SAVING LIVES
CHANGING LIVES

A REVIEW OF SCHOOL-BASED INTERVENTIONS ADDRESSING THE HEALTH AND NUTRITION OF SCHOOL-AGED CHILDREN IN THE EAST AND CENTRAL AFRICA REGION

June 2021

Commissioned by

WFP Regional Bureau Nairobi

Prepared by

clear
Centers for Learning on Evaluation and Results
ANGLOPHONE AFRICA

WFP
World Food Programme

Acknowledgements

This report on the Review of school-based interventions addressing the health and nutrition of school-aged children in East and Central Africa is one of three regional studies conducted by the Centre for Learning on Evaluation and Results – Anglophone Africa (CLEAR-AA) for the World Food Programme (WFP) Regional Bureaux (Dakar, Johannsburg and Nairobi). Dr Kalkidan Hassen Abate is the author and lead researcher for the East and Central Africa study. The design of the study was a collective effort of the CLEAR team that included Dr Robert Akparibo and Aislinn Delany, the lead researchers for the West Africa study and the Southern Africa study, respectively and Dr Steven Masvaure. Shakilah Syed provided research assistance for the three studies and Angela Bester coordinated the research and the drafting of the regional reports.

CLEAR-AA extends its gratitude to Faith Awino and the staff of the World Food Programme (WFP) Regional Bureau, Nairobi for their guidance and constructive comments on the research and the drafts of the report. We also thank Trixie-Belle Nicolle of the WFP Regional Bureau, Johannesburg for her capable coordination of the three regional studies, and for facilitating the team's engagements with the respective WFP Regional Bureaux.

Contents

Tables

Figures

Executive Summary

Introduction

As part of its effort to support governments of East and Central African states to design and deliver evidence-based interventions to address the state of health of school age children in the region, the World Food Programme (WFP) Regional Bureau (Nairobi), commissioned this review in 2020 to generate the best available evidence on: i) the state of health and nutrition of school-aged children in the region; ii) systematic evidence synthesis of published academic and grey literature to evaluate the potential impact of existing school feeding, school-based nutrition and health interventions on the health and nutritional of the target children, implementation challenges and gaps, and lessons learnt; iii) review of existing policies that guide and support the design and delivery of school-based nutrition interventions; and iv) stakeholder mapping of existing partners that are supporting the development and delivery of school-based health and nutrition interventions in the East and Central Africa region .

A mixed methods approach involving a combination of methods, including desktop and systematic reviews, secondary data analysis, and policy and stakeholder mapping exercises, was employed. The situation of school health and nutrition of school aged children and adolescents (5-19 years) in the East and Central Africa region was assessed using existing published literature/reports, complemented with data accessed from the Global burden of disease(GBD) database and UNICEF databases. The impact of existing interventions on health, nutrition and education of school-aged children and adolescents was investigated through a systematic review of evidence. Relevant literature for the systematic review were accessed from academic databases (MEDLINE, EMBASE, CIHNAL, Web of Science, PsychoInfo, the Cochrane databases of systematic reviews, and Google Scholar). Grey literature was sourced from United Nations agencies, government ministries, and regional and continental organizations. Quantitative papers were pooled in statistical meta-analysis using the Review Manager Software (Rev Man 5) whenever applicable. Odds ratios and their 95% confidence intervals were calculated for analysis. Papers that met the inclusion criteria but with no optimal data set for meta-analysis were subjected to narrative/ descriptive synthesis. The review undertook sensitivity analysis done when studies lack homogeneity.

Key findings

State of health and nutrition of school-aged children

School-aged children in the region experience a range of health and nutrition problems, that if not addressed, will have a lasting impact through adulthood. Malnutrition is prevalent among children and adolescents 5-19 years. In all countries of the region, nearly one third of all boys were underweight while the corresponding figure for girls was ranged from 15.52 percent in Rwanda to 22 percent in Ethiopia. The prevalence of obesity of girls and boys is below 5 percent in all countries in the region. However, the prevalence of overweight girls in all countries in the region was greater than 10 percent, with Djibouti having the highest prevalence at 21.29 percent. Furthermore, girls in the region had higher prevalence rates for overweight than boys (UNICEF, 2020). Malnutrition begins well before children enter school as evidenced by the prevalence of stunting of children under-five years in the region. The prevalence of stunting in countries in the region is high, ranging from 19.4 percent in Kenya to 57.6 percent in Burundi (UNICEF/WHO/World Bank, 2021). Micronutrient deficiency was most prevalent in Somalia where the prevalence rates for iron deficiency, iodine deficiency and Vitamin A deficiency were 25.13 percent, 7.19 percent, and 3.5 percent, respectively (Global Burden of Disease, 2019).

The prevalence of malaria among school-aged children was high in Burundi (41.35 percent), Uganda (40.66 percent), South Sudan (19.5 percent) and Rwanda (15.4 percent) and lowest in Eritrea (1.56 percent) Sudan had the highest prevalence of diahorreal illness among school-aged children (2.4 percent), while the prevalence was lowest in Uganda (1.00 percent) (Global Burden of Disease, 2019).

The prevalence of HIV in the general population has been decreasing in the region over the past 10 years, but there remains a sizeable burden of HIV in some countries, namely, Kenya and Uganda. HIV prevalence among children and adolescents in these two countries are 0.89 and 0.83, respectively, and are the highest for countries in the region (Global Burden of Disease, 2019).

Mortality trends over the past 10 years show a decline among school-aged children in the region, but mortality is still high in the region, notably in Somalia. The main risk factor attributable to mortality of children 5-14 years was unsafe water, sanitation and hygiene, while for adolescents aged 15-19 years unsafe sex was the major risk factor.

Most schools in the region, particularly in Ethiopia, Somalia, and South Sudan, lack adequate water, sanitation and hygiene services. The lack of these services is consistent with the lack of clean water supply and adequate sanitation services in the communities where these schools are located.

School-based health and nutrition interventions

Most countries in the region have school feeding programmes that cater exclusively for primary school grades, with the exception of Rwanda and Uganda that cater for students in secondary schools. Countries in the region tend to have more than one model of school feeding, for example, the WFP model complemented by the home-grown school feeding model. Nutrition supplementation and nutrition education form part of the package of interventions.

School-based deworming in the region is receiving attention as essential to curbing the negative effect of intestinal worms on school attendance. Countries in the region, for example, Kenya and Ethiopia have school-based periodic deworming treatment programmes for children living in endemic regions. While the remaining countries have some elements of deworming activities.

A number of school-based HIV prevention interventions are reported in the region. The most common one was provision of education on HIV and sexual reproductive health behaviours using the teaching learning platform and peers. School-based water, sanitation and hygiene (WASH) interventions most commonly implemented in the region include provision of WASH infrastructure, hygiene education, and menstrual health management.

The review mapped the policy environment for school health and nutrition, and found that most of the countries have multiple policies and strategies to guide school-based health and nutrition interventions. There were school health policies that covered a range of health issues affecting children, and in some instances included school feeding. School health and nutrition issues were also covered in countries' education sector strategies.

The stakeholder mapping revealed a diverse range of organizations involved in school health and nutrition in the region. These included other United Nations agencies, some with whom WFP collaborates at country level. The Continental and regional intergovernmental bodies are key stakeholders that set policy directions and priorities in school health and nutrition for their member countries. There are several international non-governmental organizations with

footprints in countries in the region, as well as regional research institutions. This diversity of stakeholders offers opportunities for partnership, and in the case of United Nations agencies, opportunities for joint programming at country level.

Effectiveness of school-based interventions

The review found that school feeding had a relatively consistent positive effect on the nutritional status of school-aged children, and a decline in morbidities particularly in school feeding programmes that included micronutrient fortification and animal source foods. The evidence of the effects of school feeding on educational outcomes such as dropout rates, attendance, academic achievement and enrolment of girls was mixed.

School-based deworming programmes in the region resulted in a non-signifcant reduction in the prevalence of soil transmitted helminths. However, the evidence regarding the impact of school-based deworming on educational outcomes and nutritional status of school-aged children was inconclusive. The review found evidence of improved health outcomes for school-based deworming programmes when complemented with community-based deworming programmes.

School based nutrition education interventions consistently demonstrated optimal health and nutrition outcomes, particularly in promoting healthy behaviour. The evidence indicated improved dietary intake, improvement in haemoglobin levels and body mass index of school aged children following school based nutrition education interventions employing different strategies.

The reviewed school-based education interventions were effective in improving the knowledge of students about HIV and sexual reproductive health (SRH). The common characteristics of these interventions were the involvement of teachers and integrating HIV/SRH education in school curriculum. School-based educational sessions have the potential to be inclusive of all SRH topics and provide training opportunities for both teachers and students. However, the evidence on the benefit peer-led HIV education intervention in improving knowledge towards HIV/sexual risk behaviour was limited. Such disparity suggests the need to understand the context in which any intervention is selected and the peer dynamics in the schools before designing the interventions. Nonetheless, greater condom use gains were reported in four studies and HIV counselling and testing service utilization in two studies with peer lead interventions.

Interestingly, there were two studies (Cho et al., 2011 and 2018) that reported the positive utility of keeping orphan youths through fee and uniform support in school as an HIV prevention strategy. In these studies, comprehensive school support effectively prevented school dropout, delayed sexual debut, and reduced HIV risk factors.

Results pertaining sexual debut and risky sexual behaviour were heterogeneous. Those intervention that are part of the school curriculum reported positive gains in reducing risky sexual behaviour. However, results involve peer education interventions, reported no change in desired sexual outcomes such as limiting the number of sexual partners. These contrasting findings may inform the need for more complex interventions involving adult figures such as teachers to bring change in sexual behaviour to safeguard adolescents from sexually transmitted infections, including HIV.

There is strong evidence which supports the potential benefit of school-based WASH interventions in reducing illness (Garn et al., 2016, Zhang et al et al., (2013), Dreibelbis et al., (2017), Patel et al., (2012) and Gelaye et al., (2014). Studies that focused on educational outcomes reported better

enrolment and reduced absenteeism. Evidence on spillover beneficial effects of school-based WASH interventions to the family and larger community is limited. However, a cluster randomized trial in Kenya reported measureable reduction in diarrheal diseases (45 percent - 65 percent) among children younger than five years whose siblings attend intervention schools (Dreibelbis et al., 2017).

An interesting finding in the present review is the potential of WASH interventions in improving educational outcomes such as absenteeism and enrolment, for girls. Studies have reported school-based hygiene promotion, water treatment and sanitation improvement programme resulted in an increase in the proportion of girls enrolled in school and reduction in the odds of absence for girls from school (Garn et al., 2014, Kansiime C, Hytti L, Nalugya R, et al., 2020). Furthermore, girls indicated that their comfort in managing menstruation which has a potential impact on menstrual-related school absenteeism.

Challenges and gaps

The review identified a number implementation challenges faced by countries in the region, and the extent to which these challenges were manifested depended on the country context. Implementation challenges include government technical, human resources and financial capacity constraints; climatic conditions and local conflicts that disrupt the implementation of programmes; and provision of meals that are acceptable to local preferences. The lack of rigorous monitoring and evaluation of programmes was identified as a major gap, along with the lack of rigorous research on the role of contextual factors in the effectiveness of school feeding programmes. Most of the literature reviewed focused on school feeding programmes. The search on school-based HIV and WASH interventions did not yield studies that explored implementation challenges in a substantive way.

Design and implementation

Countries in the region experience challenges in the procurement of food, even where good procurement systems are in place in countries such as Ethiopia and Kenya. Breakdowns in the supply pipeline do occur, and centralized distribution procedures contribute to delays in delivery. The lack of clarity around strategies for local procurement was a source of confusion, for example, the requirement of parent contributions and linkages to local suppliers of food for school feeding programmes. The quality of food was also identified as a challenge, where, for example, food supplied was too close to the ‘best before date’ or came in damaged containers, or donated food did not always meet local preferences.

In countries such as Somalia and South Sudan where there is a high level of physical insecurity and food insecurity, school feeding programmes are pragmatic focus on food security rather on educational goals. School feeding in areas affected by conflict is often disrupted as people, including schoolchildren are displaced. Designs of school feeding programmes did not always take climate conditions and movement of people into account.

School feeding programmes can have unintended consequences that undermine their impact. For example, school feeding programmes may result in increased school enrolments and add strain to existing school infrastructure and teaching capacity. This is likely to affect the quality of teaching. Similarly, there is a possibility of passing of information about HIV that do more harm than good by peer educator/teachers if less intensive training was provided.

Financing, capacity and governance

Sustainable financing is perhaps the most common challenge in implementing school feeding programmes effectively, and with sufficient coverage to have an overall and sustainable impact on the health and nutrition of school-aged children.

Capacity challenges of governments at national, regional, local and school administration levels were identified as a significant challenge to the effective and efficient implementation of the school feeding programmes. These challenges include the high turnover of senior management, making it challenging to strengthen the policy environment. These problems can also impact other school-based interventions. Teachers require training to effectively implement HIV-related interventions, and unless this is integrated into the school curriculum and resourced, it becomes an add-on to work of teachers. In the case of poorly resourced schools, this can add further strain on teachers. The attitudes of teachers to sexuality pose a challenge when these attitudes contradict the sexuality education programme.

The mapping of policies related to school health and nutrition found that, in most countries in the region, policy directives on school health and nutrition are fragmented across multiple policies of different ministries. This presents a major challenge for policy coherence and for the coordination of school-based interventions. There is the risk that uncoordinated or poorly coordinated school-based health and nutrition interventions undermine one another instead of accelerating improvements in the health and nutrition status of school-aged children.

Data and information gaps

Monitoring and reporting on school feeding programmes is not always rigorous or done consistently. This may be as a result of insufficient budget allocation for monitoring and reporting, or a lack of technical capacity at school administration level and in the relevant coordinating ministries. It is also challenging to monitor in contexts where there is conflict and disruption of school feeding programmes. With weak monitoring systems it becomes challenging to build a robust evidence base to inform policies and programmes, not only for school feeding, but also for other school-based health and nutrition interventions.

There is large gap on evidence of the benefits of large-scale implementation of school-based HIV and WASH interventions. There is need for more research on large-scale interventions and the relative contributions of different components to the effectiveness of the interventions. Data disaggregated by sex are essential for the design of effective interventions, as the health and nutrition needs of girls and boys are not the same. The review noted that there were insufficient studies that disaggregated data by sex.

Conclusions

There is increasing recognition that the subsequent 7,000 days of children are as important as the first 1,000 days for them to develop into healthy adults and achieve their full potential, yet data on the health and nutrition of school-aged children is limited. With the limited data available, the review established that school-aged children in the WFP East and Central Africa region have a high burden of preventable morbidity and mortality. The prevalence of underweight school-aged children is high, along with high prevalence of dietary iron deficiencies and intestinal worms (GBD, 2019). The prevalence of malaria among school-aged children in the region is very high in Burundi and Uganda where malaria is endemic. The data also highlighted to some extent, the differences between girls and boys, with girls being more likely to be overweight than boys, and HIV prevalence rates higher for female adolescents than for male adolescents (GBD, 2019, UNAIDS, 2021).

School feeding programmes are in place in all countries in the region, and are at the centre of school-based health and nutrition. Most of the school feeding programmes have complementary interventions, mainly deworming, nutrition education, training and capacity building of teachers and cooks. Bearing in the mind the methodological limitations of this systematic review, the findings indicate a positive effect of school feeding on the nutritional status of school-aged children, and a decline in morbidities, particularly in programmes in which micronutrient fortification and animal source food were provided. School-based deworming was shown to have benefits in the reduction of soil-transmitted helminths. However, the data also indicate that the effectiveness of deworming could be improved if extended to community-based intervention in places where water, sanitation and hygiene are poor. School-based nutrition education was found to have positive outcomes for health and nutrition.

School-based HIV prevention interventions have the potential to provide comprehensive preventive education and training to yield improved knowledge and attitude towards HIV and condom use. The benefits of school-based WASH interventions can be clearly established with potential spill over effect of these benefits to families and the larger community. With school-based WASH interventions, particularly those involving menstrual management schemes, health and educational benefits for girls can be achieved.

The implementation of school-based health and nutrition interventions in the region is challenged by capacity constraints within government ministries, insecurity and climate-related factors, the lack of sustainable financing by governments, and challenges in procurement and quality of food. Community-based initiatives become a burden to communities in times when they are unable to contribute to, for example, to the school feeding programme.

Lessons learned

The design of school-based health and nutrition interventions should be sensitive to local contexts, not only to national contexts. Local climatic conditions and terrains, capacities of communities and parents to participate and contribute to the implementation of programmes should be taken into account in the design of interventions. Schools do not exist in isolation of the communities in which they are located, and it is therefore essential that parents and the wider community are consulted in the design of interventions to ensure that they are relevant to the needs of their children.

Countries tend to have multiple policies that cover school health and nutrition, and not all countries have stand-alone school feeding, HIV or WASH policies. There is a risk that these policies inadvertently contradict one another, so effective coordination of the different ministries and sectors is essential. Different ministries may be responsible for implementation of policies, for example, ministries health, education, water and sanitation, social welfare. It is essential that implementation is coordinated effectively, so that schools do not receive contradictory direction.

School-based health and nutrition interventions should ideally be tailored to their age-related needs, as the needs of 6-year olds are vastly different to the needs of 10-year olds, and 18-year olds. It is equally important to tailor interventions to the different needs of girls and boys, female and male adolescents.

School-based health and nutrition interventions can be mutually reinforcing, for example, combining school feeding with nutrition education and deworming. Similarly linking WASH interventions with school feeding can be more impactful than stand-alone interventions. An

integrated approach to school-based health and nutrition interventions does however require good coordination capacity at school-level.

It is essential that meals provided to children are nutritious and culturally acceptable to children and their parents if the nutritional status of school-aged children is to be improved. Meals need to meet the preferences of parents and children in terms of quality and quantity to ensure that they attend school regularly and consume the food

School-based HIV interventions have the potential to provide comprehensive preventive education and training to yield improved knowledge of HIV and condom use. These interventions are more likely to have impact if they are long term educational classes integrated within school curriculum activities that are supported with reference materials.

School-based WASH programmes can be more impactful if applied in appropriate settings where there is a demand for these interventions. Girls would benefit more if school WASH programmes involve menstrual management intervention components.

Greater investment is needed in strengthening monitoring and evaluation of school feeding and other school-based health and nutrition interventions, and investment in research to generate robust evidence to inform policies and improve the design and implementation of programmes. It is essential that data collected through monitoring and research are disaggregated by sex so that school-based health and nutrition interventions take into account the different needs of girls and boys.

1 Introduction

1.1 Background

World Food Programme School Feeding Strategy 2020-2030

1. Poor health, prevalent among learners/students from disadvantaged communities, has a significant effect on education and is the cause of absenteeism that contributes to grade repetition, early school leaving, and poor education outcomes. Many of the poor health conditions of these learners/students are preventable and treatable through an essential integrated package of health and nutrition services. The school system is potentially a cost-effective platform for delivering an integrated package of health and nutrition services to schoolchildren in rural and poor areas as these areas more likely to have schools than health centres.

2. WFP has been supporting school feeding for the past six decades. According to WFP's analysis of available evidence, school feeding is the costliest element of an integrated package of health and nutrition services but is cost-effective because of the multiple benefits generated. WFP's cost-benefit analysis of national school feeding programmes and WFP programmes found that every USD 1 invested in school meals programmes yields an economic return of USD 3-10 from improved health, education, and productivity.[1]

3. As human capital development of children is vital for a country in many ways, investing in it has proven to help children achieve their best as well as create productivity, stability and improve resilience in communities. WFP launched the WFP School Feeding Strategy in 2020, which entails the new approach taken by WFP to ensure that all school-going children receive a good quality meal and an integrated package of nutrition and health. This strategy also reaches out to government and partners to help in addressing gaps in guaranteeing a proper school health and nutrition response for children in schools. The new strategy recognizes the necessity for WFP to work collaboratively with other agencies, governments, and stakeholders in delivering an integrated response to contribute to the achievement of the Sustainable Development Goals (SDGs).

4. The original **Theory of Change** for the School Feeding Strategy has since been updated. The updated Theory of Change sets out the impacts, outcomes, assumptions and theory of action, and links these to the SDGs. Key elements of the Theory of Change are set out as follows:

[1] WFP. 2020. A chance for every child: Partnering to scale up school health and nutrition for human capital, January 2020, p.20

Table 1: Summary of Theory of Change

Impacts	1. Girls and boys, especially those that are vulnerable, have the opportunity to achieve their full potential. 2. Improved livelihoods of smallholder farmers & actors, especially women, in local value chain
Results (relating to children)	1. Improved learning outcomes of girls and boys** 2. Improved health (physical & psycho-social) of girls & boys** 3. Increased access to education for girls & boys**. 4. Enhanced diet diversity of girls & boys** 5. Reduced short-term hunger for girls & boys** 6. Improved nutritional status of girls & boys** **denotes that children, especially those that are vulnerable, will be targeted

Source: WFP (2020). WFP School Feeding Strategy 2020 – 2030.

