey.

Improved sanitation facilities include flush/pour-flush toilets, ventilated improved pit latrines, composting toilets and pit latrines with a slab or platform. Unimproved facilities include pit latrines without a slab or platform, hanging latrines and bucket latrines.

Basic service: improved sanitation facilities at the school that are single-sex and usable (available, functional, and private) at the time of the survey.
Table 10: Recommendations and indicators for water, sanitation and hygiene at school

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish rules and routines on hygiene and sanitation</td>
<td>Develop a policy addressing water, hygiene, and sanitation.</td>
<td>- There is a school policy addressing provision of safe water, sanitation facilities and personal hygiene practices.</td>
</tr>
<tr>
<td></td>
<td>Ensure that safe drinking water is always available and easily accessible throughout the school premises and free of charge.</td>
<td>- There is a piped water supply for drinking water on school grounds. - Students have access to free and safe drinking from improved or unimproved source.</td>
</tr>
<tr>
<td></td>
<td>Ensure access to appropriate hand washing, personal hygiene and sanitation facilities with running water and soap to all students especially close to toilets.</td>
<td>- Functional hand washing facilities and soap are available for students to use when they wash their hands after they use the toilets or before they eat.</td>
</tr>
<tr>
<td></td>
<td>Make clean, age- and gender-appropriate sanitation facilities and products (including menstrual supplies) available and easily accessible to all students.</td>
<td>- Students have access to improved sanitation facilities that are single sex, functional and private. - School’s sanitation facilities are cleaned regularly. - School provides privacy/space to wash/sanitary napkins or other menstrual supplies to female students.</td>
</tr>
<tr>
<td></td>
<td>Promote safe hygiene and sanitary behaviour.</td>
<td>- School promotes positive hygiene behaviours. - School teaches students and trains teachers on the main ways to prevent soil-transmitted helminth infection: use latrines to defecate, and wash hands with soap at key times.</td>
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</table>

School garden

School gardens should be a platform for active learning by providing school children with practical experience in food production and natural resource management, which serve as a source of innovation they can take home to their families and apply in their own household gardens and farms. Furthermore, school gardens could contribute food to school feeding programmes with a variety of fresh micronutrient-rich products. Experience from Uganda, South Africa as well as high-income countries has found that home-gardens improved agricultural skills, nutrition knowledge and dietary practices. An important consideration is that school gardens should not be regarded as the main sources of food or as any source of income. School gardens should not overburden students and teachers.

Table 11: Recommendations and indicators for school gardens

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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</thead>
<tbody>
<tr>
<td>Use school or urban gardens as a learning platform can support school-based food and nutrition education.</td>
<td>Set up school gardens with a pedagogic focus linked to the nutrition education curriculum.</td>
<td>- School has a school/kitchen garden for students to use for teaching purposes (e.g. teaching about food preparation, healthy eating, gardening skills, science, etc.).</td>
</tr>
<tr>
<td></td>
<td>Ensure that food from school gardens is nutrient dense.</td>
<td>- The school grows a diverse range of nutritious crops in the school garden.</td>
</tr>
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</table>
The school community

Community involvement

Publications included in this review addressed involvement of the school community members in two main ways: 1) to contribute directly through motivating students to consume healthier diets but also benefit their own health and 2) to empower community members to be actively involved in school food and nutrition programmes.

The term ‘community’ refers to students, parents, teachers, staff working at the school (nurses, canteen staff), farmers or companies providing food to the school, as well as the wider community living around the school.

- **The community members are role models to improve the diets of students but also benefit from school food and nutrition programmes**

Parents play an important role in influencing and shaping the dietary practices of children and adolescents since they control most of the food choices at home and their support can positively influence diets.

Teachers and school staff can also act as important role models for promoting healthy diets and could have a direct interest in healthy diets as a key to improving learning potential and well-being of children.

Studies that involved parents and the community found improvements in children’s body mass index and dietary behaviours, such as consumption of more fruit and vegetables and fewer calories, fat and sodium compared to studies not involving parents.

Community members could also benefit from school food and nutrition programmes themselves. Nutrition education provided through schools can also influence families, the school community and be a channel for wider community participation. Schools could also make their sports facilities accessible to the community to promote physical activity in the community.