5. **Context-specific approach** According to the strategy, WFP will work closely with governments and partners by using a context-specific approach to ensure that primary school children have access to good quality meals in school as well as receiving an integrated package of nutrition and health.

1.2 Purpose, scope and objectives

6. The WFP Regional Bureaux of East & Central Africa, Southern Africa and West Africa appointed the Centre for Learning on Evaluation Results Anglo-phone Africa (CLEAR-AA) to conduct a review of the literature on school-based interventions addressing the health and nutrition status of school-aged children in Sub-Saharan Africa. The Regional Bureaux require the information to develop plans for implementing the WFP School Feeding Strategy 2020 - 2030. This report presents the results of the review for the WFP East and Central Africa region.

7. The specific objectives of the regional review were to:

   i. Develop an analysis of the regional situation of health and nutrition of school-aged children, and undertake a review of evidence to understand the effectiveness of school based health and nutrition interventions on the health, nutrition and education of the target children.

   ii. Using evidence from the situation analyses and evidence review, highlight lessons learned and best practices, and challenges and gaps in the implementation of school health and nutrition interventions in the Sub-Saharan Africa region.

   iii. Examine the existing policy and legal framework for school health and nutrition in Sub-Saharan Africa.

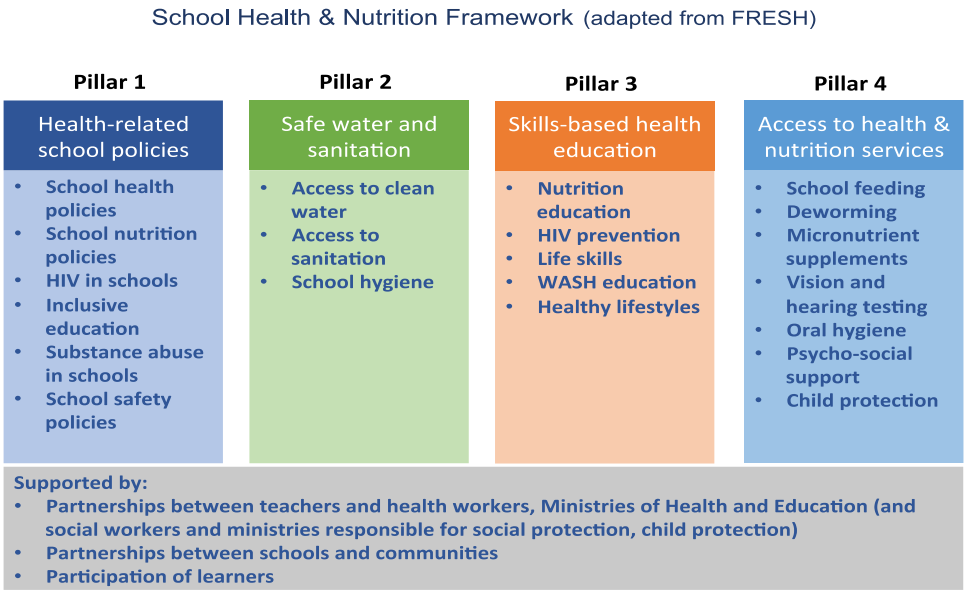
   iv. Conduct a regional stakeholder mapping and analysis. This should include an analysis of regional bodies and their position on the issue in the region and an

analysis of United Nations agencies and main partners and their position on the issue in the region.

8. The report focuses on the 11 countries that fall within the East and Central Africa region as defined by WFP. The countries covered were Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan, South Sudan, and Uganda. Comoros was included as it is falls within the East Africa region as defined by other United Nations agencies.

9. School health and nutrition covers a wide range of school-based interventions for example, school feeding, health checks (visual and hearing tests), vaccinations, Water, Sanitation and Hygiene (WASH), health education, and HIV prevention education (Figure 1). During the inception process, it was agreed with WFP that the first phase of the assignment would focus on school-based nutrition, covering micronutrient supplementation, and nutrition education interventions, and deworming interventions. The second phase of the study covered school-based HIV and WASH interventions.

Figure 1 School Health and Nutrition Framework



Source: UNESCO, UNICEF, WHO, World Bank and Education International Inter-agency Flagship Programme (2002) on Focusing Resources on Effective School Health (FRESH)

1.3 Methodological approach and limitations

10. The team adopted mixed methodology approaches to collect and analyse data from both secondary data sources and existing published literature. The detailed methodology is contained in Annex A and is summarised in Table 1.

Table 2 Methodological approaches used in assignment

Component of assignment	Approach	Main data sources
Analysis of regional situation of health and nutrition of school-aged children	Descriptive statistical analysis of trends and prevalence of health and nutrition problems, and mortality	Global Burden of Diseases database (IHME, 2019) UNICEF data on mortality UNICEF data on stunting UNICEF-World Bank Global Nutrition UNICEF-World Bank Joint Database on WASH
Effectiveness of school-based health and nutrition interventions	Systematic review of academic literature and grey literature, and meta-analysis where appropriate	African Index Medicus, Campbell Collaboration, DOPHER, EMBASE, PubMed, Cochrane Library, Trial registers, Web of Science. Grey literature sourced through Google Scholar, government and institution websites.
Policy and legal frameworks for school health and nutrition	Mapping of policies of countries in the region, as well as policies of regional institutions	Websites of country governments and websites of United Nations entities
Stakeholders and their positions	Mapping of stakeholders: United Nations entities in the region, regional economic communities, and civil society organizations.	Websites of United Nations entities, regional economic communities, and civil society organizations

11. The study has the following limitations; first, there is paucity of published trials or evaluation studies. At this stage, data specific to nutrition of school age children are rarely available. More specifically, the available data from other United Nations agencies were not in line with the WFP classification, hence we tried to make inference from countries to generate evidence for the region. Although our aim was to conduct a focused review with good quality studies that would be valid and generalizable to the region, we acknowledge that this review is limited by the available data and skewed to a few countries.

1.4 Structure of the report

12. The report is organized into the following chapters:

- Section 1 has presented the background, purpose, scope as well as the methodological approach that the review embarked on.
- Section 2 presents the regional context that includes the socio-economic context and the state of food security and nutrition in the region.
- Section 3 presents information on the current status of the health and nutrition of school-aged children in the region. It presents the latest available data on the prevalence of infectious diseases and the burden of mortality of school-aged children. It also covers the range of parasitic infections to which school-aged children are exposed. In outlining the

nutritional status of school-aged children, this section presents information on obesity, overweight and underweight, and nutritional deficiencies such as Vitamin A.

- Section 4 discusses interventions to improve the health and nutrition status of school-aged children. It focuses specifically on school-based interventions. It includes mapping of school-feeding programmes in the region, school health and nutrition policies, and mapping regional stakeholders and their position on school health and nutrition.
- Section 5 presents the results and discussion of a systematic review of the effectiveness of school-based health and nutrition interventions. The section is organised according to the main interventions identified for this regional study, namely, school-feeding programmes, school-based deworming, school-based nutrition education, school-based HIV interventions, and school-based WASH interventions.
- Section 6 discusses the challenges and gaps in implementing school-based health and nutrition interventions in the region.
- Section 7 sets out the main conclusions of the study and lessons learnt.

2 Regional Context

13. This section of the report discusses the context of the East and Central Africa region, outlining the economic conditions of countries in the region and human development. It also provides an overview of the food and nutrition situation in the region, the prevalence of HIV and AIDS, and the state of water, sanitation and hygiene.

2.1 Socio-economic context

14. Eastern Africa is the fastest growing region on the African continent, with an average annual GDP growth rate of 6.6 percent between 2014 and 2018. The growth rate in 2019 was 6.1 percent, with Ethiopia, Rwanda and Tanzania registering the highest growth rates in the region (UNECA, 2020 a). Increased agricultural production and infrastructure investments have contributed to the upward growth trajectory between 2014 and 2018. The impact of the COVID-19 pandemic has however changed the growth trajectory of the region, and the projected growth rate of 6.6 percent for 2020 has been revised to 1.5 percent (UNECA, 2020 b). The region is vulnerable to weather-related shocks, and several countries in the region experience cycles of severe drought. In 2020, the region experienced the most severe plague of desert locusts in decades, devastating thousands of hectares of crops. The agriculture sector remains the most dominant in Eastern Africa countries, and although mining and manufacturing sectors play an important role, most Eastern Africa countries have transformed or significantly diversified their economies. They have not created sufficient jobs to absorb new entrants, namely, young people. Rising debt levels and high trade imbalances expose Eastern Africa countries to vulnerabilities, notwithstanding the rapid economic growth (UNECA, 2020 a).

15. Population in the Eastern African region is growing rapidly and projected to reach 870 million by 2050 (UNFPA, 2020). All countries in the East and Central African region (as defined by WFP), with the exception of Kenya, fall into the low human development index group. The HDI for Burundi (0.433), South Sudan (0.433) and Ethiopia (0.485) are the lowest in the region, while Kenya has the highest HDI (0.601), followed by Uganda, Rwanda and the Sudan (UNDP, 2020) (Table 2).

Table 3 Human Development Index 2019: East African countries

Country	Burundi	Djibouti	Eritrea	Ethiopia	Kenya	Rwanda	Somalia	South Sudan	Sudan	Uganda
2019 HDI value	0.433	0.524	0.459	0.485	0.601	0.543	No data	0.433	0.510	0.544

Source: UNDP Human Development Report 2020

16. Poverty rates have reduced in a number of countries in the region, for example, Kenya and Rwanda, but most countries in the region are not on track to eradicating extreme poverty by 2030. The trend indicates that in most countries in the region, more than half the population is still multi-dimensionally poor (UNECA, 2020 a).

2.2 Food security and nutrition in the region

17. According to the FAO estimates, in 2019, the prevalence of undernourishment (PoU) in East and Middle Africa was 27.2 and 29.8 percent, respectively. This prevalence is three times the world average (8.9 percent) and is the highest among all regions of the globe. FAO indicate that the rise

in undernourishment in East and Middle Africa resulted from a combination of due to conflict, climate shocks and economic instability. Each of these issues has continued to exacerbate food insecurity in 2020. Widespread droughts, generated by El Niño–Southern Oscillation (ENSO), have contributed to the increase in food insecurity seen in recent years in several countries. At the same time, changing environmental conditions and competition for key resources such as land and water, have played a significant role in provoking violence and armed conflicts, exacerbating the vicious circle of hunger and poverty.

Table 4: Prevalence of undernourishment (PoU) in Sub-Saharan Africa

Region	2005	2010	2015	2016	2017	2018	2019*	2030**
Sub-Saharan Africa	23.9	21.3	21.2	21.4	21.4	21.4	22.0	29.4
Eastern Africa	32.2	28.9	26.9	27.1	26.8	26.7	27.2	33.6
Middle Africa	35.5	30.4	28.2	28.8	28.7	29.0	29.8	38.0
Southern Africa	4.9	5.4	7.0	8.0	7.0	7.9	8.4	14.6
West Africa	13.8	12.1	14.3	14.2	14.6	14.3	15.2	23.0

Source FAO et al. State of Food Security and Nutrition in the World 2020 Report
NOTES: * Projected values. ** The projections up to 2030 do not reflect the potential impact of the COVID-19 pandemic

18. The region also hosts a higher prevalence of stunted children above the global average (22 percent) (UNICEF/WHO/world bank, 2020). According to UNICEF, more than one-third of stunted children (38 percent) children lived in Sub-Saharan Africa, of these Eastern Africa (35.2 percent) and Central Africa (32.1 percent) has a higher prevalence of stunting compared to Western Africa (29.2 percent), and Southern Africa (29.3%). Though there appears to be a decline in stunting, there still exists a substantial burden of stunting in some countries in the East Africa region, particularly in Burundi (Table 4). See Annex F for 10-year trend data.

Table 5 Prevalence of stunting of children under-five years: East African countries: 2015-2020

Country	2015	2016	2017	2018	2019	2020
Burundi	56.3	56.3	56.5	56.8	57.2	57.6
Comoros	28.7	27.4	26.2	24.9	23.7	22.6
Djibouti	33.1	33.5	33.7	33.9	34.0	34.0
Eritrea	50.4	50.3	50.2	49.9	49.5	49.1
Ethiopia	40.1	39.2	38.2	37.3	36.3	35.3
Rwanda	36.7	35.9	35.1	34.3	33.4	32.6
Somalia	29.7	29.3	28.8	28.3	27.9	27.4
South Sudan	31.4	31.3	31.2	31.0	30.8	30.6
Sudan	35.3	35.0	34.7	34.4	34.1	33.7
Uganda	30.7	29.9	29.3	28.8	28.4	27.9

Source: UNICEF/WHO/World Bank Joint Malnutrition Estimates Database, April 2021

19. The COVID-19 pandemic is having a negative impact on food security, with those who are already vulnerable likely to be the hardest hit, as incomes decline and poverty increases. Countries in Eastern Africa already affected by the desert locust plague and weather-related disasters, now have to shoulder the burden of COVID-19. Food price inflation was larger in 2020 in Burundi, Rwanda and Uganda than in 2019, and nutritious diets have become increasingly non-affordable. The impacts will be felt, not only in the rural areas, but also in urban areas with large populations living in informal settlements. The number of people experiencing severe food insecurity in the nine countries covered by the WFP Regional Bureau Nairobi is estimated to rise from 24 million to 41.5 million, of which 14 million live in urban areas (WFP, 2020).

20. The 2020 Global Report on Food Crises (GRFC)[2] identified Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda as countries facing food crises, using the IPC classification. Food insecurity in these countries has been driven by extreme weather conditions, economic shocks, and conflicts resulting in a high number of refugees and internally displaced persons. The high levels of food insecurity, along with the lack of adequate water and sanitation and access to health services are reported to contribute to the high levels of child malnutrition in these countries (GRFC, 2020). In 2019 in South Sudan, almost 7 million people (61 percent of the population) faced a food insecurity crisis (Phase 3 or worse (up to Phase 5 – catastrophe) (GRFC, 2020).

2.3 HIV in the East and Central African Region

21. According to UNAIDS data, the prevalence of HIV has been decreasing in the region in the past 10 years, but there remains a substantial burden of HIV in certain countries. In 2019, Uganda has the highest prevalence (5.8 percent) followed by Kenya (4.5 percent), Rwanda (2.6 percent) South Sudan (2.5 percent) and Burundi (1 percent). Ethiopia and the remaining countries have prevalence rates below 1 per cent (Table 5).

Table 6 HIV prevalence persons 15-49 years in selected East African countries (2010-2019)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Burundi	1.6	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1
Djibouti	1.7	1.6	1.4	1.3	1.2	1.1	1	1	0.9	0.8
Eritrea	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.6	0.6
Ethiopia	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1	1	0.9
Kenya	5.7	5.6	5.5	5.4	5.2	5.1	5	4.8	4.7	4.5
Rwanda	3.2	3.2	3.1	3.1	3	2.9	2.9	2.8	2.7	2.6
Somalia	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
South Sudan	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5

[2] The GRFC is prepared annually by the Global Network Against Food Crises co-founded by the European Union, FAO and WFP. The network of 16 organizations includes FAO, OCHA, UNHCR, UNICEF, WFP, regional economic institutions, and food research institutions. The GRFC selects countries on the basis of criteria that include requests for external assistance and/or faced shocks, and countries hosting huge refugee populations assisted by UNHCR and WFP.

Sudan	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Uganda	6.8	6.8	6.7	6.6	6.5	6.4	6.2	6.1	5.9	5.8

Source: UNAIDS database accessed June 2021

22. It is worth noting that HIV prevalence rates are higher for young women than for young men in the region, particularly in Kenya and Uganda (Table 6). This illustrates the vulnerability of young women, including female adolescents, to HIV infection, and has implications for the design of HIV prevention strategies and programmes.

Table 7 HIV prevalence among young people 15-24 years in selected East African countries

	Females	Males
Burundi	0.6 [0.4 - 0.7]	0.4 [0.3 - 0.5]
Comoros	<0.1 [<0.1 - <0.1]	<0.1 [<0.1 - <0.1]
Djibouti	0.4 [0.3 - 0.7]	0.4 [0.3 - 0.6]
Eritrea	0.3 [0.1 - 0.4]	0.2 [0.1 - 0.2]
Ethiopia	0.4 [0.2 - 0.7]	0.3 [0.2 - 0.4
Kenya	2.4 [1.4 - 3.3]	1.3 [0.9 - 1.8]
Rwanda	1.1 [0.7 - 1.5	0.7 [0.5 - 0.9]
Somalia	<0.1 [<0.1 - <0.1]	<0.1 [<0.1 - <0.1]
South Sudan	1.3 [0.5 - 1.9]	0.7 [0.2 - 1.2]
Sudan	<0.1 [<0.1 - <0.1]	<0.1 [<0.1 - <0.1]
Uganda	2.8 [1.5 - 4.0]	1.2 [0.7 - 1.7]

Source: UNAIDS database accessed June 2021

2.4 Water supply, sanitation and hygiene

23. According to the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) estimates, the household water supply in countries in the region is not optimal. Household drinking water coverage was below 50 percent in South Sudan, Ethiopia and Uganda while the remaining countries have also a big gap in coverage up to 40 percent. Similarly, household sanitation facility coverage was as low as 7 percent in Ethiopia, 11 percent in South Sudan, 18 percent in Uganda and 29 percent in Kenya. Details of the household and sanitation coverage are depicted in Table 7.

Table 8: Household drinking water supply and sanitation facilities coverage in selected East African countries (2021)

Country	Household drinking water supply (percent)	Household saniation (Percent)
Burundi	61	46
Comoros	80	50
Djibouti	76	64
Eritrea	n.a.	n.a.
Ethiopia	41	7
Kenya	59	29
Rwanda	58	67
Somalia	52	35
South Sudan	41	11
Sudan	60	37
Uganda	49	18

Source: UNICEF/WHO/World Bank Joint Malnutrition Estimates Database, April 2021

3 State of health and nutrition of school-aged children in the region

24. The health of school-aged children including adolescents has received increasing attention from policy-makers in recent years. While recognizing the importance of infant and young child health beyond survival, there is recognition that the subsequent 7,000 days are as important as the first 1,000 days (Bundy et al., 2018). [3] Children require age-specific investment in their health and nutrition in critical subsequent phases: 5-9 years for growth and consolidation; 10-14 years when substantial physiological changes place demands on diet and health, and adolescence 15-19 years to support brain maturation and emotional control (Bundy et al, 2017). Common health conditions faced by children in low and low middle-income countries affect their access to education and their learning outcomes. These common conditions include worm infections, hunger, anaemia, diarrhoea, respiratory illnesses, and malaria (Sarr et al., 2017). In addition, adolescents, particularly in Eastern and Southern Africa are at risk of contracting HIV.

25. Data on the state of health and nutrition of school-aged children are not as readily available as data on children under the age of five years. For this part of the study, we accessed the UNICEF database and the Global Burden Diseases database (GBD).[4] The analysis covered the nine countries in the WFP East and Central Africa region as well as Comoros and Eritrea. The results are

[3] Bundy, D. A., de Silva, N., Horton, S., Patton, G. C., Schultz, L., Jamison, D. T., ... & Sawyer, S. M. (2018). Investment in child and adolescent health and development: key messages from Disease Control Priorities. *The Lancet*, *391*(10121), 687-699.

[4] http://www.healthdata.org/gbd/about.

discussed in the ensuing sections, and are grouped for children 5-14 years and older children or adolescents 15-19 years when applicable.

3.1 The burden of malnutrition among school aged children

26. Currently, there are no routine national or subnational surveys on anthropometric indicators of school-aged children in the region.[5] The review on malnutrition among school-aged children relied on the estimates of the global nutrition reported to reflect the burden of underweight and overweight/obesity of school aged children in the region.

3.1.1 Underweight, overweight and obesity

27. In all countries of the region, nearly one third of all boys were underweight while the corresponding figure for girls was ranged from 15.52 percent in Rwanda to 22 percent in Ethiopia. The prevalence of overweight and or obesity among boys was highest in Djibouti (12.9 percent for overweight and 4.47 percent for obesity) followed by Somalia (8.38 percent for overweight and 2.06 percent for obesity) and Sudan (7.98 percent for overweight and 2.03 percent for obesity). A similar trend among the countries were observed in the prevalence of being overweight and or obesity among girls. The most striking finding of the report was presence of higher proportion of overweight/obesity among girls as compared to boys in all of the countries. Details of these findings are depicted in Table 8.

Table 9 Percentage of malnourished children and adolescents aged 5-19 years (2016)

Country	Underweight		Overweight		Obesity	
	Boys	Girls	Boys	Girls	Boys	Girls
Burundi	31.63	18.93	6.17	14.19	1.14	2.38
Comoros	30.55	17.65	7.34	16.87	1.61	3.81
Djibouti	27.43	16.87	12.92	21.29	4.47	5.9
Eritrea	32.46	19.88	6.26	15.19	1.16	2.91
Ethiopia	35.64	21.94	4.65	12.46	0.77	1.41
Kenya	31.58	18.42	6.2	16.23	1.21	3.16
Rwanda	31.01	15.52	5.23	16.94	0.57	2.74
Somalia	29.81	18.03	8.38	17.17	2.06	3.81
South Sudan	n.a	n.a	n.a	n.a	n.a	n.a
Sudan	30.18	18.14	7.98	16.72	2.03	3.61
Uganda	30.7	16.61	4.54	15.99	0.51	2.79

Source: UNICEF Global Nutrition Report (2020)

[5] Multi-Indicator Cluster Surveys and Demographic and Health Surveys cover on children under five years

3.1.2 Micronutrient deficiency

28. Micronutrient deficiency or 'hidden hunger' is the second strand of malnutrition. Deficiencies of essential vitamins, for example, Vitamin A, and minerals such iron, have a deleterious impact on the health and wellbeing of children. It is referred to as 'hidden hunger' as these deficiencies go unnoticed for a long time until it is too late (UNICEF, 2020). Inadequate intakes of Vitamin A may lead to Vitamin A deficiency which can cause visual impairment and increased risk of illness and death from childhood infections, including measles and those causing diarrhoea (Sommer, 2008). Iodine deficiency has multiple adverse effects in humans, while the deficiency during childhood in particular affects somatic growth, cognitive and motor functions (Zimmermann, 2009). In children, and adolescents iron requirement is exceptionally high due to rapid growth, hence its deficiency during these periods could result in poor growth and development (Camaschella, C., 2019). (Annex F)

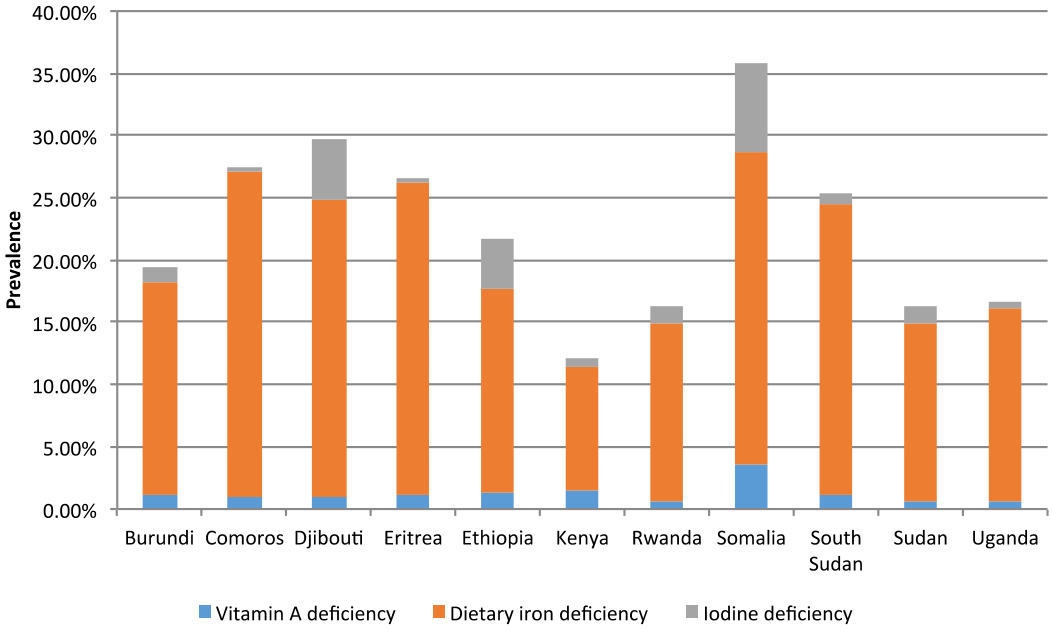
29. Figure 2 illustrates the prevalence of micronutrient deficiencies among school-aged children in the region. According to the GBD (2019), in the region, the highest prevalence of Vitamin A deficiency among school-aged children was observed in Somalia 3.5, 95% Confidence Interval (lower value 2.81, upper value 4.18) followed by Kenya 1.43, 95%Confidence Interval (1.07, 1.87) and Ethiopia 1.3 (0.90, 1.77), while the lowest prevalence was observed in Sudan 0.58, 95%CI (0.40, 0.84)[6].

30. The prevalence of dietary Iron deficiency was comparably high in Comoros 26.10 95% Confidence Interval (19.78, 32.27), Somalia 25.13, 95% Confidence Interval (19.94, 28.67), Eritrea 25.12, 95% Confidence Interval (20.29 29.99) South Sudan 23.38 95% Confidence Interval (17.45, 29.20) and Djibouti 23.94, 95% Confidence Interval (18.31, 30.17). Kenya has the lowest prevalence of dietary iron deficiency as compared to the other 10 countries in the region 9.97, 95% Confidence Interval (9.02, 10.84).

31. The highest prevalence of dietary Iodine deficiency was observed in Somalia 7.19 (5.44, 9.80) followed by Djibouti 4.81, 95% Confidence Interval (3.56, 6.59) and Ethiopia 4.06, 95% Confidence Interval (3.03, 5.34). (Details are shown in Annex F)

[6] Figures in brackets denote the lower and upper values

Figure 2 Prevalence of micronutrient deficiency among 5-19 year old children in WFP East and Central Africa region,

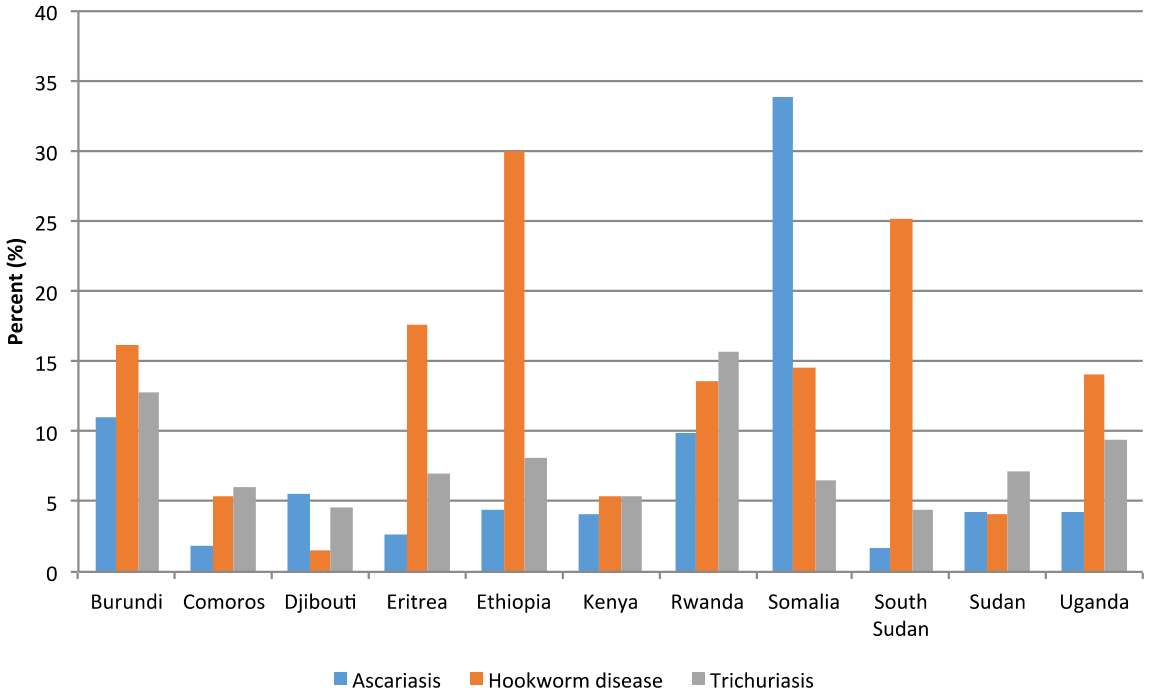


Source: Global Burden of Disease database (2019)

3.2 Intestinal Parasitosis

32. The prevalence of ascariasis was exceptionally very high in Somalia 33.95, 95% CI (24.60, 44.65) while Burundi 11.09, 95% CI (7.16, 16.23) and Rwanda 9.94, 95% CI (6.07 15.08) were ranked second and third. Hookworm prevalence was highest in Ethiopia 30.05, 95% CI (22.03, 38.51) and South Sudan 25.26, 95% CI (19.02, 32.32) and Eritrea 17.66, 95% CI (20.02, 31.79). Trichuriasis prevalence was highest in Rwanda 15.73, 95% CI (10.83, 22.09) and Burundi 12.73, 95% CI (8.63, 17.79). All the remaining countries had prevalence rates below 10 percent. Details of the about the three intestinal Parasitosis are depicted in Figure 3.

Figure 3 Prevalence of intestinal worms among children 5-19 years in East & Central Africa region



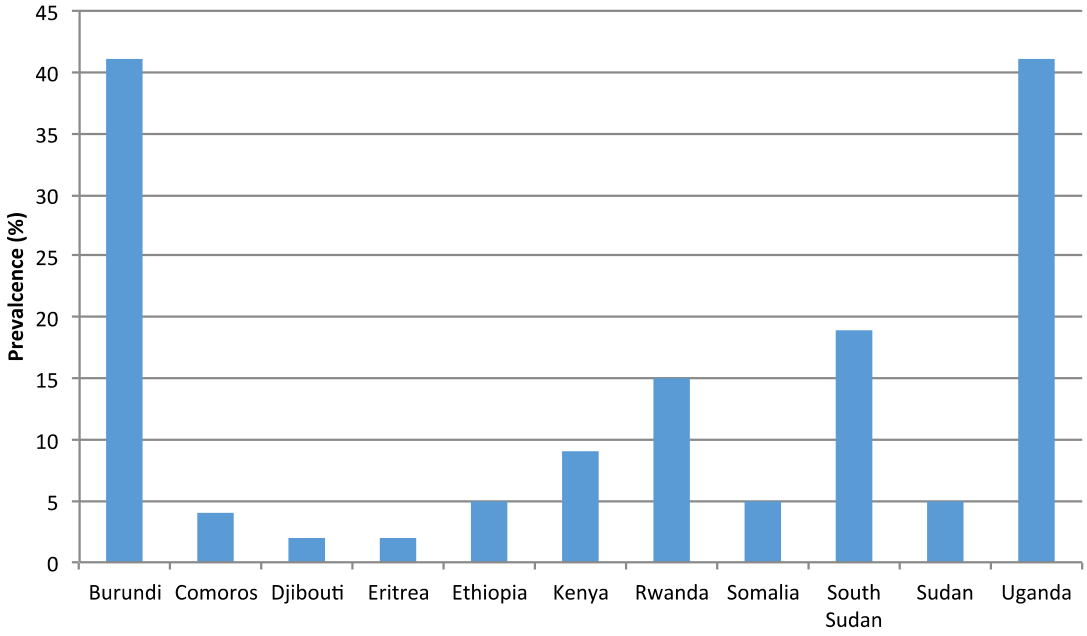
Source: Global Burden of Disease database (2019)

3.3 Malaria

33. The World Health Organization (WHO) estimated 228 million cases of malaria worldwide in 2018, with 93 percent of cases in the WHO Africa Region, and 52 million cases in the WHO Eastern and Southern Africa region. Uganda is especially prone to malaria – it accounts for 5 percent of the global malaria cases, followed by Rwanda and Kenya at 3 percent, and Burundi accounting for 1 percent of global cases of malaria. Within the WHO Eastern and Southern Africa region, Uganda accounted for nearly a quarter of estimated cases of malaria (23.7 percent). Other countries that are prone to malaria are South Sudan and Ethiopia (WHO, 2019).

34. The prevalence of malaria among school-aged children in 2019 is shown in Figure 4, based on the GBD data. The countries with highest prevalence are Burundi 41.35 with 95% CI (26.40, 53.51); Uganda 40.66 with 95% CI (35.26, 49.56); South Sudan 19.50 with 95% CI (4.10, 39.27); and Rwanda 15.48 with 95% CI (4.89, 36.00). The remaining countries have prevalence rates below 10 percent.

Figure 4: Prevalence of malaria among children 5-19 years in WFP East and Central Africa region

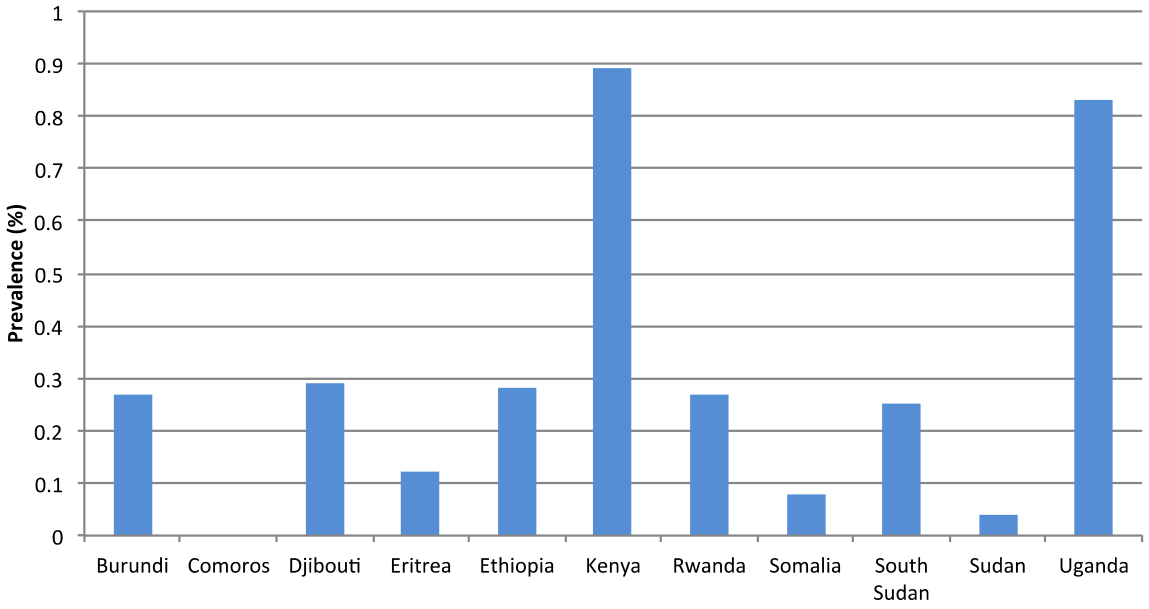


Source: Global Burden of Disease database (2019*)*

3.4 HIV

35. For majority of young people, sexual activity begins in adolescence. Early onset of sexual activity without precautions exposes adolescents HIV, and in the case of girls, teenage pregnancy. According to the GBD (2019) estimates, in the region, the highest prevalence of HIV among school-aged children is observed in Kenya (0.89 percent) followed by Uganda (0.83 percent). The prevalence in Burundi, Ethiopia, Rwanda and South Sudan was comparable as it falls between 0.25-0.28 percent (Figure 5). Detailed figures are contained in Annex F.

Figure 5 Prevalence of HIV children and adolescents 5-19 years



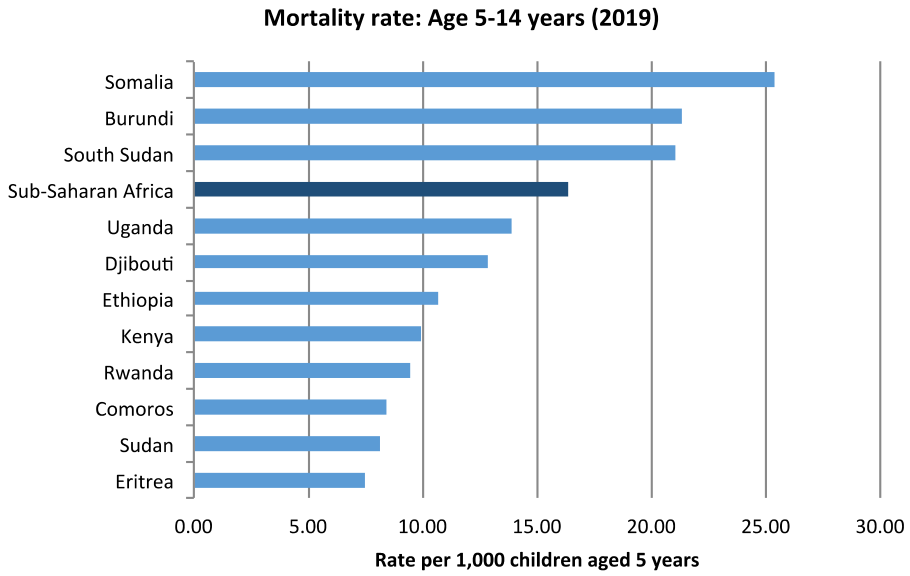
Source: Global Burden of Disease database (2019*)*

3.5 Child mortality and main causes

36. Figure 6 shows the probability of dying among children 5-14 years per 1,000 children[7]. Somalia, Burundi and South Sudan had the highest mortality rates, 25.7, 21.32 and 21.04, respectively. This is considerably above the mortality rate for this age group in Sub-Saharan Africa (16.36). The mortality rate was lowest for Eritrea 7.49). Uganda, Djibouti and Ethiopia had mortality rates in excess of 10 children per 1,000 but lower than the mortality rate for Sub-Saharan Africa.

[7] UNICEF data express the mortality rate as the probability as a rate per 1,000 children aged 5 years available at https://data.unicef.org/resources/dataset/child-adolescent-and-youth-mortality-rates/

Figure 6 Mortality among children 5-14 years in WFP East and Central Africa region

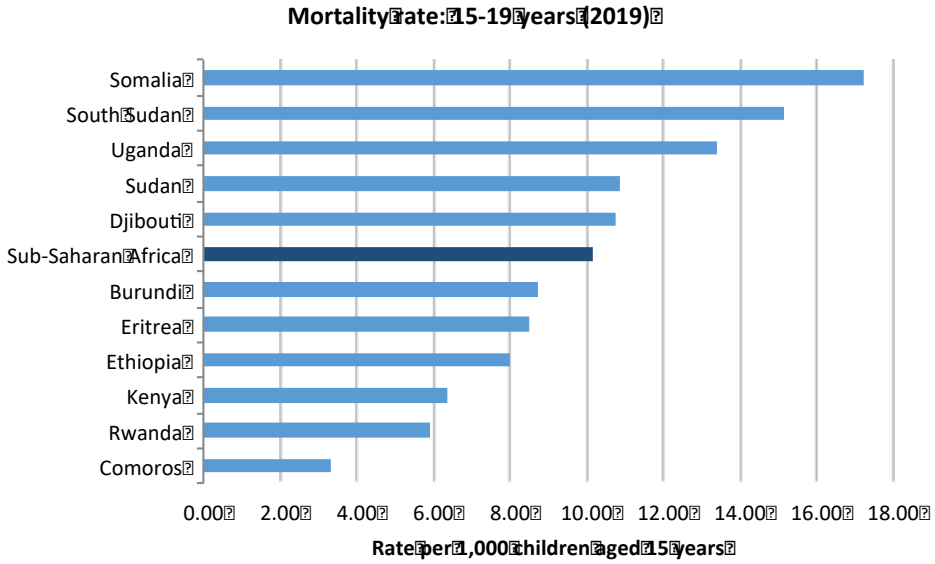


Source: UNICEF database (2019)

37. Figure 7 shows the probability of dying among children) aged 15-19 years.[8] As was the case with 5-14 year olds, Somalia has the highest mortality rate for 15-19 year olds in the region, followed by South Sudan and Uganda. These countries, along with Sudan and Djibouti, have mortality rates above the rate for Sub-Saharan Africa. Mortality rates for children aged 15-19 years tend to be lower than mortality rates for children aged 5-14 years given the risk distribution, susceptibility and care requirements of latter age groups.