- **The community members are empowered and active in school food and nutrition programmes**

Children and adolescents and their communities are not passive actors, but rather take ownership of their food learning processes and can become agents of change in their local food system. Involving parents will increase consistency between recommendations given to students by the school and practices at home. Parental involvement in school programmes was also associated with better outcomes in body mass index and blood pressure among primary and secondary school students. Responding to community needs and getting buy-in from parents and the community was also shown to lead to more effective and successful school feeding programmes. Failing to involve parents, for instance in school garden programmes, was shown to create tensions within the communities.

**Box 10. Examples of community involvement in school food and nutrition programmes**

- Peer-support and mentoring programmes for students, cooking classes
- Staff and peers modelling healthy behaviours
- Healthy eating messages in the school newsletter
- Weekly/monthly sessions with parents from teachers
- Hands-on activities for children and parents, such as cooking or gardening
Table 12: Recommendations and indicators for school community involvement

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
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<tr>
<td>Raise and build awareness about healthy diets to improve diets of students and the wider community. 8,12,21,22,30,35,42,43,47,49,54,56,60–82,89,90</td>
<td>Provide information and communication: - Increase nutrition knowledge and demand for healthy food in schools through awareness campaigns. - Encourage communication among school staff, families, and community members. - Disseminate and communicate new or existing school policies to the public.</td>
<td>- Information is given to parents about the nutritional quality of foods (snacks or meals) that students bring from home. - Parents/community are informed about nutrition problems/solutions. - The school utilises various communication tools to reach out to parents. - Community members are informed about school nutrition policies/guidelines/ regulations.</td>
</tr>
<tr>
<td>Educate parents in preparing a healthy snack/lunch for students who bring food to school including take-home materials and food samples.</td>
<td>- Nutrition education is offered to parents/community. - Interventions are implemented to influence the nutrition knowledge, attitudes and practices of the school community. - School involves students as agents of change within their families or the wider community.</td>
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</tr>
<tr>
<td>Ensure community mobilisation, ownership and involvement in the food and nutrition programme. 8,12,21,24,30,45,46,49,54,56,60–62,63,66</td>
<td>Use community-level structures to reach different community members and to encourage their involvement in school food and nutrition actions.</td>
<td>- Community-level structures are used by the school to establish communication (village councils, traditional authority structures, village elders, and the like). - Meetings are held with community members to hear their opinions and actively involve them.</td>
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Capacity development and training of the school community

This component includes any training or capacity development of teachers, cafeteria staff, vendors, farmers and food suppliers on the basics of nutrition, new food and nutrition policies and programmes at school. Therefore school-based food and nutrition actions require capacity development across the board. Training could include the following topics: healthy diets, healthy food preparation, food safety and hygiene and should be provided with training materials adapted to the specific audience. The training materials should be accessible for staff at school. Furthermore, teachers and other school personnel should gain knowledge and skills to become successful agents of change for positive nutritional behaviours. 21

Table 13: Recommendations and indicators for capacity development and training of the school community

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
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<tbody>
<tr>
<td>Strengthen capacity of school staff, vendors and suppliers to implement school food/nutrition activities. 8,21,24,28,35,36,42,45,47,52,60–62,66,82,87,89</td>
<td>Conduct educational and skills-based workshops and training with food vendors, cooks, farmers, food suppliers to teach them about food and health related issues, healthier food preparation techniques, timely and efficient food preparation methods, food safety and nutritional quality of meals.</td>
<td>- There are pre- or in- service training programmes in place to train vendors and canteen staff on school food/nutrition which are also open to community members. - Vendors/canteen staff/suppliers attend training programmes to learn about healthy diets and how to comply with the nutrition and food safety guidelines.</td>
</tr>
<tr>
<td>Provide periodic nutrition training courses or workshops for teaching staff so they have the capacity and competence to become change agents/champions for healthy diets.</td>
<td>- School provides regular nutrition training to teachers. - School encourages teachers serve as role models to motivate students to adopt healthy eating habits.</td>
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<tr>
<td>Make training manuals/guidelines available and accessible for relevant staff.</td>
<td>- Training manuals on nutrition are available for all staff within school.</td>
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<tr>
<td>Provide health screening for school staff and give free counselling.</td>
<td>- All school staff receive free annual health screening or dietary counselling.</td>
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</table>
Livelihoods of suppliers

Procuring food from local smallholder farmers for school feeding, school meal programmes or any school food, can transform the livelihoods of local farmers and their families by increasing demand for local food and guarantee markets for local producers. It requires envisioning farmers not only as service providers for school food but also as direct beneficiaries in terms of their livelihoods.

Studies found that this can stimulate the local economy and address vulnerabilities of producers, improve food security and dietary intakes within their households. A study in Burkina Faso found that procuring food locally (as opposed to from the US), saved 20% of the costs for the purchasing agencies, while still meeting government food safety and quality standards. Furthermore, local procurement did not distort market prices. Research also found that local procurement for school feeding in Kenya increased annual incomes of farmers.

Table 14: Recommendations and indicators for livelihoods of food suppliers

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<tr>
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<th>Indicators</th>
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| Procure food for school food programmes from local farmers. | - Develop school food procurement strategies and guidelines, specifically aimed at supporting smallholder farmers.  
- Strengthen the capacities of smallholder farmers and communities to produce nutritious food.  
- Incentivise nutrition-sensitive value-chain actors to produce and process high-quality food for schools. | - School procures food from small-scale farmer associations, community groups, or local businesses.  
- School food procurement contributes to farmers’ incomes.  
- School food procurement from smallholder farmers contributes to increased production, productivity, market participation, farmers’ food security and healthy food consumption. |

External school food environment

Food provision – external school food environment

The external food environment was rarely addressed in the reviewed reports. A review of WHO of national nutrition policies also found that the least common type of standard or rule in countries concerned the types of foods and beverages sold in the immediate vicinity of the school.

The physical access to diverse types of food in the food environment influences what consumers can purchase and consume. Policies are needed to encourage healthy food outlets and combat unhealthy food provision at food retail outlets near schools. The impact of the sale of unhealthy foods outside the school is particularly strong where children have access to these foods at lunchtime (e.g. if they can leave the school grounds or purchase foods through the schoolyard fence), which can negatively influence dietary behaviours of students.

Efforts to create a health-conducive environment should also include food vendors that may be present on or near the school premises. In many countries there is a high concentration of fast-food restaurants near schools and a relatively low concentration of stores that sell fruit and vegetables.

As part of their initiative to improve nutrition among schoolchildren, governments can use public planning laws or legislation regulating commercial licensing to set incentives and rules for a healthy retail and food services environment for schools.
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Box 11. Example of regulating food in the external food environment in South Korea

In 2009, under the Special Act on Children’s Dietary Life Safety Management, Korea established “Green Food Zones” to improve schoolchildren’s health by regulating the food available in and around the school environment. Within Green Food Zones, which cover a 200-metre radius around schools, businesses may not sell energy-dense, low-nutrient density food. Such food is defined by the Minister of Food and Drug Safety as food that falls above a set threshold for calories per serving, total sugars and saturated fats.

Table 15: Recommendations and indicators for food provision – external school food environment

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</table>
| Limit exposure to unhealthy food outside the school premises. | Define zoning or public planning laws promoting healthy zones within a certain perimeter of school grounds around schools in which unhealthy foods should not be sold. | - School regulates when students are allowed to purchase meals or snacks from food stores outside of school grounds during school hours.  
- Unhealthy foods and beverages (e.g. high-fat, salty or sugary foods are not sold in a specified radius around the school grounds).  
- Number/density of different food outlets in the external school food environment and types of available foods/beverages are regulated. |

Food promotion – external school food environment

Only two reports addressed food promotion in the food environment surrounding the school and recommended eliminating the promotion of unhealthy foods and beverages.

Table 16: Recommendations and indicators for food promotion – external school food environment

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulate the promotion, marketing and advertisement of foods, snacks, and beverages high in energy, sugar, fat and salt around schools.</td>
<td>Marketing for high fat, salty or sugary foods and brands outside of the school grounds are regulated (e.g. density and type of food/beverage advertising in the external school food environment).</td>
</tr>
</tbody>
</table>

School policy environment

School food and nutrition policy or institutional framework

Recommendations related to school policies included written documents defining rules and regulations around different elements of school food and nutrition, as well as the presence of a coordinating committee for food and nutrition matters.