[8] UNICEF data express the mortality rate for this category as a rate per 1,000 children aged 15 years available at https://data.unicef.org/resources/dataset/child-adolescent-and-youth-mortality-rates/

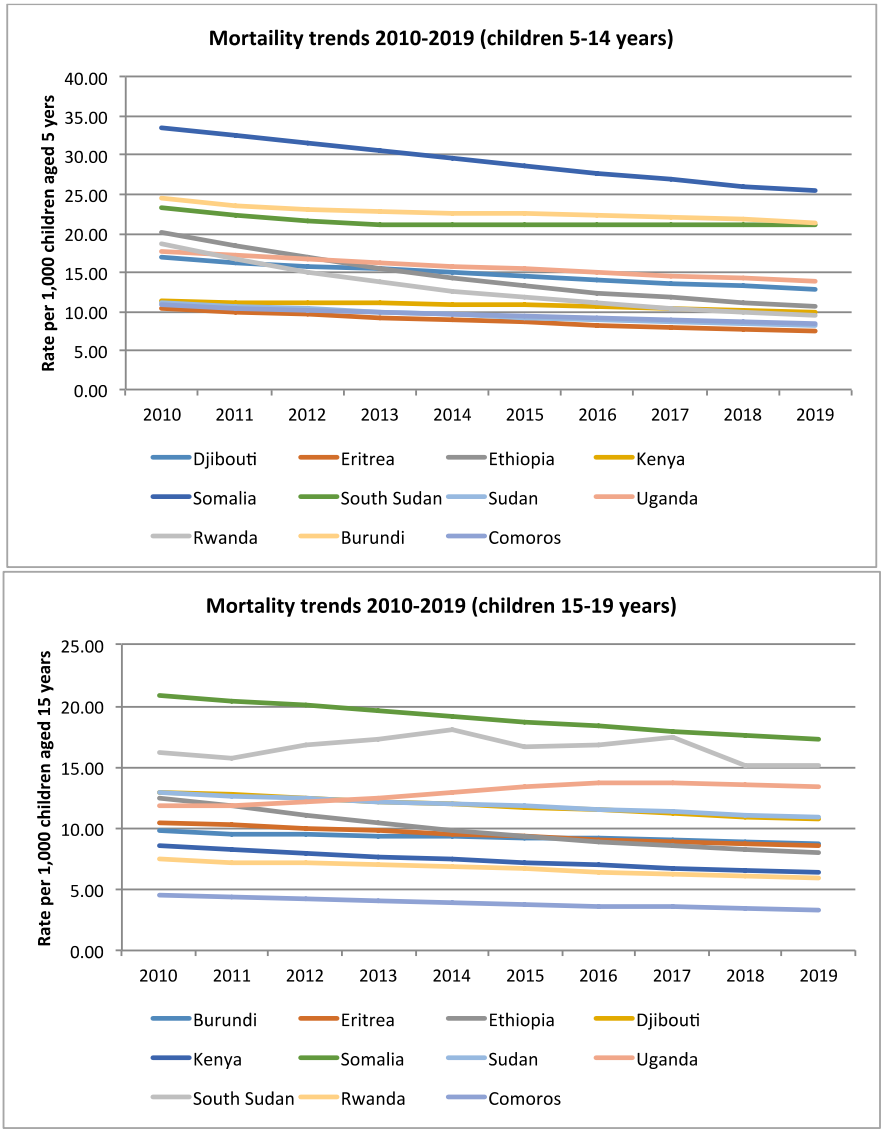
Figure 7 Child mortality among 15-19 year olds in WFP East and Central Africa region



Source: UNICEF database (2019)

38. There were general trends of decreasing mortality over the past 10 years for both age groups (5-14 years and 15-19 years) in the region except in Uganda's 15-19 years age group where the death rates increased from 11.79 in 2010 to 13. 39 per 1,000 children in the year 2019 (Figure 8).

Figure 8 Trends in mortality among school-aged children (2010-2019): WFP East and Central Africa region[9]



Source: UNICEF database (2019)

3.5.1 Causes of death

39. Based on the data from the GBD (2019), from the total death for the same age group, the highest proportion of death due to HIV/AIDS was observed in Kenya 24.34, 95% Confidence Interval (17.63, 31.65), followed by Uganda 19.37, 95% Confidence Interval (12.79, 25.80) and Djibouti 13.0, 95% Confidence Interval (8.13, 19.23), while the lowest was in the Sudan 1.98, 95% Confidence Interval (0.99, 3.71) and Comoros 0.02, 95% Confidence Interval (0.00, 0.14)

40. Similarly, the proportion of death due to malaria from the total death was highest in Comoros, 12.58, 95% Confidence Interval (0.40, 48.63) followed by Uganda 10.10 (3.06, 21.01) and Burundi 7.59 (2.76, 16.77). The highest proportion of death due to diarrheal disease was observed in

[9] Details available at; https://data.unicef.org/resources/dataset/child-adolescent-and-youth-mortality-rates/

Burundi 14.53 (8.45, 22.27) followed by Eritrea 16.36 (8.37, 35.17) and South Sudan 13.31(7.80, 20.20). In the region's most populous country, Ethiopia the highest death was attributed to HIV 11.62 (7.78, 16.11) followed by diarrheal disease 6.99 (11.57, 18.927) and Lower respiratory infections 6.31 (5.27, 7.45).

41. The main risk factor attributable to all-cause mortality of school-aged children aged 5-14 year in the region for 2019 was unsafe water, sanitation and hand hygiene 11.3 per 100,000 (CI: 7.21, 16.78). Conversely, the major risk factor attributable for higher mortality among 15-19 years school-aged children was unsafe sex with death of 23.86 per100,000 (13.54-36.13). Malnutrition was at the top of all risk factors ladder in terms of disability adjusted life years (DALY) for the age 5-14 years with DALY of 1.272.59 per 100,000 (CI: 936.18-1739.8) years, while unsafe sex remained the major contributor DALY of 15-19 years group 812.06 per 100,000(CI:1,060.31-2696.05)

4 School-based health and nutrition interventions

42. This section highlights various aspects of school-based health and nutrition interventions in the region. These are school feeding, school-based deworming, school-based nutrition education, HIV interventions, and WASH-related interventions. The section also reports on the mapping of school health and nutrition policies in the region, and identifies key stakeholders in the region and their roles in school health and nutrition.

43. Sarr et al., (2017) propose that although importance of school health and nutrition in education was recognized in the 1980s, it gained real impetus at the 2000 World Education Forum with the launch of the framework for Focusing Resources on Effective School Health (FRESH). Countries in the Africa region all offer school health services in some form and to varying degrees such as school feeding, deworming, health education and WASH interventions.

44. In 2016, the WHO Africa Regional Office convened a regional consultation to take stock of progress in school health in the African Region. The consultation noted that the implementation of school health interventions was challenging for many countries in the Africa region, due to, among other things, the limited involvement of other sectors, poor coordination between education and health ministries, and weaknesses in planning, monitoring and evaluation of school health services. One of the key recommendations of the consultation was that countries develop and adopt school health policies, as schools were one of the critical platforms for school-aged children to access health services (WHO, 2016).

45. School health covers a wide range of services, and the extent of coverage depends on the country context in terms of its policies, available financial and human resources, and prevalence of health conditions in the country. Bundy et al., (2017) argue for investment in an essential package of school health services for children in low-income and low middle-income countries, differentiated by age groups. They recommend the essential package of services for children 5-14 years to include: deworming, insecticide-treated net promotion, tetanus and human papillomavirus (HPV) vaccinations; oral health promotion; vision screening and provision of glasses; micronutrient supplementation; multi-fortified food; and school feeding. The essential package for adolescents 10-19 years includes: healthy lifestyle education; sexual health education; adolescent-friendly health services; nutrition education; and mental health education and counselling. As the age ranges of overlap, both packages are necessary to support development through middle childhood and adolescents. In low-income and low middle-income countries in Sub-Saharan Africa, children and adolescents form a significant proportion of the population, and addressing

their health needs comprehensively through school-based interventions has the potential for wider impact beyond the school environment.

4.1 School feeding programmes

46. School feeding programmes in the region are mostly implemented with WFP support. In terms of WFP's provisional country context classification, Burundi, Somalia, South Sudan and Sudan are countries with low capacity and/or experiencing conflicts (Context 1), and receive operational support from WFP. Djibouti, Ethiopia, Kenya and Rwanda are classified as transitioning countries (Context 2) with emerging or established capacities, in relatively stable environments. School feeding programmes take different forms, but commonly, children are provided with a meal in school, and may include take-home rations. School feeding programmes may also be complemented with interventions to improve the micronutrient content of food and nutrition education.

47. We mapped school feeding programmes in the nine countries of the WFP East and Central Africa region (Annex B). Most of the school feeding programmes have been in existence for more than 10 years, and the oldest programme is in the Sudan, having been established as far back as 1969, followed by Kenya and Uganda programmes established in 1980 and 1983, respectively. Countries in the region tend to have more than one model of school feeding, for example, the WFP model complemented by the home-grown school feeding model. Most countries cater only for primary school grades, but countries with more established programmes cater for pre-primary grades (for example, Ethiopia). Rwanda and Uganda are the only countries with school feeding programmes that cater for students in secondary schools.

48. There are growing efforts in the region to adopt community driven school feeding programmes. For example, in Rwanda, the WFP schoolfeeding programme is in the transitioning stage and the programme will be handed over to the Ministry of Education, which will then engage parents as part of the Home Grown School Feeding Programme (WFP, 2019). This innovative approach links school feeding programmes with local smallholder farmers to provide children with food that is safe, diverse, nutritious, and local. The benefits of this approach are believed to provide local farmers with a predictable outlet for their products, leading to a stable income, more investments and higher productivity in agriculture.

49. There are also many good practices that have evolved over time, and often quite rapidly. In Kenya, novel approaches, such as school farming for school feeding and agroforestry projects relating specifically to school feeding, were reported (Borish, D., King, N., & Dewey, C., 2017). These programmes have potential to contribute to mitigating the impacts of climate change. In Burundi as well, the Home Grown School Feeding Programme has been receiving attention, and the approach of procuring food from local smallholder farmers is captured in Burundi's school feeding program (WFP, 2017).

4.2 School-based deworming

50. School-based deworming in the region is receiving attention as essential to curbing the negative effect of intestinal worms on school attendance. In collaboration with Ministries of Health, WHO has been working to control soil-transmitted helminth infections worldwide by implementing a programme that enables wider access to preventive chemotherapy for school children (WHO 2012, WHO 2017). School –based deworming has been also indicated as an effective environment for influencing diet behaviour through school-based nutrition education programmes (Silveira, J.

A., Taddei, J. A., Guerra, P. H., & Nobre, M. R. 2011). It provides people with the knowledge, skills, and motivation to make wise dietary and lifestyle choices, building thus a strong basis for a healthy and active life.

51. Countries in the region, for example, Kenya and Ethiopia have school-based periodic deworming treatment programmes for children living in endemic regions. Intestinal worms affect attendance at school (Mwandawiro et al., 2019, Negussu et al, 2017).

4.3 School-based HIV interventions

52. A number of school-based HIV prevention interventions are reported in the region. The most common one was provision of education on HIV and sexual reproductive health behaviours using the teaching learning platform and peers. There are also studies that reported promoting schooling through provision of school fees and uniforms as a means of keeping children in school to minimise their exposure to risky environment. There are also studies that focused on enhancing partnership between schools and health facilities and parents' involvement in sexual communication.

4.4 School-based WASH services

53. According to the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) countries in the region have limited school WASH services. This is not surprising given the low coverage of water supply and sanitation for households in several countries in the region. The lack of school sanitation facilities was high in Somalia (59 percent), Eritrea (45.64 percent) and Ethiopia (39.4 percent). Similarly, lack of hygiene services in schools was reported at 80 percent in South Sudan and Ethiopia, and 75 percent in the Sudan. This low school WASH coverage is not surprising if one considers the low regional household water supply coverage. This is depicted in Table 9.

54. Furthermore, there is a high level of lack of school water supply where schools reported no service at all as high as 88.4 percent in Comoros and 76.3 percent in Ethiopia. Lack of school sanitation facility was high in Somalia (59 percent) Eritrea (45.64 percent) and Ethiopia (39.4 percent). Similarly, lack of hygiene service in schools was reported 80 percent in South Sudan and Ethiopia and 75 percent in Sudan. This low school WASH coverage would not be surprising if one consider the low regional household water supply coverage (below 60 percent).

Table 10: Percentage of schools in East Africa lacking WASH services

Country	Water	Sanitation	Hygiene
Burundi	41.43	5.07	66.65
Comoros	88.45	Not available	Not available
Djibouti	14.39	8.20	Not available
Eritrea	30.36	45.64	Not available
Ethiopia	76.37	39.43	79.88
Kenya	Not available	Not available	Not available
Rwanda	Not available	15.54	31.88
South Sudan	39.90	25.64	80.40

Somalia	45.00	59.60	No data
Sudan	9.86	38.00	75.00
Uganda	5.38	4.41	46.38

Source: WHO/UNICEF Joint Monitoring Programme (2020)

55. The available WASH interventions reported in the region were heterogeneous. However, these studies - involve education on hygiene behaviour of pupils such as hand hygiene, use of soap. In most of the studies provision of WASH material such as soap or installation of WASH facilities such as latrine were involved. There are also studies that involve menstrual hygiene management for girls. Details of the School based WASH interventions in the region and their outcome for each study is presented in the result section of the report and Annex E.

4.5 School health and nutrition policies and legal frameworks

56. Health and nutrition interventions at school can play an important role in improving the health of children through improving their health literacy and behaviours, which in turn can improve their education performance. However, the potential for school-based interventions to achieve these objectives can only be fully realised when there are clear policy directions from governments. We mapped and reviewed the policies for school health and nutrition interventions in the WFP East and Central Africa region (Annex C).

57. The search found policies and strategies for nine WFP focus countries in the region. Most of the countries have multiple policies and strategies to guide school-based health and nutrition interventions. Reference to school health and nutrition was found in education sector strategic plans, national nutrition policies and strategies, national health policies, and agriculture sector policies. Burundi, Ethiopia and Kenya are among the few countries that have dedicated school health or school feeding policies. This is consistent with the findings of the FAO's Regional Overview of School Food and Nutrition Programmes in Africa that surveyed 41 countries. The study found that more than half of the respondent countries (56.1 percent) had no school feeding policy. Only one respondent country from the Eastern Africa region (Kenya) indicated that it had a school feeding policy in place. The study further found that school feeding was reported to be covered in other policies, for example, school health policies, social protection policies, and to a lesser extent, in agricultural policies (FAO, 2019).

58. The review found five countries, namely, Ethiopia, Kenya, Rwanda, Somalia and Uganda had policies or strategies that address school-based interventions for HIV and WASH (Annex C). These were not stand-alone policies and instead formed part of school health policies or strategic plans in the case of Kenya, Uganda and Rwanda. In Ethiopia, HIV and WASH are covered in the National School Health and Nutrition Strategy (2016) and in the Education Sector Strategy (2016). Somalia has an education sector strategic plan that includes WASH but does not cover HIV.

59. The school WASH policies, strategies or plans aim for coverage of all schools, and cover similar WASH services. They set standards for school WASH facilities, for example, separate latrines for girls and boys, age-appropriate facilities and catering for children with special needs. The policies include hygiene education as well as menstrual hygiene management. The Kenya School Health Policy (2018) links WASH to the school feeding with the inclusion of food safety and hygiene measures. The Somalia Education Sector Strategic Plan 2018-2020 makes provision for the integration of preparedness and response activities to include the expansion of WASH and school feeding programmes during periods of emergency.

60. School policies, plans or strategies addressing HIV focus mainly on HIV prevention and sexual and reproductive health. The Rwanda School Health Strategic Plan 2017-2018 outlines strategic objectives and key strategies to prevent HIV and other sexually transmitted infections among school children and youth. The strategies include improving knowledge of HIV and STIs, providing a supporting environment for HIV-positive students and teachers, and implementing monitoring and evaluation activities. The strategy includes ensuring that adolescents and young adults have access to friendly sexual and reproductive health programmes and education on sexual and reproductive health. Uganda's School Health Policy (2008) makes promotes the provision of safe spaces for school-aged children to access counselling on sexual reproduction and the reintegration of adolescent mothers into the education system. The Kenya School Health Policy sets out the obligations of the Ministries of Education and Health to contribute to prevention of new HIV infections and reduction in AIDS-related deaths in the school community, reductions in HIV stigma and discrimination in the school community, and strengthening institutional capacities to manage HIV and AIDS.

4.6 Regional stakeholders

61. The review included a mapping of regional stakeholders in school health and nutrition. The mapping covered United Nations entities in the region, Regional Economic Communities, research institutions and international non-governmental organizations with a presence in the region, as well as regional farmers' organizations. The results of the mapping are reported in Annex D. A limitation of the mapping is that it relied on the websites and documents of organizations that could be considered stakeholders, and these websites did not always have information on the positions of these organizations on school health and nutrition.

United Nations entities

62. The Food and Agriculture Organization of the United Nations (FAO), UNICEF and the World Health Organization (WHO) are the three major United Nations entity stakeholders in the WFP East and Central Africa region.

63. The FAO Sub-regional office for East Africa, based in Addis Ababa, serves as the technical hub for Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan and Uganda**.** It also plays an important liaison role to the African Union Commission, UNECA and Regional Economic Communities. FAO has developed its *School Food and Nutrition Framework (2019)* that seeks to guide FAO's support to countries in leveraging the synergies presented by schools as platforms for a holistic approach to raising levels of nutrition, reducing poverty, and enabling inclusive food systems. FAO is one of the contributors to the *Home Grown School Feeding Framework* and is expected to collaborate with WFP and other stakeholders in supporting governments to design and implement Home Grown School Feeding. The mapping of school feeding programmes found that FAO is collaborating with WFP on home-grown school feeding programmes in Ethiopia and Rwanda.

64. The International Fund for Agricultural Development (IFAD) has nutrition is one of its areas of focus. IFAD aims to contribute to nutrition-sensitive agriculture in production of food by smallholder farmers and women farmers who receive support from IFAD via national governments. IFAD's Eastern and Southern Africa hub covers Eritrea, Ethiopia, Kenya, Rwanda and Uganda. IFAD is one of the contributors to the Home Grown School Feeding Framework, and is expected to collaborate with WFP and FAO, focusing on the supply of food for schools from smallholder producers.

65. UNICEF is another major stakeholder in the region. UNICEF's *2019 State of the World's Children* report focuses on food and nutrition of children. Key messages include: (a) Investing in nutrition for children and young people is a cornerstone investment if the world is to achieve the Sustainable Development Goals by 2030; (b) Improving children's nutrition requires food systems to deliver nutritious, safe, affordable and sustainable diets for all children. The report stresses the importance of middle childhood 5-9 years as an opportunity for children who experienced stunting to catch up. Nutrition habits are also established during this period. The report notes data on what school-aged children eat are limited; (c) Adolescents 10-19 years diets in low and middle-income countries are generally nutritionally poor. UNICEF' *Child Friendly Schools Framework (CFS)* promotes a child rights and holistic approach to education that includes the promotion of the physical and emotional health of children by addressing their key nutritional and health care needs and equipping them with knowledge for the future. UNICEF also plays major role in supporting countries to strengthen their capacities in the provision of WASH services, and jointly monitors the availability of WASH services with WHO.

66. In August 2019, the WHO Regional Committee for Africa developed a strategic plan to reduce malnutrition in the Africa Region. The strategy aims to reduce all forms of malnutrition throughout the life course. Its objectives are to strengthen policies and regulatory frameworks, strengthen national capacity and evidence base for nutrition programming. Its guiding principles include a life-course approach, multi-sectoral collaboration, universal health coverage and partnerships. One of the priorities in the strategic plan is to strengthen multi-sectoral collaboration to prevent malnutrition, and advocates for strong collaboration between health and education sectors for educating school-aged children on nutrition.

67. United Nations Economic Commission for Africa **(**UNECA) has a regional office for East Africa in Kigali and provides capacity building and advisory services to Burundi, Djibouti, Ethiopia, Eritrea, Kenya, Rwanda, South Sudan and Uganda. UNECA Head office in Addis Ababa collaborated with FAO and the African Union in preparing the *2019 Africa Regional Overview of Food Security and Nutrition.* The UNECA report on Macroeconomic and Social Developments in Eastern Africa 2020 finds that although Eastern Africa is the fastest growing region in Africa, the current pace of economic transformation is too slow to ensure achievement of SDGs by 2030. The report discusses the on-going challenge of fighting hunger and malnutrition, and concludes with the need to urgently address poverty and its impact on health and nutrition, and in turn on human development and the economy.