Studies examining the effect of “having a policy” and “it being comprehensive” found that school-based policies focusing on both the food and beverage and physical activity environments (versus targeting only one of these areas) showed improvements in students’ body mass index. Policies addressing the school food environment were associated with improvements related to availability, purchasing and/or consumption but less often with weight-related outcomes.
### Cross-cutting issues

**Gender**

Including a gender perspective to school policies that deal with food and nutrition can help to address gender inequalities in access to food, education, income and has positive impact to break the intergenerational cycle of malnutrition.\(^{21,40}\) School enrolment of girls can be increased through gender sensitive school programmes, since girls often miss classes due to menstruation.\(^{73}\) Women can be empowered through involvement in food procurement, preparation and management of school food and nutrition programmes. Unintentional consequences of putting too much burden on women in school food and nutrition programmes should be considered.\(^{53}\)

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put in place a school policy which addresses actions related to health, food and nutrition.(^{8,42,46,48,49,55,81})</td>
<td>Develop a written nutrition school policy (stand alone or integrated in broader policy) that addresses different elements of comprehensive school food and nutrition programmes.</td>
<td>The school has a policy addressing food and nutrition issues.</td>
</tr>
<tr>
<td></td>
<td>Develop a monitoring and evaluation plan for the policy including context-specific and independent assessments.</td>
<td>- Mechanisms are in place for regular monitoring and evaluation of the policy.</td>
</tr>
<tr>
<td></td>
<td>Raise awareness about the policy in the community.</td>
<td>- Different community members are involved in monitoring and evaluation.</td>
</tr>
<tr>
<td>A school committee (including representatives from school and foodservice staff, students, parents, teachers and others) is in place to routinely discuss policy implementation, monitoring and improvement related to food and nutrition and ensure financial sustainability.(^{21,35,36,46,56,57,60,63})</td>
<td>Set up a school nutrition committee or include nutrition agenda in existing school committees with members of the community.</td>
<td>There is a school food and nutrition committee, council or team that implements or oversees the school food and nutrition programme.</td>
</tr>
<tr>
<td></td>
<td>Ensure involvement of a multitude of community actors, including civil society, farmer organisations, the private sector and vulnerable groups with specific consideration to gender and minority groups.</td>
<td>Different community members are involved in the school food and nutrition committee (e.g. teachers, other school staff, parents, caregivers, community members, health workers, local business, government officials, religious leaders).</td>
</tr>
<tr>
<td></td>
<td>Ensure that school food and nutrition is regularly on the agenda of school committees.</td>
<td>School food and nutrition committee meetings are held regularly.</td>
</tr>
<tr>
<td></td>
<td>Clearly define the roles and responsibilities of committee members to ensure the adequate implementation of the programme.</td>
<td>Roles and responsibilities of the committees are clearly defined (e.g. identify pupil nutrition needs based on relevant data; recommend new or revised nutrition policies or programmes; seek funding or leverage resources to support nutrition programmes or communicate nutrition policies to school or community, review nutrition curricula or instruction materials; design, implement and manage programmes; provide feedback and monitoring and hold school programmes accountable.</td>
</tr>
<tr>
<td></td>
<td>Regularly train the committee members on food and nutrition related issues.</td>
<td>- There is adequate food and nutrition capacity in the committee.</td>
</tr>
<tr>
<td></td>
<td>The school has a budget for food and nutrition activities, monitoring budgetary implications transparently.</td>
<td>- Training/workshops are provided for committee members on food/nutrition.</td>
</tr>
<tr>
<td></td>
<td>The school has a budget for food and nutrition activities.</td>
<td>- The school has budget available for food and nutrition activities.</td>
</tr>
<tr>
<td></td>
<td>Finances for food and nutrition activities are monitored and transparently reported at the school.</td>
<td>- Finances for food and nutrition activities are monitored and transparently reported at the school.</td>
</tr>
</tbody>
</table>
Table 18: Recommendations and indicators for gender equality in school food and nutrition programmes

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure equal access to education, activities and services for girls and boys.</td>
<td>Ensure girls and boys have equal access to schools.</td>
<td>School provides equal access for boys and girls to attend school.</td>
</tr>
<tr>
<td></td>
<td>Ensure girls and boys are equally participating in school food and nutrition activities.</td>
<td>School provides equal access for girls and boys participating in / enjoying school food and nutrition activities.</td>
</tr>
<tr>
<td>Encourage equal involvement of women in school food and nutrition programmes without overburdening them.</td>
<td>Involve women in school food and nutrition programmes or local food procurement as cooks, farmers or programme managers to support rural women’s productive activity and incomes; foster women’s participation in farmers’ organisations; and reinforce rural women’s self-confidence, knowledge and skills through training and learning.</td>
<td>Female smallholders are involved in school food and nutrition programmes.</td>
</tr>
<tr>
<td></td>
<td>Increase access to capital to invest in women’s productive activities (for inputs, technology and additional labour on their farms, etc.).</td>
<td>School food provision contributes to increased income of women through work in school meal programmes.</td>
</tr>
<tr>
<td></td>
<td>Conduct gender assessments to identify constraints and potential pathways to identify and minimise potential constraints.</td>
<td>Unintended consequences and constraints of women involved in school food/nutrition activities are assessed and addressed.</td>
</tr>
</tbody>
</table>

Participatory approaches

Recommendations related to participation included ensuring inclusive non-discriminatory participation in decision-making and in review and accountability mechanisms of school food and nutrition programmes. Students should be engaged in discussions about how school-based programmes could operate. They should have an opportunity to express their preferences and have some influence in determining the decisions that are made.

Table 19: Recommendations and indicators for participatory approaches in school food and nutrition programmes

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure inclusive non-discriminatory participation of students.</td>
<td>Involve students in the design, development and implementation of school food and nutrition projects.</td>
<td>- Students are involved in the design, development and implementation of school food and nutrition programme.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Students can provide suggestions on which foods and beverages are offered at the canteen.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Students’ preferences are considered when planning school meals or nutrition activities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Motivation of students to participate in school food and nutrition projects is assessed.</td>
</tr>
<tr>
<td>Facilitate students-led projects on food and nutrition.</td>
<td></td>
<td>- Student-led projects on food and nutrition are offered at school.</td>
</tr>
</tbody>
</table>

Inclusion and human rights

Promoting a human rights-based approach to school food and nutrition programmes was recommended by some documents. School meals can support the fight against health inequalities but targeting needs to be done carefully to avoid stigmatisation, exclusion or discrimination. Universal provision of free or subsidised school meals should be central to rights-based and inequality sensitive approaches. Reports also suggested to address stigmatisation of students, the food they bring to school, or their body image within schools.
Box 12. Example – Human rights approach to school feeding – Brazil

Some countries have adopted school feeding legislation founded on a human rights-based approach. Such an approach recognises children’s right to adequate food in school as a legal entitlement instead of public assistance. For example, Law 11.947 of 2009 establishes the School Feeding Programme in all primary schools in Brazil. Article No. 3 of the Law states that school feeding is a students’ right and thus it is a duty of the state to promote and safeguard this right established by the Law.

Legal developments on school food and nutrition with a human rights-based approach go beyond the national level. In 2013, the Latin-American Parliament adopted a regional model Framework law on school meals, which provides a set of guidelines for regulating various aspects related to access to food for children within schools. In 2013, the Forum for Presidents of the Legislative Powers of Central America and the Caribbean Basin adopted the Framework law on the right to adequate school food and nutrition. Other issues that can be considered in a school food and nutrition law to make it more inclusive, as follows:

- Ensure accessible drinking water, washrooms and toilet facilities.
- Guarantee alternative meals to children with special dietary requirements or restrictions (at no extra charge).

Table 20: Recommendations and indicators for inclusion and human rights of school food and nutrition programmes