African organizations

68. There are continental (Africa-wide) stakeholders with regional offices/hubs or a presence in countries covered by the WFP East and Central Africa region. These have been included in the stakeholder mapping. They include the African Union (AU), AUDA-NEPAD: African Union Development Agency, The Common Market for Eastern and Southern Africa (COMESA), The Intergovernmental Authority on Development in Eastern Africa **(**IGAD) , The African Development Bank and The East African Farmers Federation (EAFF)

69. The African Union (AU) adopted the revised *Africa Regional Nutrition Strategy 2015-2025* that mirrors nutrition targets adopted by African countries at the World Health Assembly in 2011. The AU works with Member States to improve nutrition and knowledge/evidence – for example, the *Cost of Hunger in Africa* study. The AU strongly supports school feeding. It has the AU School Feeding Initiative where the AU is working with Member States to implement school feeding. The AU commissioned a major study on *Sustainable School Feeding in Africa (2018)* with support of WFP.

The *African Day of School Feeding* is an annual commemoration that was instituted in January 2016 through AU Decision of African Union Heads of State and Government in recognition of the value of home grown school feeding.

70. AUDA-NEPAD: African Union Development Agency: School feeding is one of NEPAD/AUDA's flagship projects under the Food and Nutrition Programme. In 2019, AUDA-NEPAD published the *Home Grown School Feeding Handbook* based on lessons learned from Botswana, Ghana, and Nigeria.

71. The Common Market for Eastern and Southern Africa (COMESA) is a regional economic community with Member states that include Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan and Uganda. COMESA's 2016 Health Charter identifies poor nutrition as one of the major drivers of disease burdens in the COMESA region and on the Continent, and urges COMESA States to (i) review national agricultural policies to align them to CAADP; (ii) prioritize rural agriculture and infrastructure in national development planning; (iii) mainstream nutrition in national development and social protection policies and programmes; and (iv) progressively make access to food, clean water and sanitation by all justiciable. COMESA adopted the COMESA Social Charter (2015) that aims to promote the welfare of people in the region, and improve the quality of life. The charter has the wellbeing of the child as one of its pillars. There is reference to maternal and child health, but the emphasis is on children under-five years.

72. The Intergovernmental Authority on Development in Eastern Africa **(**IGAD) has among its objectives to (a) achieve regional food security, as well as encourage and assist efforts to collectively combat drought and other natural or human-made disasters; (b) initiate and promote programmes and projects to achieve regional food security and sustainable development of natural resources and environmental protection. IGAD Strategy 2016-2020 identifies reduction in stunting prevalence in the region as a priority. It has a nutrition programme that aims to increase the IGAD regional nutrition momentum for accelerated achievement of better child and maternal nutrition outcomes among pastoralists and cross-border populations. The IGAD Food Security Task Force developed the IGAD Food Security and Nutrition Response Strategy in 2020 to guide actions to reduce food insecurity and malnutrition. IGAD has a draft strategy for Nutrition Advocacy that was validated in late 2019, but the current status is unknown.

73. The East Africa Community (EAC) is a regional intergovernmental organization with six Member States (Burundi, Kenya, Rwanda, South Sudan, Tanzania and Uganda). Its primary aim is to broaden and deepen economic, political, social and cultura integration in the region, and so improve the quality of life of its citizens. The EAC agenda includes harmonization of policies on agriculture and food security, and implementing joint programmes on these, harmonization of education, and joint action on communicable and non-communicable diseases.

74. The African Development Bank: Banking on Nutrition programme seeks to unlock the nutrition potential in the bank's investment portfolio. The Bank launched its *2018-2025 Multi-sectoral Nutrition Action Plan* in December 2018. The plan targets nutrition-smart investments in agriculture, water and sanitation, and social protection, and projects a 40 per cent reduction in stunting by 2025. The Action Plan includes the use of school-based food and nutrition interventions covering school feeding, micronutrient supplements, deworming, health promoting behaviours, WASH and creating enabling school environments.

75. The East African Farmers Federation (EAFF) is a network of more than 20 million smallholder farmers in 10 Eastern African countries, including Burundi, Djibouti, Eritrea, Ethiopia, Kenya,

Rwanda, South Sudan and Uganda. Its mandate and functions include enhancement of food security, food sovereignty, and poverty alleviation; active engagement of women and youth in agricultural development; and empowering farmers through lobbying and advocacy for pro-poor policies. The EAFF is a member of the Pan-African Farmers Organization (PAFO) and committed to participating in awareness of COVID-19 preventative measures and doubling efforts to produce and supply more food to feed Africa.

African research institutions

76. Africa Research Universities Alliance Centre of Excellence in Food Security is concerned about triple burden of malnutrition, and high intake of low nutrient higher energy food leading to malnutrition, and impact on vulnerable groups especially children. It also notes that many on the Continent rely on agriculture for livelihoods. One of its research focus areas is to explore pathways to providing sufficient, safe, nutritious and consumer driven food for populations of 21st century Africa. The objectives of the Centre of Excellence are to design foods with local and indigenous African plants and animals that are affordable, marketable and convenient, nutrient dense, and implement appropriate food processing technologies for SMMEs to manufacture convenient African foods; policies and programmes to ensure nutrient adequate foods are available, culturally acceptable, accessible and affordable to African populations. The Centre is led by University of Pretoria, South Africa in collaboration with University of Ghana, Legon, Accra and the University of Nairobi.

Civil society organizations and non-governmental organizations

77. It is outside the scope of the study to map all civil society and non-governmental organizations in each country in the WFP East and Central Africa region. The mapping focused on global and regional organizations with a presence in the countries that form part of the region.

78. Save the Children International operates in the following East African countries: Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda. Save the Children subscribes to the FRESH framework for School Health and Nutrition (SHN). The SHN programme is linked with the Save the Children education sector programmes and is seen as a continuation of the Early Childhood Development programme. SHN interventions are adapted to country contexts and needs and include providing school children with access to improved WASH facilities; access to deworming and micronutrient supplementation, vision and hearing screening, oral health promotion, malaria prevention and treatment, obesity reduction; skills-based health education for developing lifelong health behaviours, including HIV and AIDS prevention; advocacy for national policies support schools and communities. Save the Children produced a Health Education Manual (2013) to assist SHN Programme Managers to design and implement health education in schools, for children aged 8-10 years. The lessons cover WASH, Infectious Diseases including Neglected Tropical Diseases, Taking care of our bodies, Preventing diseases and injury, Nutrition, Sexual Reproductive Health including HIV and AIDS prevention.

79. World Vision International operates in the following East African countries: Burundi, Ethiopia and Rwanda World Vision released its *Health Sector and Nutrition Approach 2020-2030* that sets the high-level goal: Ensure healthy lives and promote well-being for all children. While children under-five years are the main target of World Vision, the new approach recognises the need to improve the health and nutrition of adolescent girls to reduce under-five mortality and maternal mortality. The approach makes provision for improving dietary diversity and addressing micronutrient and iron deficiency in adolescents 12-18 years. Health and nutrition interventions are linked with other

interventions, for example, WASH, child protection, mental health, and infectious and neglected tropical diseases.

80. The Global Alliance for Improved Nutrition (GAIN) has offices in eight Sub-Saharan African countries including Ethiopia and Kenya. GAIN's aim is to make diets more affordable and accessible, and supports large-scale food fortification in Ethiopia and Kenya. GAIN adopts a food systems approach to nutrition, working closely with governments to shift policies in favour of nutritious diets.

81. Project Concern International (PCI) operates in Burundi, Ethiopia and Kenya. Its food security programmes are designed to end hunger and malnutrition by imparting climate-smart and nutritionally-targeted agriculture practices, strengthening livelihoods; improving health nutrition and hygiene practices; and supporting integrated school feeding programmes. School feeding programmes form part of an integrated approach that includes training teachers, parents, volunteers and students in healthy eating and personal hygiene, working with schools and community leaders to keep girls in school, supporting government-led vaccination and health days and distribution of deworming kits, and improving school infrastructure with an emphasis on water and sanitation. PCI also works with government agriculture extension officers and schools to establish school gardens, and partners with local farmers and schools to establish a local supply of fresh, nutritious food.

82. CARE International works in 100 countries globally, including eight countries in the WFP East and Central Africa region. The organization's work includes food and nutrition, education and health. Its health, food and nutrition programmes focus on children under-five years. CARE also works with adolescent girls on improving health - reducing anaemia and sexual reproductive health especially for married adolescent girls. CARE supports smallholder agriculture, especially women farmers, to meet their food needs and develop sustainable livelihoods. There is no reference to school health and nutrition in the organization's description of its programmes.

Implications for WFP

83. The stakeholder mapping revealed a diverse range of organizations involved in school health and nutrition in the region. WFP has partnerships with several other United Nations entities at country level through the United Nations Strategic Development Cooperation Framework (UNSDCF), and collaboration with the United Nations Rome-Based Agencies (RBAs), namely, FAO and IFAD, through the Home Grown School Feeding Programme. There are undoubtedly opportunities for strengthening WFP's partnerships at country level with other United Nations organizations in pursuing an integrated approach to the health and nutrition of school-aged children. There are also opportunities for joint United Nations advocacy on school health and nutrition.

84. The African Union and its implementing agency, as well as regional intergovernmental bodies have policies and programmes on school health and nutrition. WFP's support at country level to strengthen the policy environment for school health and nutrition should be aligned to the policies of the African Union and the relevant regional intergovernmental bodies.

85. The stakeholder mapping identified several international non-governmental organizations (NGOs) that have a footprint in a number of countries in the region, and so present opportunities for partnerships in strengthening national capacities for implementation of school feeding for example. It was beyond the scope of the review to map the national NGOs and community-based organizations (CBOs) in each of the countries in the region. Partnering with national NGOs,

particularly those with good capacities, should not be confined to implementation, but should include advocacy on issues pertaining to the health and nutrition of school-aged children.

86. The need for evidence generated through sound research is a theme that runs through the remaining sections of this review report. There are research institutions in the region that are potential partners for WFP to expand the evidence base for more effective policies and programmes in school health and nutrition.

5 Systematic review of effectiveness of school-based health and nutrition interventions

87. This section presents the results of reviewing systematically, the literature on the effectiveness of health and nutrition interventions. It briefly explains the method used, followed by the presentation of the results of the searches conducted. The results are organised around the interventions of school feeding, school-based deworming, school-based nutrition education, HIV interventions in schools, and school-based WASH interventions.

5.1 Systematic review method

88. The literature discussed in the preceding sections of the report points to potential benefits of school-based health and nutrition benefits for children. However, there remains a need for empirical evidence to draw firm conclusions about the effectiveness of these programmes in improving health and other outcomes for children, and indirect effects beyond the school environment.

89. We conducted a systematic review to identify and analyse evidence from published academic and grey literature sources to establish the potential impact of school-based health and nutrition interventions on the health, nutrition and education of school-aged children in the Eastern and Central Africa region. The review covered all countries defined as WFP focus countries, namely, Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan, and Uganda. The searches included countries classified as East or Central Africa by other United Nations agencies, for example, Comoros, as these countries were not covered in the regional studies for West Africa and Southern Africa. The detailed methodology is discussed in Annex A.

5.2 Results: Impact of school feeding programmes

90. Through an extensive database search, a total of 281 papers was identified and retrieved for examination. Following a review of the titles and abstracts against the review objectives and inclusion criteria, 250 titles were excluded. The full texts of the remaining 31 studies were evaluated, and of these, 17 studies were included in the present systematic review and meta-analysis.

91. The types of studies identified and included for the analysis were randomized controlled trials (n=4 studies), clustered randomized controlled trials (n=2 studies), non-randomized controlled studies (n=3 studies), comparative cross-sectional studies (n=8 studies). Most of the studies were conducted in Ethiopia (n=8 studies) and these were all comparative cross-sectional studies. The studies from Kenya were interventional studies, either randomized or non-randomized control trials (n=5 studies). The three studies from Uganda were also interventional. We were also able to locate on comparative sectional study from Somalia and a randomized control trial from Burundi. Details of the included studies and their outcomes are depicted in Annex E.

Table 11 Studies reporting health and nutritional outcomes

Reference	Country	Nutritional Anthropometry/status	Energy intake / dietary diversity	Anaemia prevalence and /or haemoglobin levels	Combination of morbidity outcomes
Alderaman et al., 2019	Uganda			X	
Neervoort et al., 2013	Kenya	X		X	
Gewa et al., 2013	Kenya		X		
Neumann et al., 2013	Kenya				X
Zenebe et al., 2018	Ethiopia	X			
Demlew and Nigussie, 2020	Ethiopia	X			
Baum, Miler and Gains 2017	Uganda	X			
Parker et al., 2015	Burundi			X	
Bagonza, Arthur 2013	Uganda	X			

Table 12 Types of education outcomes reported in studies

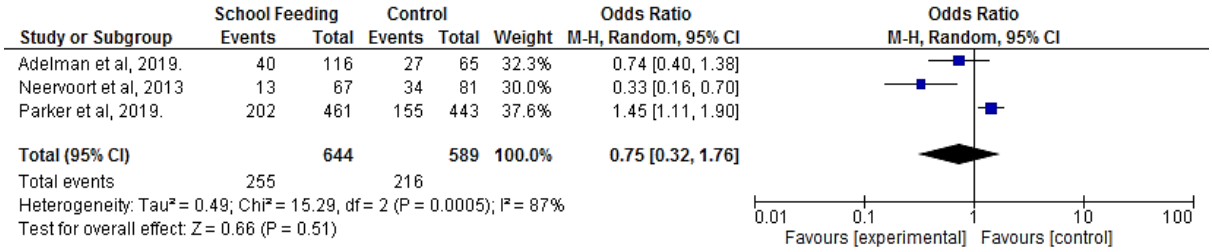
Reference	Country	Enrolment	Attendance	Retention/ Drop out	Performance / completion
Hulet et al., 2014	Kenya				X
Omwami, Neumann, Bwibo 2011	Kenya		X		
Zenebe et al., 2018	Ethiopia		X		
Dheressaa Kaba, 2011	Ethiopia	X	X	X	
Aregawi, F., Yusuf J., and Haji J. **, 2012**	Ethiopia	X		X	
Gallenbacher, Ramin, 2018	Ethiopia	X	X	X	X
Bagonza, Arthur 2013	Uganda				X
Omar, Muturi and Samantar, 2019.	Somalia	X		X	X
Assefa and Tefera, 2015	Ethiopia		X	X	X
Yohannes and Kassahun, 2017	Ethiopia		X		X
Reta ,2019	Ethiopia		X		X

92. The studies reviewed most frequently measured nutritional anthropometry outcomes, namely, stunting, thinness, and weight. There were only two studies that measured dietary diversity or daily nutrient intake, while three measured anaemia prevalence and/or haemoglobin levels. One study measured a combination of morbidity outcomes including malaria, lower respiratory infections, and diarrhoea. Under educational outcomes, studies most frequently measured school attendance (n=7) and education performance or school completion (n=7), retention/dropout rate (n=5) and enrolment (n=4). Most of the studies were from Ethiopia and by Kenya.

Anaemia prevalence and haemoglobin levels

93. Out of the three studies that evaluated the impact of school feeding (SFP) on the prevalence of anaemia, two reported a significant reduction (Alderaman et al., 2019, Neervoort et al., 2013), while one study (Parker et al., 2015) reported a null effect. In the meta-analysis (n=3 studies), data of 1233 children were included with a ration of school-fed to non-fed children 1.09:1. The result indicated no difference in anaemia prevalence with school feeding (OR = 0.75 [0.32, 1.76], I2-87%) Sensitivity analysis (through leaving one out) did not change the results. Pooling of the two random controlled trials did not change the non-significant association (OR [95%CI]: 1.10 [0.58, 2.10]) (Figure 9).

Figure 9: Effects of school feeding on anaemia prevalence among school-aged children in WFP East and Central Africa region



Morbidity

94. For health outcomes, we were only able to locate a trial from Kenya (Neumann et al., 2013), which evaluated the effects of school feeding on the probability of a morbidity outcome. A composite indicator to reflect malaria, fever chills, diarrhoea with >3 watery stools per day, lower respiratory infection, typhoid jaundice, and illnesses accompanied by reducing food intake and/or physical activity and being bedridden. The result indicated a general decline in the probability of morbidity outcome (PMO) and severe illnesses within the school feeding group.

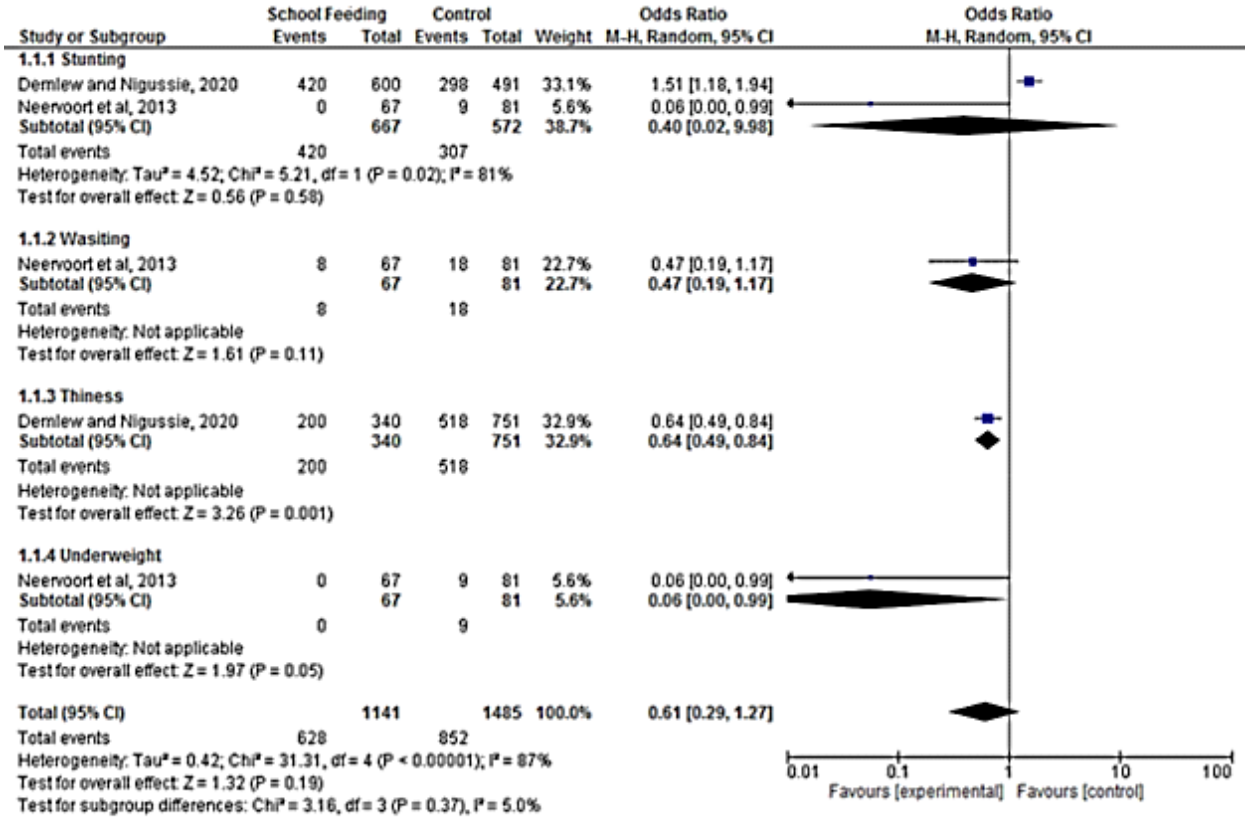
Stunting, thinness and weight

95. Two studies investigated the relationship between school feeding (SFP) and stunting (Demlew and Nigussie, 2020, Neervoort et al., 2013). In the pooled analysis a total of 1233 children (SFP and non-SFP ratio of 1.36:1) were included. The result revealed a non-significant reduction of stunting prevalence with SFP (OR [95% CI]: 0.40 [0.02, 9.98], I2 = 81%). In contrast, Zeneb et al., (2013), reported an average increment of 0.72 in height-for age Z-score (HAZ) 95% CI [0.49, 0.95] favouring SFP (Figure 10).

96. For thinness, in their analysis of 148 children (67 SFP and 81 control), Neervoort et al., (2013) reported 36 percent lower odds of having thinness compared to non-SFP children: OR [95%CI]: 0.64 [0.49, 0.84]. Corroborating this finding, Zenebe et al., (2018) also reported an average increase

of 0.52 in thinness (BAZ scores) 95% CI [0.36, 0.78] with SFP. Conversely. Neervoort et al., (2013) reported no significant difference in prevalence of wasting between two groups OR [95% CI] 0.47 [0.10, 1.17] (Figure 11).

Figure 10: Relationship between school feeding and stunting



Dietary diversity

97. Only two studies (Gewa et al., 2013, and Zenebe et al., 2018) reported diet-related outcomes. Zenebe et al., (2018) reported a higher dietary diversity score (5.8 ± 1.1) with school feeding (SFP) compared to non-SFP (3.5 ± 0.7), while Gewa et al., (2013) indicated the absence of undesirable effects of SFP on food intake at home (Table 12, Annex E).

Educational outcomes

98. For educational outcomes, in the meta-analysis of two studies (Dheressa, 2011 and Assefa and Tefera, 2015), a non-significant reduction in the school dropout rate was observed among SFP groups (OR: 0.61 [0.36, 1.04], I2 =27%, N= 842 children. Yohannes and Kassahun (2017) also reported a non-significant association between SFP and (Mean difference: -1.28 [-2.84, 0.28], n=320 children). Similarly, Reta (2019) also reported a non-significant effect on attendance and academic achievement (P>0.05). Better educational outcomes were reported among schools with school feeding programmes in Somalia (Omar, Mutari and Samantar, 2019) – schools with SFP were found to have a higher girl enrolment rate, and a higher retention rate than non-SFP schools. The increase in total enrolment in SFP schools was higher than the increase in non-SFP schools

and the failure rate in SFP schools was lower than the failure rate in non-SFP schools. Hulet et al., 2014 also reported greater improvements in test scores of children receiving school feeding when complemented with animal source food.

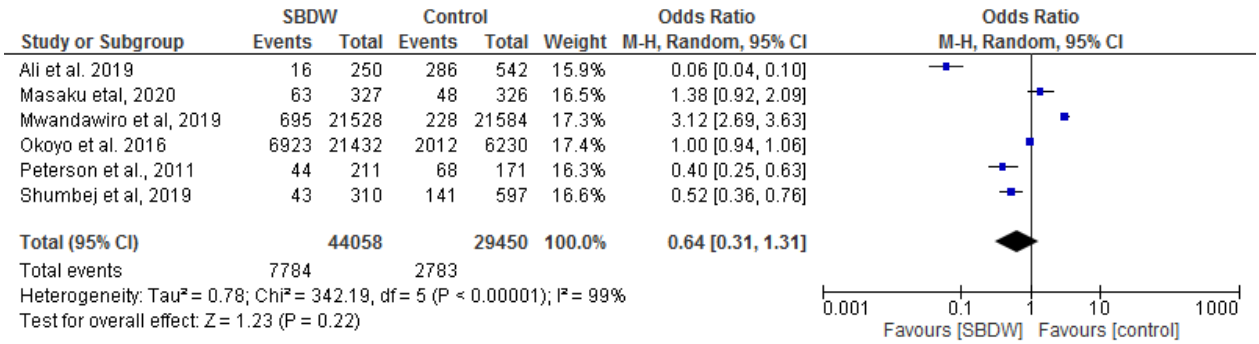
5.3 Results: Impact of school-based deworming (SBDW)

99. A total of 306 papers were identified in the literature search and retrieved for examination. Following the review of titles and abstracts against the review objectives and inclusion criteria, 217 titles were excluded. The full texts of the remaining 89 studies were evaluated, following which, 81 of these were excluded. The remaining eight studies were included in the systematic review and meta-analysis (Table 13 in Annex E).

100. Of the eight included studies, six were repeat cross-sectional surveys, while two were clustered controlled randomized trials. Most of the studies were conducted in Kenya (n=6) and two were from Ethiopia. The most common outcome measured by the studies was the prevalence of soil transmitted helminths (STH). One cluster quasi-randomized stepped-wedge trial investigated the impact of school-based deworming on school attendance and examination performance. In seven of the included studies the comparator was "no intervention group" or "pre-intervention STH prevalence rate", while one of the studies (Pullan et al., 2019) compared school-based deworming with a community-based deworming programme.

101. Meta-analysis was performed to investigate the relationship between school-based deworming (SBDW) and the prevalence of STH. The result indicated a non-significant reduction in the prevalence of STH with SBDW interventions – OR= 0.64 [0.31, 1.31], Heterogeneity: $Tau^2 = 0.78$; $I^2 = 99\%$] (Figure 12). Furthermore, one trial (Pullan et al., 2019) reported superiority of a community-based deworming programme over SBDW for hookworm and trichuris infections (P<0.05). Only one trial (Davey et al., 2015) investigated the effect of SBDW on education outcomes and reported improved school attendance (P<0.05) but not on examination performance.

Figure 11: Effect of SBDW on prevalence of STH



5.4 Results: Impact of School-based nutrition education (SBNE)

102. The extensive literature search returned 68 studies and all citations were retrieved for examination. Following a review of titles and abstracts against the review objective and inclusion criteria, 54 citations were excluded. The full texts of the remaining 14 studies were evaluated, following which, nine were excluded. The remaining five studies were included in the systematic review (Table 14 in Annex E).

103. All included studies were randomized or non-randomized controlled studies. Two of the studies, Tamru et al., (2017) and Dargie (et al., (2018) were conducted in Ethiopia while another two, Florence et al., (2020) and Gitau, Kimiywe & Waudo et al., (2016) were conducted in Kenya, and the remaining study, Loechl et al., (2010) was conducted in Uganda. The type of nutrition education included in the interventions was heterogeneous in terms of duration, content, and modality and therefore not appropriate for meta-analysis.

104. Four of the studies reported improved dietary intake with the SBNE intervention, and the remaining two studies reported improvement in haemoglobin levels and a reduction in thinness. A quasi-experimental study by Tamru et al., pre- and post-comparative studies by Loechl et al., 2010 and Gitau, Kimiywe & Waudo et al., 2016, reported improved dietary intake with SBNE. Two trials (Dargie et al., 2018 and Florence et al., 2020, reported improvement in body mass index for age Z-score with SBNE. Gitau, Kimiywe & Waudo et al., 2016, reported improvement in haemoglobin levels of children following school-based nutrition education interventions.

5.5 Results: Impact of School-based HIV intervention (SBHI)

105. Through an extensive database search, a total of 147 papers were identified and retrieved for examination. Following a review of the titles and abstracts against the review objectives and inclusion criteria, 114 titles were excluded. The full texts of the remaining 33 studies were evaluated, and of these, 14 studies were included in the present systematic review. The details of the study types, interventions, implementation, intervention outcomes and research findings are set out in Annex E.

106. The types of studies identified and included for the analysis were randomized controlled trials (n=2 studies), clustered randomized controlled trials (n=3), quasi experimental study (n=4) pre-post study (n=3), non-randomized longitudinal studies (n=1 studies), comparative studies (n=1). Most of the studies were conducted in Kenya (n=7 studies) and were interventional studies, either randomized or non-randomized one. The three studies from Uganda were also interventional studies (two clustered randomised trials and a quasi-experimental study). We were also able to locate two interventional studies from Sudan and one quasi-experimental study from Ethiopia.

107. The most common school-based HIV intervention reported was provision of education on HIV and reproductive health behaviours (n=11 studies). The reported mode of delivery is either as short-term lesson (one study) or long-term educational classes integrated in school curriculum activities supported with reference materials (n=10 studies). The reported topics delivered in these educational activities were wide-ranging. They include self-awareness, sexual and reproductive health, healthy relationships, drug and alcohol abuse, life skills, HIV and AIDS and other sexually transmitted infections, behaviour change, condom use, puberty, relationships and emotions, decision-making, self-esteem skills, reporting of physical and sexual violence, knowing one's rights, sexually transmitted infections, HIV and AIDS and stigma, prevention of pregnancy, gender, and sexuality. Meanwhile, two studies reported promoting schooling through provision of school fees and uniforms as a means of reduce risk of HIV exposure. One study also investigated "enhancing partnership between schools and health facilities.

108. There are several implementation strategies reported in the included studies, namely, training school teachers, forming/promoting a school health club, anti-AIDS club, drama and music club, peer educator club, using nurse research staff members, computer-based interactive sex education, integrating HIV in the school curriculum, and parental involvement.

109. The reported outcome measures in the included studies were heterogeneous. They include sexual and reproductive health knowledge, sexual debut, number of sexual partners, condom use, HIV counselling and testing utilization, HIV diagnosis, HIV care service utilization, retention in care and treatment service, sexual behaviour, self-efficacy, adoption of preventive behaviours including abstinence and faithfulness to a partner, pregnancy, engagement in transactional sex, forced sex, circumcision, quality of life (QALY) and adolescent-Parent/Caregiver sexuality communication. Only two studies included educational outcomes, namely, school dropout, school absence and future schooling expectations.

110. Change in knowledge towards HIV and Sexual Reproductive Health (SRH) was the target of six studies and five reported statistically significant improvement in knowledge outcomes. The interventions involved in these changes were peer education (Ethiopia, Sudan), Primary School Action for Better Health (PSABH) model (Kenya), Making Life's Responsible Choices (MLRC) course (Kenya), life skill sessions (Kenya) and lessons on SRH topics (Uganda).

111. Results pertaining sexual debut and risky sexual behaviour were heterogeneous. Six studies in Kenya involving the Primary School Action for Better Health (PSABH) model, Making Life's Responsible Choices (MLRC) course, Keeping Adolescent Orphans in School, Peer education club membership and life skill training sessions reported positive gains in reducing risky sexual behaviour (lower proportion of students engaged in sexual debut, unsafe sexual activity such as transactional sex or having multiple sexual partner or non-coercive sex). Interestingly, one of the studies involving life skills training sessions as additional to community interventions resulted in delay of first sexual encounter among girls when compared to controls with no intervention. However, results of the quasi-experimental studies in Ethiopia and Rwanda, which involved peer education interventions, reported no change in risky sexual behaviours such as limiting the number of sexual partners.

112. Condom use was reported in four studies where intervention groups were found to have used condom during their last sexual encounter or persistently during the study period. The interventions involved for these improvements were peer education on HIV-related risky sexual behaviours (Ethiopia and Kenya), the Primary School Action for Better Health (PSABH) model (Kenya) and low-tech, computer-based interactive sex education (Kenya).

113. Two studies (Ethiopia and Kenya) reported improved HIV counselling and testing service utilization following peer education intervention. The Red Carpet Program (RCP) training and sensitization programme in Kenya also resulted in improved linkage of adolescent and youth HIV diagnosis and retention in care and treatment centres.

114. There were only two studies, which investigated the impact of school-based HIV intervention on educational outcomes. Cho et al., 2011 and 2018 reported orphan youths who received school fee and uniform support aimed at keeping them in school as a means of HIV prevention, were less likely to drop out of school and achieved a higher average grade level in school ($p \leq .001$).

115. HIV-related education interventions are reported to have resulted in improving attitudes and beliefs including; sexual behavioural intentions (one study) belief in youth vulnerability for HIV (one study) enacted stigma (one study), willingness to care for a family member or friend who suffers with AIDS (one study), and willingness to socialise and learn from with persons living with HIV or AIDS (one study). However, there were reports that state no change regarding attitudes towards premarital sex (one study), risk perception (one study) HIV voluntary testing (one study) with HIV-related education interventions.

116. One novel intervention, which involved the parental involvement in HIV/SRH education reported a significantly stronger increase in 'Frequency of communication about sexuality and HIV/AIDS related topics' reported by both students and their parents/caregivers. The study also reported, a significant "effect" on 'Quality of sex-related communication; openness and parental competence' among parents/caregivers as well as among the students.

5.6 Results: Impact of school-based WASH interventions

117. Our extensive literature search located 134 studies and all citations were retrieved for examination. Following a review of titles and abstracts against the review objective and inclusion criteria, 92 citations were excluded. The full texts of the remaining 43 studies were evaluated, following which, nine were excluded. The remaining 19 studies were included in the systematic review.

118. Three studies investigated the effectiveness of WASH interventions on hand washing behaviour. Zhang et al et al. (2013) in Uganda reported increased proportion of "always washing hands" behaviour at school (3.5 percent at baseline to 100 percent) and after using toilet (5.5 percent at baseline to 65.0 percent) and use of soap increased from 13.5 percent to 84.5 percent with intervention packages composed of provision of tippy-taps, soap and educational materials to schools. A study in Kenya also demonstrated an increase in students' knowledge ($p<.001$) and frequency of handwashing following a hand-hygiene curriculum and group handwashing station interventions. The hand-hygiene curriculum increased knowledge, and the handwashing station enabled students to translate their knowledge in to action. Furthermore, Saboori et al., 2013 (Kenya) found a significantly higher proportion of pupils practising hand washing with soap events in intervention schools that received a soap provision (32 percent) and schools that received soap and latrine cleaning materials (38 percent).

119. The effectiveness of school-based WASH interventions on illness outcomes varied across studies. A lower prevalence of a.lumbricoides and hookworm (Garn et al., 2016), lower stomach pain episodes (Zhang et al., 2013), reduction in diarrhoeal disease (Dreibelbis et al., 2017), decreased risk of respiratory infections (Patel et al., 2012, lower active trachoma (Gelaye et al., 2014), reduced helminthic and protozoa infections (Gelaye et al., 2014) were reported. However, there were studies that reported no change in prevalence or duration of any of the illness including diarrhoea (Chard et al., 2019, Patel et al., 2012), e.coli contamination (Saboori et al., 2013), respiratory infection (Chard et al., 2019) and conjunctivitis (Chard et al., 2019) as compared to pupils attending control schools.

120. In terms of educational outcomes, Garn et al. (2014) (Kenya) reported that school-based hygiene promotion, water treatment and sanitation improvement programmes resulted in a 4 percent increase in the proportion of girls enrolled in school. Freeman et al., 2014 (Kenya) also reported a 58 percent reduction in the odds of absence for girls, but not for boys, with hygiene promotion and water treatment interventions. Similarly, a study from Uganda (Muduwa, Ddembe & Nakawoo, 2019) reported an increase in school enrolment in a very short period of time (380 in 2010 to over 800 by the end of 2012) and a drop in absenteeism rates by 38 percent following provision of WASH facilities for schools. However, Chard et al., 2019 (Kenya) reported no impact of provision of WASH facilities on pupil absenteeism, enrolment, dropout, and grade progression outcomes.

121. Studies reported positive outcomes of school-based interventions focused on girls' menstrual management. A study from Uganda (Kansiime C, Hytti L, Nalugya R, et al., 2020) on the MENISCUS intervention that involved menstrual hygiene management, demonstrated a decrease in the

proportion of girls reporting anxiety about next period from 58.6 percent to 34.4 percent, and an increase in reported use of effective pain management from 76.4 percent to 91.4 percent. The study also indicated that most girls (81.4 percent) reported that improved school toilet facilities improved their comfort managing menstruation, which potentially impacts on their menstrual-related school absenteeism. Similarly, Phillips-Howard et al., 2016 (Kenya) reported that provision of menstrual cups and sanitary pads for a year was associated with a lower sexually transmitted infection (STI) risk, and cups with a lower bacterial vaginosis risk, but there was no association with school dropout. A study in Ethiopia (Huynh, 2019), observed a small to no effect on Math and English test scores of schools that provide menstrual hygiene management (MHM) spaces and school that do not.

122. One study from Kenya which involved a cleaning intervention (Caruso et al., 2014) did not find a reduction in pupil absenteeism with a scalable, low-cost, school-level latrine cleaning, indicating that the additional impact of cleaning may not have been sufficient to reduce absence beyond reductions attributable to the original WASH intervention.

5.7 Discussion of results

123. The school environment offers an ideal cost-effective platform to deliver basic health interventions that can target the most common health conditions affecting school-aged children and their families (Bundy et al., 2018). With school health and nutrition programmes, both health and education sector's goals can be addressed with possible extended impact on the success of other sector development (Sarr et al., 2017). For optimal outcomes of school-based programmes, evaluation of the efficacy of interventions is a critical undertaking. Hence, in the present review, we have evaluated the outcomes of five school-based health and nutrition interventions, including school feeding, school-based deworming, HIV prevention, WASH and nutrition education in the WFP East and Central Africa region. In doing so, data from well-designed trials and or rigorously conducted country reports are required. However, such rigorous studies are few, particularly in low-income countries. Hence, to mitigate the anticipated shortage of adequate studies, we have included all published and unpublished studies conducted in the region irrespective their risk of bias.

124. In the synthesis, a relatively consistent positive effect of school feeding programmes on nutritional status of school-aged children, and a decline in morbidities were observed, particularly in programmes in which micronutrient fortification and animal source foods were provided. In the search, we maintained a high level of pragmatism by including interventional observational published and grey literatures. However, only one or two studies were available for each studied nutritional outcomes; stunting, wasting, thinness, underweight and anaemia. Furthermore, due to the depth of the included studies, the independent effect of school feeding on nutrition, health, and education of school-aged children difficult to ascertain. Studies that explore or control the independent effects of school feeding programmes adjusted for various factors including modality, timing, and composition of snacks or meals, age of child, and other household characteristics are necessary, yet they are limited.

125. In spite of all the above limitations, there exists evidence of improvements in nutritional outcomes of school-aged children, such as a non-significant reduction in anaemia, reduction in thinness, stunting, and improvement in dietary intake. These findings may warrant the need for further well-designed, large-scale trials that can inform the conditions under which school feeding programmes might benefit school-aged children, which are important but were not reported. As Drake et al., (2016) highlighted, there is no one-size-fits-all model for school feeding programmes,

given that different countries approach school feeding programmes with different objectives and different modalities. However, good practices from other regions, which are likely applicable for East and central Africa, such as the inclusion of fruits and vegetables, the collaboration with local smallholder farmers, and the incorporation of school feeding programmes with other school-based programmes should be considered.

126. We also evaluated the impact of school-based deworming on school-aged children in the region. In a meta-analysis of six studies (10,567 children), we found a non-significant reduction in prevalence of soil transmitted helminths with school-based deworming programmes. Our findings may warrant the need to extend the intervention beyond school to community-based programmes in settings where WASH-related illnesses are at the top of morbidity. One large clustered randomized controlled trial (Pullan et al., 2019) included in the present review reported lower achievement of SBDW relative to community-based deworming in reducing soil-transmitted helminth prevalence (risk ratio = 0.46 and 0.59 for annual and biannual community-wide treatment respectively). This phenomenon may indicate the need for better investigation of the efficacy of school-based deworming to stop the transmission chain of STH in settings with a poor record of sanitation and hygiene. A similar pattern of results was obtained from Anderson et al. (2013) who reported limited benefit of school-based deworming, given that 15 percent of hookworm eggs, and 50 percent of Ascaris lumbricoides worms in the community were attributed to school-aged children who had received repeated treatment. Clarke et al. (2016) also reported greater reduction in prevalence hookworm (odds ratio 4.6, 95% CI: 1·8-11.6) and Ascaris lumbricoides (16.4, 2.1-125.8) with mass deworming as compared to targeted deworming.

127. We could not locate any study to support or refute the utility of school-based deworming programmes in improving the nutritional status of school-aged children in the region. Interestingly, Robinson et al. (2019) reported no improvement in nutritional status, haemoglobin, cognition, school performance, or survival with mass deworming programmes. However, there are indications of health and nutritional benefits with mass deworming interventions, from earlier systematic reviews (Hall et al., 2008, Albonico et al., 2008).

128. We also could not locate any study conducted in the region, aimed at evaluating the effect of school-based deworming on any of ill-health biomarkers including haemoglobin/anaemia. Hence, we could neither support nor refute the impact of school-based deworming on anaemia prevalence in the region. Nonetheless, the available review on the matter of the effects of deworming on haemoglobin reported a marginal increase in mean values that could translate into a small reduction (5 percent to 10 percent) in anaemia in a population with a high prevalence of intestinal helminths. Similarly, a meta-analysis by Robinson et al. (2019) also reported a single dose probably has no effect on average haemoglobin (MD 0.06 g/DL, 95% CI -0.05 - 0.17). In the midst of these uncertainties, the potential for interrupting transmission of soil-transmitted by deworming programmes are now under investigation in randomized clinical trials through DeWorm3 studies, which are aimed at assessing the feasibility of interrupting the transmission of soil-transmitted helminths through mass drug administration.

129. Interestingly, school-based nutrition education was reported to have optimal health and nutritional outcomes in all included studies. Schools provide the most effective and efficient opportunity to reach a large segment of the population through nutrition education aimed at promoting healthy eating behaviour (Anderson et al., 2013).

130. We have also evaluated school-based HIV prevention interventions in WFP East and Central African countries. Our extensive search followed by screening using more pragmatic inclusion criteria

provided only 14 studies. There is a paucity of studies relative to the many HIV risk factors that require a wide range of interventions. Nonetheless we found promising interventions which work for school-based children in the region.