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| Take affirmative action against bullying, stigmatisation and discrimination.⁸,36,42,46,48,54,63,73 | Address bullying, stigmatisation and discrimination and focus on encouraging a healthy body image, shape and size among all students and staff members, accepting diverse abilities and no tolerance for stigmatisation related to bodyweight, healthy eating, or physical activity. | - Schools have or follow a written policy/guideline/rule prohibiting bullying among students at school.  
- Bullying policies address issues of healthy eating, physical activity, body images and targeting of school feeding programmes. |
| Contribute to achieving human rights to adequate food, education and social protection.⁹¹,36,46 | Ensure that all students have access to a full, healthy meal every day via free or subsidised school meals and access to education in line with rights-based and inequality sensitive approaches. | - Students have access to a healthy meal at school.  
- School enrolment is high and dropout rates are low for vulnerable populations. |
|                                                             | Target the most vulnerable and hard-to-reach children, including orphans, children from indigenous communities and marginalised ethnic groups, and children with special needs with school meal programmes. | - School meals programmes specifically target children and adolescents from the most vulnerable population groups.  
- School assesses risk of exclusion or discrimination in school meal programmes. |

Environmental sustainability

Environmental sustainability should address all components of the school food and nutrition activity: procurement from local climate smart producers, using sustainable transport for food, using sustainable food preparation methods and addressing food loss and waste. The 2021 Global Survey of School Meal Programmes found that many schools (79%) made an effort to limit food waste and over half (57%) made an effort to reduce packaging waste.⁴¹
Box 13. Examples of food waste reduction

In Slovenia, schools have reduced food waste by 42% as part of the “Food is Not for Waste” project by the Eco-School programme and in Poland, over 200 teachers have founded school clubs focused on waste reduction. In Argentina, food waste is also addressed by turning it into compost for school gardens. In South Africa, food waste in the National School Nutrition Programme is minimised by distributing any excess food to orphans and other vulnerable people. In the United States, to limit food waste, the National School Lunch Programme allows students to decline some food items. Efforts to limit packaging waste include the re-use of packaging and containers and, as in the case of the Swatini’s National School Feeding Programme, the re-sale of bags and containers to raise money for the programme.40

Table 21: Recommendations and indicators for environmental sustainability of school food and nutrition programmes

<table>
<thead>
<tr>
<th>Overall recommendation</th>
<th>Specific recommendations</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put in place a policy or guideline addressing environmental</td>
<td>Develop a policy defining goals related to environmental sustainability.</td>
<td>There is a school policy addressing environmental sustainability.</td>
</tr>
<tr>
<td>sustainability.</td>
<td>Promote sustainable diets by setting limits on the number of servings (e.g. of eggs, dairy, poultry, fish, and red meat); and by requiring that a set number of plant-based meals are offered per day or per week.</td>
<td>School meal planning or purchasing decisions are in line with environmental sustainability goals.</td>
</tr>
<tr>
<td>Ensure environmental sustainability of food procurement by</td>
<td>Ensure environmental sustainability of food procurement by considering the use of traditional, neglected and underutilised foods, while enhancing biodiversity conservation and environmental sustainability, involve local farmers adopting climate-smart production practices and use of environmental modes of transport for school food suppliers.</td>
<td>- Farms providing food to schools grow diverse crops (e.g. number of species grown).</td>
</tr>
<tr>
<td>Familiarise school children with improved methods for sustainable food production awareness about avoiding food waste.</td>
<td>Familiarise school children with improved methods for sustainable food production awareness about avoiding food waste.</td>
<td>- Food purchasing policies support environmentally sustainable choices (e.g. minimally processed, locally sourced options, less packaging materials, reduced use of single serve packages, condiments in bulk, reusable dishware).</td>
</tr>
<tr>
<td>Set criteria for reducing food loss and waste/minimising the use of plastics, derivatives in food packaging and storage (fumigation/pest control in storage area/sealed food storage/use “imperfect” commodities/produce/use of nearly expired food/re-use of bags/containers/recycling/use of compostable materials).</td>
<td>Set criteria for reducing food loss and waste/minimising the use of plastics, derivatives in food packaging and storage (fumigation/pest control in storage area/sealed food storage/use “imperfect” commodities/produce/use of nearly expired food/re-use of bags/containers/recycling/use of compostable materials).</td>
<td>- Composting programme/system is in place including waste from cooking classes, from students’ meals or snacks, school garden or yard waste.</td>
</tr>
<tr>
<td>Encourage fuel conservation such as using fuel-efficient stoves and other fuels like gas to protect forests.</td>
<td>Encourage fuel conservation such as using fuel-efficient stoves and other fuels like gas to protect forests.</td>
<td>- Food waste is regularly tracked, quantified and classified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Recycled packaging is used for safe storage.</td>
</tr>
</tbody>
</table>

- Fuel used in cafeteria is in line with environmental sustainability goals.
Coherence
All activities on the school premises related to food and nutrition need to be aligned to avoid unintended consequences. For instance, nutrition education should always be aligned with activities within the school to ensure coherence and avoid confusion in students, e.g. if nutrition education promotes fruit and vegetables consumption, the school canteen should also provide these. When assessing school food and nutrition programmes, it is important to see if all activities related to the curriculum, food provision, school gardens and involvement of parents and the community are aligned.

Additional elements to consider

Breaktimes
No recommendations or guidelines were identified for the length or number of breaktimes. However, a systematic review revealed that longer lunch breaks have been associated with higher odds of eating fruit for lunch and eating fruit and vegetables on a daily basis, and lower odds of eating unhealthy foods on a daily basis.

In the absence of an existing benchmark for breaktimes, school food and nutrition programmes should be assessed for sufficient and regular time for students to consume healthy food and drink water. Another related recommendation referred to queues in cafeterias, which might not allow enough time for students to make their choices and eat their lunches.

Potential indicators could be:
- Students have a regular meal schedule.
- There are no queues at the cafeteria allowing students to have sufficient time to eat their meals.

Safety and violence prevention
Safety and security at school could relate to physical equipment and infrastructure at the school but also to the behaviour of staff and other students.

Potential indicators include:
- School has trained teachers to monitor and administer first aid and basic safety.
- School teaches first aid in the school curriculum.
- School teaches about injury prevention and safety, for example, road safety.
- School has policies that prohibit bullying, sexual harassment, and sexual violence.
- School has rules and guidelines for staff and students related to physical safety, stigma and discrimination, corporal punishment of students by teachers, fighting and other forms of violence and sexual harassment and abuse that have been communicated to relevant stakeholders.
- School has written substance abuse policy (or health policy with a strong substance abuse component) prohibiting use of psychoactive substances, alcohol and tobacco by students and by faculty and staff on all school premises and during all school-sponsored activities.
- School has procedures in place for how a pupil can safely report any type of violence.
- School has a policy describing how to respond when any type of violence.

Private sector engagement
The private sector could be a significant player in promoting healthy diets in schools. However, private sector engagement in foods and beverages is likely to have a conflict of interest in school food and nutrition that might not be in line with public health goals. Potential harmful actions that food producers and food distributors could undertake include: promotion of unhealthy foods on the school premises, free distribution of unhealthy foods or sponsoring of sports events.
It is important to consider potential conflicts of interest when involving food and beverage companies in school activities and establish measures to identify and manage them appropriately, to avoid compromising schools’ nutrition-related work and public-health goals.36 Potential indicators have been proposed by two reports:53,55

- The involvement of the private sector in the following activities is monitored to ensure it promotes nutritious school meals: food vending, food processing, transport, catering, provision of supplies (utensils).
- The private sector is not involved in the development of a school food and nutrition policy or a member of the school committee.

**Friendly, trusting climate at school**

Ensuring the active and sustainable involvement of the community in school programmes requires a positive and trusting atmosphere at school.30,56,87,88,95 Open conversations, ensuring a culture of values and respect between all community members is key.87,88,95 This might increase teachers’ motivation, as well as the wider school community to engage in school activities. Qualitative research methods could be considered to assess the following:

- Whether parents and community willingly help with and support school activities.
- If communities, parents, teachers and school staff are not overburdened by their participation in school food and nutrition programmes.
- The quality of the relationships between students and staff, as well as with families and the wider community.
- Whether the collaboration between teachers, students, community and programme or research staff is equitable.
- If communication and interactions between all school community members are open and dynamic.
- The extent of school staff motivation and commitment to school food and nutrition activities.

**Outcomes of school food and nutrition programmes**

For all the domains and specific elements of our framework, different outcomes can be expected. Depending on the main objectives of a school food and nutrition programme, outcomes might differ. The above suggested indicators assess activities at the level of the school, not at the level of the individual. In order to understand the potential impact of school-level activities on individuals, potential indicators are provided in this section.