131. All of the interventions in the present review but one, were effective in improving the knowledge of students about HIV and SRH. The common characteristics of these interventions were the involvement of teachers and integrating HIV/SRH education in school curriculum. These features were consistently observed in 'Primary School Action for Better Health (PSABH) model' (Maticka-Tyndale, Mungwete and Jayeoba 2014), Making Life's Responsible Choices course (Harper GW, et al., 2018), and school life skills session interventions (Njue et al., 2015) in Kenya, school lessons on SRH topics in Uganda (Kemigisha et al., 2019) and the Sudanese National Aids Program (SNAPS) (Maha et al., 2015). School-based educational sessions have the potential to be inclusive of all SRH topics and provide training opportunities for both teachers and students. However, contrary to the above findings, a study in Rwanda (Michielsen et al., 2012) reported limited utility of peer education intervention in improving knowledge towards HIV/sexual risk behaviour. Conversely, this finding contradicts the result of studies in Ethiopia and Rwanda that involve the same intervention (peer education) for positive gains in knowledge. Such disparity suggests the need to understand the context in which any intervention is selected and the peer dynamics in the schools before designing the modality of interventions. There is great deal of debate about the source young people prefer receiving sexual health information such as parents, teachers, friends or digital media. In some instances, cultural practices restrict young people from accessing sexual health information.

132. Greater condom use gains were reported in four studies which involved peer education interventions on risky sexual behaviours (Menna, Ali and, Worku, 2015, Odundo, Anjuri and Odhiambo, 2013), the 'Primary School Action for Better Health' (Maticka-Tyndale, Mungwete and Jayeoba 2014)' and low-tech, computer-based interactive sex education (Rijsdijk et al., 2011) in Uganda. These findings corroborate previous suggestions that school-based HIV interventions in Sub-Saharan Africa have the potential to promote condom use among young people and justify further investment in such interventions in the region (Sani et al., 2016).

133. Interestingly, there were two studies (Cho et al., 2011 and 2018) that reported the positive utility of keeping orphan youths through fee and uniform support in school as an HIV prevention strategy. In these studies, comprehensive school support effectively prevented school dropout, delayed sexual debut, and reduced HIV risk factors. Though it seems resource intensive, such an intervention could protect 10.9 million orphaned children by the HIV pandemic living in sub-Saharan Africa (UNICEF, 2016). Such an intervention could mitigate the economic and social impact of HIV and AIDS on children orphaned by AIDS, or who are living with sick caregivers and face an increased risk of physical and emotional abuse.

134. Interventions that involve peers in some form were found to improve HIV counselling and testing service utilization (Ruria et al., 2017 and Odundo, Anjuri and Odhiambo, 2013). These findings suggest peer-driven interventions models to promote HIV and AIDS service utilization might be most effective in student populations. It has been long known that since peer education as a behavioural change strategy draws on several well-known behavioural theories that implicitly assert that certain members of a given peer group (peer educators) can be influential in eliciting behavioural change among their peers (Coates, 2008). Hence effective design and implementation of peer programmes could improve HIV counselling and testing service uptake whenever applicable.

135. Results pertaining sexual debut and risky sexual behaviour were heterogeneous. The Primary School Action for Better Health model (Maticka-Tyndale, Mungwete and Jayeoba, 2014), Making Life's Responsible Choices course (Harper et al., 2018), and school life skill session interventions (Njue et al., 2015), Keeping Adolescent Orphans in School, Peer education club membership (Odundo, Anjuri and Odhiambo, 2013) and life skill training sessions (Rijsdijk et al., 2011) reported positive gains in reducing risky sexual behaviour. However, results of the quasi-experimental studies in Ethiopia and Rwanda, which involve peer education interventions, reported no change in desired sexual outcomes such as limiting the number of sexual partners. Individual and review studies have shown that peer education interventions do not completely succeed in reducing sexual risk behaviour (Michielsen, 2012, Medley et al., 2009, and Fritz et al., 2011). These contrasting findings may inform the need for more complex interventions involving elder figures such as teachers to bring change in sexual behaviour to safeguard adolescents from sexually transmitted infections, including HIV.

136. Due to the paucity of data, it is difficult to draw any firm conclusion about the utility of computer-based sexual education on school-aged children. There is only one included study, which involves low-tech, computer-based interactive sex education delivered with other combinations of interventions, hence, the isolated effect of the intervention was difficult to ascertain (Rijsdijk et al., 2011). Nonetheless, the most recent systematic review (Maloney et al., 2020) indicates that the overwhelming majority of validated interventions were designed for use in high-income countries, where smartphones and high- speed internet are ubiquitous. Limited access to new technologies in poor settings has likely discouraged researchers from developing interventions for these regions with the greatest need.

137. This review highlights the importance of school-based HIV interventions in improving the attitudes of students and student-parent sex communication (Caruso et al., 2014 and Maha et al., 2015). These changes could help to decrease stigma and discrimination, and to improve life skills, which is an integral part of adopting safe sexual behaviour.

138. There is clear lack of rigorous studies focusing on the impact of school- based HIV interventions on incidence or prevalence of STIs including HIV. There is also a lack of robust data on school-level adherence to the intervention implementation processes. Moreover, the included studies are from few countries, as we could not locate studies from Burundi, Somalia, and Eritrea. The findings therefore cannot be generalised to all countries in the region.

139. We were able to locate 19 studies to evaluate school- based WASH interventions. Except one, all of these studies were interventional studies (18 studies). There is clear biological plausibility supporting the health and educational benefits of providing WASH interventions in schools to bring about change in biological as well as educational outcomes. Accordingly, the included studies in this review indicate that school-based WASH interventions can protect against WASH-related illness, increase WASH-related knowledge and practices, and improve educational outcomes including reduced absenteeism, as long as the context for the implementation of the interventions is suitable.

140. Six of the studies reported the potential of school-based WASH intervention in reducing illness (Garn et al., 2016, Zhang et al et al., (2013), Dreibelbis et al., (2017), Patel et al., (2012) and Gelaye et al., (2014). It is plausible that reduced illness could bring about better educational outcomes by reducing absenteeism. Studies that focused on educational outcomes reported better enrolment (Muduwa, Ddembe & Nakawoo, 2019, Garn et al., 2014) and reduced absenteeism (Muduwa, Ddembe & Nakawoo, 2019 and Freeman et al., 2014).

141. Due to the paucity of data, the evidence on spill over beneficial effects of WASH interventions to the family and larger community is limited. However, if one considers the communicable nature of infectious diseases, reduction in WASH-related disease among family members can be expected. A cluster randomized trial in Kenya (Dreibelbis et al., 2017) reported measureable reduction in diarrheal diseases (45 percent -65 percent) among children younger than five years whose siblings attend intervention schools. These findings demonstrated the potential spill over effect of school-based WASH interventions to families and the larger community.

142. An interesting finding in the present review is the potential of WASH interventions in improving educational outcomes such as absenteeism and enrolment, for girls. Garn et al., 2014 (Kenya) reported that a school-based hygiene promotion, water treatment and sanitation improvement programme resulted in 4 percent increase in the proportion of girls enrolled in school. Freeman et al., 2014 (Kenya) also reported 58 percent reduction in the odds of absence for girls, with the same intervention. Furthermore, Kansiime C, Hytti L, Nalugya R, et al (2020) also reported that most girls (81.4 percent) indicated that their comfort in managing menstruation due to the improved school toilet facilities do have potential impact on menstrual-related school absenteeism. Conversely, there are studies, which reported null effect of such interventions, which can be the consequence of intervention type, programme fidelity and adherence.

143. It is plausible to hypothesise that all of the school-based interventions are effective in improving at least one intermediate or end line outcome. The context in which these interventions are applied is what matters for the efficacy of these interventions. For example, Freeman et al. (2014) reported a reduction in diarrhoea incidence with school WASH intervention in pupils attending 'water-scarce' schools' but not in water-available' schools'. Similarly, Garn et al. (2016) also found that reduction in prevalence of diarrhoea among pupils attending schools that adhered to two or three intervention components, compared with schools that adhered one component. These observations justify the need for selecting the right interventions based on the setting characteristics, as there is no universal blueprint and consistent effects across interventions.

144. In conclusion, school-based interventions have the potential to provide comprehensive preventive education and training to yield improved nutritional, health and educational outcomes. However, there are insufficient numbers of rigorous studies on the context specific factors that can facilitate and or hinder the desired outcomes of school-based health and nutrition interventions in the East and Central Africa region.

6 Challenges and gaps

145. This section highlights some of the challenges and gaps identified in the course of this review that impact on the effectiveness of these interventions. Most of the literature reviewed focused on school feeding programmes. Our search on school-based HIV and WASH interventions did not yield studies that explored implementation challenges in a substantive way. The ensuing paragraphs focus on school feeding challenges. It is however plausible that school-based interventions, whether school feeding, HIV or WASH, will have some challenges in common.

146. The African Union a major proponent of school feeding, commissioned a comprehensive study on sustainable school feeding on the African continent. The study found that while a number of African countries were already implementing school feeding programmes, these programmes often fall short of meeting the required impact. It highlighted the following key challenges facing the effective implementation of school feeding programmes: inadequate financing and heavy

dependence on foreign donors, poor logistical arrangements, and the provision of dry food lacking in dietary diversity (African Union, 2018). The report identified the lack of national scale monitoring and evaluation as a major gap in the implementation of school feeding programmes in Africa.

147. In FAO's regional overview of national school food and nutrition programmes in Sub-Saharan Africa, respondents to the survey identified several implementation challenges and gaps including heavy reliance on external funding; the low coverage of school feeding within countries; insufficient human, financial and technical resource capacities; the lack of nutrition guidelines for school meals; poor or inadequate quantity and quality of school meals; poor kitchen and storage facilities for school feeding; weak institutional arrangements to support school feeding; and the lack of monitoring and evaluation of school feeding programmes (FAO, 2018).

148. The WFP synthesis of evaluations for the East and Central Africa region (2013-2017) although not focused exclusively on school health and nutrition, provides useful insights into factors that affect results in the region. These factors include climate-related challenges (mainly drought), difficult operating terrains and security challenges, funding-related concerns including restrictions placed on in-kind contributions, programme design flaws, problems with targeting beneficiaries, and limited human resources within WFP (WFP, 2017).

149. We found very few studies or evaluations that discussed challenges and gaps related to school feeding at the country level in the East and Central Africa region, and the evaluations we found were all WFP evaluations. In reviewing country-level evaluation reports, it is evident that although countries appear to face similar challenges, the manner in which these challenges manifest themselves is largely shaped by the country context.

Design and implementation

150. **Procurement and food preferences**: Although Ethiopia and Kenya have good procurement systems in place, they do experience delivery challenges. For example, frequent breakdowns in the pipeline in Ethiopia causes delays in delivery of food (WFP, 2019, a), and in Kenya, the centralized distribution procedures required by some county governments contribute to delivery delays and teachers sometimes using personal funds to collect the food (WFP, 2018, a). In the case of Rwanda, there was a lack of clarity around the strategy for local procurement, resulting in confusion and differing expectations around, for example, parent contribution and linkages with local cooperatives (WFP, 2019, b). Food quality is also raised as an issue. For example, being too close to the 'best before' date, or damaged containers (WFP, 2019, a) and in Somalia, schools stated preference for cash transfers in place of in-kind food as the commodities provided did not always meet local preferences (WFP, 2018, b).

151. **Insecurity and climate-related factors:** In countries such as Somalia and South Sudan where there is a high level of physical insecurity and food insecurity, school feeding programmes are pragmatic focus on food security rather on educational goals. School feeding in areas affected by conflict is often disrupted as people, including schoolchildren are displaced. Teachers' strikes, for example, in Kenya have disrupted school feeding programmes. The evaluation of school feeding in Ethiopia found that the design of the community-based programme did not adequately take climate conditions into account. Communities moved during drought periods and often were unable to meet obligations to pay the salaries of cooks or provide water and firewood to prepare school meals (WFP, 2019, a).

152. **Unintended consequences or harm**: School feeding programmes can have unintended consequences that undermine their impact. For example, in Burundi school feeding has increased enrolment in schools, and without expansion of school infrastructure and teaching capacity, classroom sizes have increased and the quality of education affected negatively (WFP, 2016). Food sharing was found to be a common occurrence in Kenyan primary schools where pre-primary children formed part of the school, and this led to reduced meal sizes for primary school children (WFP, 2018, a). Similarly, there is a possibility of passing of information about HIV that do more harm than good by peer educator/teachers if less intensive training was provided (Mathews et al., 2014).

Financing, capacity and governance

153. **Sustainable financing** is perhaps the most common challenge in implementing school feeding programmes effectively, and with sufficient coverage to have an overall and sustainable impact on the health and nutrition of school-aged children. In Kenya for example, the School Meals Programme does not always have the funds required to feed all schoolchildren daily. Late disbursement of funds from the National Treasury was also identified as a challenge for counties in Kenya that had transitioned to the home-grown school feeding model (WFP, 2018, a). Schools in low-income settings lack the financial resources for continuous maintenance of WASH facilities (Celia, 2018).

154. **Government capacity and governance**: Capacity challenges of government at federal, regional, local and school administration levels were identified as a significant challenge to the effective and efficient implementation of the school feeding programme in Ethiopia. Capacity challenges include the high turnover of senior management, making it challenging to strengthen the policy environment, while at regional level capacity constraints have in some instances affected the quality and timeliness of implementation (WFP, 2019, a). These problems can also impact other school-based interventions. Teachers require training to effectively implement HIV-related interventions, and unless this is integrated into the school curriculum and resourced, it becomes an add-on to work of teachers. In the case of poorly resourced schools, this can add further strain on teachers. The attitudes of teachers to sexuality pose a challenge when these attitudes contradict the sexuality education programme.

155. Policy coherence: The mapping of policies related to school health and nutrition found that, in most countries in the region, policy directives on school health and nutrition are fragmented across multiple policies of different ministries. This presents a major challenge for policy coherence and for the coordination of school-based interventions. There is the risk that uncoordinated or poorly coordinated school-based health and nutrition interventions undermine one another instead of accelerating improvements in the health and nutrition status of school-aged children.

Data and information gaps

156. **Monitoring, evaluation and reporting:** Monitoring and reporting on school feeding programmes is not always rigorous or done consistently. This may be as a result of insufficient budget allocation for monitoring and reporting, or a lack of technical capacity at school administration level and in the relevant coordinating ministries. It is also challenging to monitor in contexts where there is conflict and disruption of school feeding programmes. With weak monitoring systems it becomes challenging to build a robust evidence base to inform policies and programmes. As mentioned earlier, there are few rigorous research and evaluation studies that can enhance our understanding of the impacts of school-based health and nutrition interventions. Similarly,

resources for increased monitoring, training refreshers, and regular support of WASH and HIV prevention activities could be especially important in low-resource or rural settings where teachers and schools have fewer resources with which to educate the children in their communities.

157. **Evidence gap:** There is large gap on evidence of the benefits of large-scale implementation of school-based HIV and WASH interventions. There is need for more research on large-scale interventions and the relative contributions of different components to the effectiveness of the interventions. Those components that are found to be most effective can then be used to scale up interventions, while those components that are found to be less effective can be removed from the intervention (Maticka-Tyndale, Mungwete and Jayeoba, 2014). Data disaggregated by sex are essential for the design of effective interventions, as the health and nutrition needs of girls and boys are not the same. The review also noted that there were insufficient studies that disaggregated data by sex.

7 Conclusions and lessons learned

7.1 Conclusions

158. There is increasing recognition that the subsequent 7,000 days of children are as important as the first 1,000 days for them to develop into healthy adults and achieve their full potential, yet data on the health and nutrition of school-aged children is limited. With the limited data available, the review established that school-aged children in the WFP East and Central Africa region have a high burden of preventable morbidity and mortality. The prevalence of underweight school-aged children is high, along with high prevalence of dietary iron deficiencies and intestinal worms. The prevalence of malaria among school-aged children in the region is very high in Burundi and Uganda where malaria is endemic. The data also highlighted to some extent, the differences between girls and boys, with girls being more likely to be overweight than boys, and HIV prevalence rates higher for female adolescents than for male adolescents.

159. School feeding programmes are in place in all countries in the region, and are at the centre of school-based health and nutrition. Most of the school feeding programmes have complementary interventions, mainly deworming, nutrition education, training and capacity building of teachers and cooks. Bearing in the mind the methodological limitations of this systematic review, the findings indicate a positive effect of school feeding on the nutritional status of school-aged children, and a decline in morbidities, particularly in programmes in which micronutrient fortification and animal source food were provided. School-based deworming was shown to have benefits in the reduction of soil-transmitted helminths. However, the data also indicate that the effectiveness of deworming could be improved if extended to community-based intervention in places where water, sanitation and hygiene are poor. School-based nutrition education was found to have positive outcomes for health and nutrition.

160. School-based HIV prevention interventions have the potential to provide comprehensive preventive education and training to yield improved knowledge and attitude towards HIV and condom use. The benefits of school-based WASH interventions can be clearly established with potential spill over effect of these benefits to families and the larger community. With school-based WASH interventions, particularly those involving menstrual management schemes, health and educational benefits for girls can be achieved.

161. The implementation of school-based health and nutrition interventions in the region is challenged by capacity constraints within government ministries, insecurity and climate-related factors, the lack of sustainable financing by governments, and challenges in procurement and quality of food. Community-based initiatives become a burden to communities in times when they are unable to contribute to, for example, to the school feeding programme.

7.2 Lessons learned

162. The design of school-based health and nutrition interventions should be sensitive to local contexts, not only to national contexts. Local climatic conditions and terrains, capacities of communities and parents to participate and contribute to the implementation of programmes should be taken into account in the design of interventions. Schools do not exist in isolation of the communities in which they are located, and it is therefore essential that parents and the wider community are consulted in the design of interventions to ensure that they are relevant to the needs of their children.

163. Countries tend to have multiple policies that cover school health and nutrition, and not all countries have stand-alone school feeding, HIV or WASH policies. There is a risk that these policies inadvertently contradict one another, so effective coordination of the different ministries and sectors is essential. Different ministries may be responsible for implementation of policies, for example, ministries health, education, water and sanitation, social welfare. It is essential that implementation is coordinated effectively, so that schools do not receive contradictory direction.

164. School-based health and nutrition interventions should ideally be tailored to their age-related needs, as the needs of 6-year olds are vastly different to the needs of 10-year olds, and 18-year olds. It is equally important to tailor interventions to the different needs of girls and boys, female and male adolescents.

165. School-based health and nutrition interventions can be mutually reinforcing, for example, combining school feeding with nutrition education and deworming. Similarly linking WASH interventions with school feeding can be more impactful than stand-alone interventions. An integrated approach to school-based health and nutrition interventions does however require good coordination capacity at school-level.

166. It is essential that meals provided to children are nutritious and culturally acceptable to children and their parents if the nutritional status of school-aged children is to be improved. Meals need to meet the preferences of parents and children in terms of quality and quantity to ensure that they attend school regularly and consume the food

167. School-based HIV interventions have the potential to provide comprehensive preventive education and training to yield improved knowledge of HIV and condom use. These interventions are more likely to have impact if they are long term educational classes integrated within school curriculum activities that are supported with reference materials.

168. School-based WASH programmes can be more impactful if applied in appropriate settings where there is a demand for these interventions. Girls would benefit more if school WASH programmes involve menstrual management intervention components.

169. Greater investment is needed in strengthening monitoring and evaluation of school feeding and other school-based health and nutrition interventions, and investment in research to generate robust evidence to inform policies and improve the design and implementation of programmes.

It is essential that data collected through monitoring and research are disaggregated by sex so that school-based health and nutrition interventions take into account the different needs of girls and boys.

REFERENCES

Adelman, S., Gilligan, D. O., Konde-Lule, J., & Alderman, H. (2019). School Feeding Reduces Anemia Prevalence in Adolescent Girls and Other Vulnerable Household Members in a Cluster Randomized Controlled Trial in Uganda. J Nutr, 149(4), 659–666. https://doi.org/10.1093/jn/nxy305

Africa Union. First Edition of the Africa Day for School Feeding (2016). https://au.int/en/pressreleases/20160222-2

African Union (2018). Sustainable school feeding across the African Union. Addis Ababa, January 2018. https://au.int/sites/default/files/documents/36100-doc-sustainable_school_feeding_1.pdf

Aiken, A. M., Davey, C., Hargreaves, J. R., & Hayes, R. J. (2015). Re-analysis of health and educational impacts of a school-based deworming programme in western Kenya: a pure replication. International Journal of Epidemiology, 44(5), 1572–1580. https://doi.org/10.1093/ije/dyv127

Albonico M, Allen H, Chitsulo L, Engels D, Gabrielli AF, Savioli L (2008). Controlling soil-transmitted helminthiasis in pre-school-age children through preventive chemotherapy. PLoS Neglected Tropical Diseases 2008;2(3):e126.

Ali, J., Polland, A., Adlerstein, D., Gziabher, Y. G., Sabar, G., Liss, Y., & Bentwich, Z. (2019). Deworming school children in Ethiopia: The importance of a comprehensive approach. Open Journal of Tropical Medicine, 3(1), 001-006.