From the included documents, we observed different outcomes of interest. Ultimate outcomes that are related to more than one element and focus on students and other individuals of the school community are listed below. They refer to nutritional knowledge, dietary behaviours or nutritional status, health and disease burden of the students. The list below is not exhaustive but provides an overview of the outcomes most commonly assessed in school food and nutrition programmes.

Other outcomes to consider depending on the focus of the programme are related to local economy, food production, food security or livelihoods of farmers providing school food, gender equality, equity and environmental sustainability.
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The following indicators have been proposed in different publications:7,8,76,87,24,28,38,41,45,48,62,66

Knowledge

- Knowledge of students/teachers/caterers/vendors about nutrition, healthy diets, hygiene and sanitation, importance of physical activity, environmental sustainability, etc.

Habits and behaviours

Physical activity

- Physical (in)activity level/sedentary activities/screen time of students or teachers
- Students’ physical activity on the way to school (walking/cycling to school or taking bus/car)

Diet

- Dietary intake: (micro)nutrient intake, caloric/energy intake, serving portions
- Food consumption: sugar, salt, fat, fruit and vegetables, sugar-sweetened beverages, local indigenous foods (e.g. percentage of students eating less than 5 servings of fruit and vegetables a day or percentage of students eating less than 400g of fruit and vegetables a day)
- Dietary diversity and quality
- Purchasing behaviours: food choice (e.g. percentage of students purchasing sugar-sweetened beverages or fresh fruit)
- Acceptance and preference of healthy food
- Eating habits related to breakfast skipping or late dinner

Health outcomes

Body composition

- Underweight, stunting, wasting, overweight/obesity (e.g. prevalence of thinness/wasting; percentage of overweight/obesity)
- Fat mass percent, waist circumference, waist–hip ratio

Biological outcomes

- Micronutrient deficiencies
- Haemoglobin concentration, anaemia
- Cholesterol (HDL/LDL) and triglycerides
- Hypertension
- Diabetes
- Metabolic syndrome
- 24h sodium excretion

Other health outcomes

- Diarrhoea
- Respiratory illnesses
- Health related quality of life
- Dental caries
Conclusions and recommendations

The aim of this scoping review was to identify and describe tools and methodologies to assess comprehensive school food and nutrition programmes. We developed a framework with all relevant elements of a comprehensive school nutrition programme, divided into five main domains: school premises; school community; external school food environment; policy environment; and cross-cutting issues. A comprehensive search of global policy documents as well as scientific publications resulted in a total of 63 documents. Most of the included documents stemmed from UN organisations and food provision within the school food environment was the most addressed. Recommendations related to nutrition education in school as well as community involvement were also proposed in most documents. Domains of the external food environment were rarely addressed. The documents provided recommendations or guidelines, evidence supporting specific recommendations or indicators to assess the implementation or effectiveness of different recommendations. However, few reports addressed food and nutrition programmes comprehensively, but only individual elements.

There is an urgent need for policies and programmes addressing school food and nutrition programmes more comprehensively, ensuring context-specific, rights-based approaches and coherence between individual actions and avoiding unintentional consequences. This review provides a comprehensive overview of possible recommendations and indicators to consider in any school food and nutrition programme. They could form the basis for the design of programmes but could also be used to assess the comprehensiveness or effectiveness of programmes. Future research should develop context specific tools and test them in different settings.
Sources

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20. FAO. Regional Overview of National School Food and Nutrition Programmes in Africa; 2018.
36. UNSCN. Schools as a System to Improve Nutrition A New Statement for School-Based Food and Nutrition Interventions.; 2017.
Identifying good practice indicators to assess comprehensive school food and nutrition programmes

A scoping review

44. FAO. School Food and Nutrition - Global Action Plan 2022–2026. Rome; 2022. doi:https://doi.org/10.4060/cc0919en
55. UNICEF and Deakin University. 2023 DRAFT School Nutrition Environment Assessment Toolkit for East Asia and Pacific.
Identifying good practice indicators to assess comprehensive school food and nutrition programmes
A scoping review


73. UNESCO. *Stepping up Effective School Health and Nutrition - A Partnership for Healthy Learners and Brighter Futures.* 2020.


77. FAO. *School Gardens Concept Note - Improving Child Nutrition and Education through the Promotion of School Garden Programmes.* Rome; 2004.

78. FAO. *A New Deal for School Gardens.* Rome; 2010.


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