Anderson, R. M., Truscott, J. E., Pullan, R. L., Brooker, S. J., & Hollingsworth, T. D. (2013). How effective is school-based deworming for the community-wide control of soil-transmitted helminths?. PLoS Negl Trop Dis, 7(2), e2027.

Aregawi, F., Yusuf J., and Haji J. (2012). The impact of school feeding program on students enrollment and Drop out in Jigjiga zone, Somali national regional state, Haramaya University. Ethiopia. Available at: http://etd.aau.edu.et/bitstream/handle/123456789/1176/Abiy%20Yohannes.pdf?sequence=1&isAllowed=y

Assefa, E. Tefera D. (2015). The Impact of School Feeding Programme on Students Academic Performance: The Case of Selected Elementary Schools in Debre Libanos Wereda, Oromia Region. Addis Ababa University. Available at: http://localhost/xmlui/handle/123456789/11060

Bagonza, A. (2013). Relationship between school feeding and academic performance of primary three children in Busia District, Uganda (Doctoral dissertation, Makerere University).

Baum JI, Miller JD, Gaines BL. The effect of egg supplementation on growth parameters in children participating in a school feeding program in rural Uganda: a pilot study. Food & nutrition research. 2017 Jan 1;61(1):1330097.

Belay, S., Kuhlmann, A. K. S., & Wall, L. L. (2020). Girls' attendance at school after a menstrual hygiene intervention in northern Ethiopia. International Journal of Gynecology & Obstetrics, 149(3), 287-291.

Borish, D., King, N., & Dewey, C. (2017). Enhanced community capital from primary school feeding and agroforestry program in Kenya. International Journal of Educational Development, 52, 10-18.

Bundy, D.A.P., de Silva, N., Horton, S., Jamison, D.T. and Patton, G.C. 2018. Re-Imagining School Feeding: A High-Return Investment in Human Capital and Local Economies. Washington, DC, World Bank.

Camaschella, C. (2019). Iron deficiency. Blood, 133(1), 30-39.

Caruso, B. A., Freeman, M. C., Garn, J. V., Dreibelbis, R., Saboori, S., Muga, R., & Rheingans, R. (2014). Assessing the impact of a school-based latrine cleaning and handwashing program on pupil absence in Nyanza Province, K enya: a cluster-randomized trial. Tropical Medicine & International Health, 19(10), 1185-1197.

Celia McMichael. Water, Sanitation and Hygiene (WASH) in Schools in Low-Income Countries: A Review of evidence of Impact. J. Environ. Res. Public Health 2019, 16, 359; doi:10.3390/ijerph16030359

Chard, A. N., Garn, J. V., Chang, H. H., Clasen, T., & Freeman, M. C. (2019). Impact of a school-based water, sanitation, and hygiene intervention on school absence, diarrhea, respiratory infection, and soil-transmitted helminths: results from the WASH HELPS cluster-randomized trial. Journal of global health, 9(2).

Cho, H., Hallfors, D. D., Mbai, I. I., Itindi, J., Milimo, B. W., Halpern, C. T., & Iritani, B. J. (2011). Keeping adolescent orphans in school to prevent human immunodeficiency virus infection: evidence from a randomized controlled trial in Kenya. Journal of Adolescent Health, 48(5), 523-526.

Cho, H., Ryberg, R. C., Hwang, K., Pearce, L. D., & Iritani, B. J. (2017). A school support intervention and educational outcomes among orphaned adolescents: results of a cluster randomized controlled trial in Kenya. Prevention Science, 18(8), 943-954.

Clarke, N. E., Clements, A. C., Doi, S. A., Wang, D., Campbell, S. J., Gray, D., & Nery, S. V. (2017). Differential effect of mass deworming and targeted deworming for soil-transmitted helminth control in children: a systematic review and meta-analysis. The Lancet, 389(10066), 287-297.

Demilew, Y. M., & Nigussie, A. A. (2020). The relationship between school meals with thinness and stunting among primary school students, in Meket Wereda, Ethiopia: comparing schools with feeding and non-feeding program. BMC nutrition, 6(1), 1-10.

Dheressa, D. K. (2011). Education in focus: impacts of school feeding program on school participation: a case study in Dara Woreda of Sidama zone, southern Ethiopia (Master's thesis, Norwegian University of Life Sciences, Ås). Available at: https://nmbu.brage.unit.no/nmbu-xmlui/handle/11250/187763

Drake L, Woolnough A, Burbano C, Bundy D. Global school feeding sourcebook: lessons from 14 countries: World Scientific; 2016.

Dreibelbis, R., Freeman, M. C., Greene, L. E., Saboori, S., & Rheingans, R. (2014). The impact of school water, sanitation, and hygiene interventions on the health of younger siblings of pupils: a cluster-randomized trial in Kenya. American journal of public health, 104(1), e91-e97.

FAO , The State of Food Security and Nutrition in the World 2020. Available at; http://www.fao.org/documents/card/en/c/ca9692en

FAO, ECA and AUC. 2020. Africa Regional Overview of Food Security and Nutrition 2019. Accra. https://doi.org/10.4060/CA7343EN

FAO. Home Grown School Feeding http://www.fao.org/3/I8063EN/i8063en.PDF

Freeman, M. C., Clasen, T., Dreibelbis, R., Saboori, S., Greene, L. E., Brumback, B., ... & Rheingans, R. (2014). The impact of a school-based water supply and treatment, hygiene, and sanitation programme on pupil diarrhoea: a cluster-randomized trial. Epidemiology & Infection, 142(2), 340-351.

Freeman, M. C., Greene, L. E., Dreibelbis, R., Saboori, S., Muga, R., Brumback, B., & Rheingans, R. (2012). Assessing the impact of a school-based water treatment, hygiene and sanitation programme on pupil absence in Nyanza Province, Kenya: a cluster-randomized trial. Tropical medicine & international health, 17(3), 380-391.

Fritz, K., McFarland, W., Wyrod, R., Chasakara, C., Makumbe, K., Chirowodza, A., ... & Woelk, G. (2011). Evaluation of a peer network-based sexual risk reduction intervention for men in beer halls in Zimbabwe: results from a randomized controlled trial. AIDS and Behavior, 15(8), 1732-1744.

Gallenbacher, R. (2018). Impact of school feeding on primary school education in Ethiopia (Doctoral dissertation, uniwien). Available at: https://othes.univie.ac.at/54298/

Garn, J. V., Brumback, B. A., Drews-Botsch, C. D., Lash, T. L., Kramer, M. R., & Freeman, M. C. (2016). Estimating the effect of school water, sanitation, and hygiene improvements on pupil health outcomes. Epidemiology (Cambridge, Mass.), 27(5), 752.

Garn, J. V., Greene, L. E., Dreibelbis, R., Saboori, S., Rheingans, R. D., & Freeman, M. C. (2013). A cluster-randomized trial assessing the impact of school water, sanitation and hygiene improvements on pupil enrolment and gender parity in enrolment. Journal of water, sanitation and hygiene for development, 3(4), 592-601.

Gelaye, B., Kumie, A., Aboset, N., Berhane, Y., & Williams, M. A. (2014). School-based intervention: evaluating the role of water, latrines and hygiene education on trachoma and intestinal parasitic infections in Ethiopia. Journal of water, sanitation and hygiene for development, 4(1), 120-130.

Gewa, C. A., Murphy, S. P., Weiss, R. E., & Neumann, C. G. (2013). A school-based supplementary food programme in rural Kenya did not reduce children's intake at home. Sci Adv, 16(4), 713–720. https://doi.org/10.1126/sciadv.aau0790 10.1017/s1368980012003266

Gitau, G. N., Kimiywe, J. O., & Waudo, J. N. (2016). Quality Nutrition Education and Its Impact on Haemoglobin Levels of School Pupils of Muranga Country, Kenya. International Journal of Advanced Nutritional and Health Science, 4(1), 155-173.

Global Network Against Food Crises. 2020 Global Report on Food Crises: Joint analysis for better decisions, https://www.fsinplatform.org/sites/default/files/resources/files/GRFC_2020_ONLINE_200420.pdf

Global Nutrition Report, 2020 Available at; https://globalnutritionreport.org/documents/9/English_full_report.pdf

Greene, L. E., Freeman, M. C., Akoko, D., Saboori, S., Moe, C., & Rheingans, R. (2012). Impact of a school-based hygiene promotion and sanitation intervention on pupil hand contamination in Western Kenya: a cluster randomized trial. The American journal of tropical medicine and hygiene, 87(3), 385-393.

Hall A, Hewitt G, Tuffrey V, de Silva N (2008). A review and metaanalysis of the impact of intestinal worms on child growth and nutrition. Maternal and Child Nutrition 2008;4(Suppl 1):118–236.

Harper, G. W., Muthigani, A., Neubauer, L. C., Simiyu, D., Murphy, A. G., Ruto, J., ... & Muthiani, P. (2018). The Development and Evaluation of a National School-based HIV Prevention Intervention for Primary School Children in Kenya. Journal of HIV and AIDS, 4(1).

Hulett, J. L., Weiss, R. E., Bwibo, N. O., Galal, O. M., Drorbaugh, N., & Neumann, C. G. (2014). Animal source foods have a positive impact on the primary school test scores of Kenyan schoolchildren in a cluster-randomised, controlled feeding intervention trial. Br J Nutr, 111(5), 875–886. https://doi.org/10.1017/s0007114513003310

Huynh, J. C. (2019). Exploring the Effect of Menstrual Hygiene Management Spaces on Academic Achievement: Evidence From Young Lives' School Survey in Ethiopia (Master's thesis, The University of Bergen).

Issa Omar M, Willy Muturi and Mohamed Said Samantar. (2019); Influence of school feeding programme on performance of public primary schools in Bossaso District Bari Region, Puntland-Somalia. Int. J. of Adv. Res. 7 (Apr). 1029-1051] (ISSN 2320-5407). http://dx.doi.org/10.21474/IJAR01/8922

Kansiime, C., Hytti, L., Nalugya, R., Nakuya, K., Namirembe, P., Nakalema, S., ... & Weiss, H. A. (2020). Menstrual health intervention and school attendance in Uganda (MENISCUS-2): a pilot intervention study. BMJ open, 10(2).

Katahoire, A. R., Banura, C., Muhwezi, W. W., Bastien, S., Wubs, A., Klepp, K. I., & Aarø, L. E. (2019). Effects of a school-based intervention on frequency and quality of adolescent-parent/caregiver sexuality communication: Results from a randomized-controlled trial in Uganda. AIDS and Behavior, 23(1), 91-104.

Kemigisha, E., Bruce, K., Ivanova, O., Leye, E., Coene, G., Ruzaaza, G. N., ... & Michielsen, K. (2019). Evaluation of a school based comprehensive sexuality education program among very young adolescents in rural Uganda. BMC public health, 19(1), 1-11.

Loechl, C., Lubowa, A., Cole, C., Prain, G., & Low, J. (2010). School-based nutrition education and promotion of orange-fleshed sweetpotato in urban and peri-urban areas of Kampala: Impacts and lessons learnt. International Potato Center. Available at: https://issuu.com/internationalpotatocenter/docs/005443

Maha Ali, M. H. M., Osman, O. B., Ibrahim, M. A. M., & Ahmed, W. A. M. (2015). The effect of AIDS peer health education on knowledge, attitudes, and practices of secondary school students in Khartoum, Sudan. AIMS public health, 2(4), 718.

Masaku, J., Njomo, D.W., Njoka, A. et al. Soil-transmitted helminths and schistosomiasis among pre-school age children in a rural setting of Busia County, Western Kenya: a cross-sectional study of prevalence, and associated exposures. BMC Public Health 20, 356 (2020). https://doi.org/10.1186/s12889-020-08485-z

Matthews EJ, Puffer ES, Meade CS, Broverman SA. Implementation of a school-based HIV prevention curriculum following national dissemination in Nyanza Province, Kenya. East African medical journal. 2014 Nov 20;91(5):152-60.

Maticka-Tyndale, E., Mungwete, R., & Jayeoba, O. (2014). Replicating impact of a primary school HIV prevention programme: primary school action for better health, Kenya. Health Education Research, 29(4), 611-623.

Medley, A., Kennedy, C., O'Reilly, K., & Sweat, M. (2009). Effectiveness of peer education interventions for HIV prevention in developing countries: a systematic review and meta-analysis. AIDS Education and Prevention, 21(3), 181-206.

Menna, T., Ali, A., & Worku, A. (2015). Effects of peer education intervention on HIV/AIDS related sexual behaviors of secondary school students in Addis Ababa, Ethiopia: a quasi-experimental study. Reproductive health, 12(1), 1-8.

Michielsen, K., Beauclair, R., Delva, W., Roelens, K., Van Rossem, R., & Temmerman, M. (2012). Effectiveness of a peer-led HIV prevention intervention in secondary schools in Rwanda: results from a non-randomized controlled trial. BMC public health, 12(1), 1-11.

Michielsen, K., Beauclair, R., Delva, W., Roelens, K., Van Rossem, R., & Temmerman, M. (2012). Effectiveness of a peer-led HIV prevention intervention in secondary schools in Rwanda: results from a non-randomized controlled trial. BMC public health, 12(1), 1-11.

Mondiale de la Santé, O. (2003). Creating an Environment for Emotional and Social Well-Being: An Important Responsibility of a Health Promoting and Child Friendly School. Genève: OMS.

Muduwa, F. (2013, July). Restoring child dignity through WASH in schools: an urban study of Kiddawalime Primary School, Kampala. In Delivering water, sanitation and hygiene services in an un-certain environment: Proceedings of the 36th WEDC International Conference, Nakuru, Kenya (pp. 1-5). cc WEDC, Loughborough University.

Mwandawiro, C., Okoyo, C., Kihara, J., Simiyu, E., Kepha, S., Campbell, S. J., Freeman, M. C., Brooker, S. J., & Njenga, S. M. (2019). Results of a national school-based deworming programme on soil-transmitted helminths infections and schistosomiasis in Kenya: 2012-2017. Parasites & Vectors, 12(1), 76. https://doi.org/10.1186/s13071-019-3322-1

Mwandawiro, C., Okoyo, C., Kihara, J., Simiyu, E., Kepha, S., Campbell, S. J., & Njenga, S. M. (2019). Results of a national school-based deworming programme on soil-transmitted helminths infections and schistosomiasis in Kenya: 2012–2017. Parasites & vectors, 12(1), 76.

Neervoort, F., von Rosenstiel, I., Bongers, K., Demetriades, M., Shacola, M., & Wolffers, I. (2013). Effect of a school feeding programme on nutritional status and anaemia in an urban slum: a preliminary evaluation in Kenya. J Trop Pediatr, 59(3), 165–174. https://doi.org/10.1093/tropej/fms070

Negussu, N., Mengistu, B., Kebede, B., Deribe, K., Ejigu, E., Tadesse, G., & Sileshi, M. (2017). Ethiopia schistosomiasis and soil-transmitted helminthes control programme: progress and prospects. Ethiopian medical journal, 55(Suppl 1), 75.

Neumann, C. G., Bwibo, N. O., Jiang, L., & Weiss, R. E. (2013). School snacks decrease morbidity in Kenyan schoolchildren: a cluster randomized, controlled feeding intervention trial. Public Health Nutr, 16(9), 1593–1604. https://doi.org/10.1017/s1368980013000876

Njenga, M., S. M., Brooker, S. J., & Mwandawiro, C. S. (2019). Effects, equity, and cost of school-based and community-wide treatment strategies for soil-transmitted helminths in Kenya: a cluster-randomised controlled trial. Lancet (London, England), 393(10185), 2039–2050. https://doi.org/10.1016/S0140-6736(18)32591-1

Njue, C., Voeten, H. A., Ohuma, E., Looman, C., Habbema, D. F., & Askew, I. (2015). Findings of an evaluation of community and school-based reproductive health and HIV prevention programs in Kenya. African Population Studies, 29(2).

Odundo, P. A., Anjuri, D., & Odhiambo, T. (2013). Impact of peer education on HIV/AIDS behaviour change among secondary school youths: a static group comparison analysis of a peer education project in Rachuonyo County, Kenya. The Lancet, 381, S101.

Okoyo, C., Nikolay, B., Kihara, J., Simiyu, E., Garn, J. V, Freeman, M. C., Mwanje, M. T., Mukoko, D. A., Brooker, S. J., Pullan, R. L., Njenga, S. M., & Mwandawiro, C. S. (2016). Monitoring the impact of a national school based deworming programme on soil-transmitted helminths in Kenya: the first three years, 2012 - 2014. Parasites & Vectors, 9(1), 408. https://doi.org/10.1186/s13071-016-1679-y

Omwami, E. M., Neumann, C., & Bwibo, N. O. (2011). Effects of a school feeding intervention on school attendance rates among elementary schoolchildren in rural Kenya. Nutrition, 27(2), 188–193. https://doi.org/10.1016/j.nut.2010.01.009

Parker, M. E., Mosites, E., Reider, K., Ndayishimiye, N., Waring, M., Nyandimbane, G., Masumbuko, D., Ndikuriyo, L., & Matthias, D. (2015). A Blinded, Cluster-Randomized, Placebo-Controlled School FeedingTrial in Burundi Using Rice Fortified With Iron, Zinc, Thiamine, and Folic Acid. Food Nutr Bull, 36(4), 481–492. https://doi.org/10.1177/0379572115615234

Pasewaldt, S. E., Baller, S. L., Blackstone, S. R., & Bryan Malenke, L. (2019). Impact of a hand hygiene curriculum and group handwashing station at two primary schools in east Africa. International quarterly of community health education, 39(3), 175-187.

Patel, M. K., Harris, J. R., Juliao, P., Nygren, B., Were, V., Kola, S., ... & Quick, R. (2012). Impact of a hygiene curriculum and the installation of simple handwashing and drinking water stations in rural Kenyan primary schools on student health and hygiene practices. The American journal of tropical medicine and hygiene, 87(4), 594-601.

Peterson, L. S., Ondiek, M., Oludhe, D. O., Naul, B. A., & Vermund, S. H. (2011). Effectiveness of a school-based deworming campaign in rural Kenya. Journal of Tropical Pediatrics, 57(6), 461–463. https://doi.org/10.1093/tropej/fmq118

Phillips-Howard, P. A., Nyothach, E., Ter Kuile, F. O., Omoto, J., Wang, D., Zeh, C., ... & Laserson, K. F. (2016). Menstrual cups and sanitary pads to reduce school attrition, and sexually transmitted and reproductive tract infections: a cluster randomised controlled feasibility study in rural western Kenya. BMJ open, 6(11), e013229.

Pullan, R. L., Halliday, K. E., Oswald, W. E., Mcharo, C., Beaumont, E., Kepha, S., Witek-McManus, S., Gichuki, P. M., Allen, E., Drake, T., Pitt, C., Matendechero, S. H., Gwayi-Chore, M.-C., Anderson, R.

Reta, M. A. (2019). College of Leadership and Governance School of Policy Studies Department of Public Policy Studies School Feeding Program and its Contribution to Quality Education in First Cycle Government Primary Schools of Yeka Sub City, Addis Ababa (Dissertation, Department of Public Policy Studies, Ethiopian Civil Service University). Available at: https://www.academia.edu/download/61233441/School_Feeding_Program_and_its_Contribution_to_Quality_Education_in_First20191116-12655-pt75uk.pdf

Rijsdijk, L. E., Bos, A. E., Ruiter, R. A., Leerlooijer, J. N., de Haas, B., & Schaalma, H. P. (2011). The World Starts With Me: A multilevel evaluation of a comprehensive sex education programme targeting adolescents in Uganda. BMC public health, 11(1), 1-12.

Ruria, E. C., Masaba, R., Kose, J., Woelk, G., Mwangi, E., Matu, L., ... & Rakhmanina, N. (2017). Optimizing linkage to care and initiation and retention on treatment of adolescents with newly diagnosed HIV infection. AIDS (London, England), 31(Suppl 3), S253.

Saboori, S., Greene, L. E., Moe, C. L., Freeman, M. C., Caruso, B. A., Akoko, D., & Rheingans, R. D. (2013). Impact of regular soap provision to primary schools on hand washing and E. coli hand contamination among pupils in Nyanza Province, Kenya: a cluster-randomized trial. The American journal of tropical medicine and hygiene, 89(4), 698-708.

Sarr, B., McMahon, B., Peel, F., Fernandes, M., Bundy, D.A.P. Banham, L., Gillespie, A., Tang, K.C.,

Shumbej, T., Menu, S., Girum, T., Bekele, F., Gebru, T., Worku, M., Dendir, A., Solomon, A., Kahase, D., & Alemayehu, M. (2019). Impact of annual preventive mass chemotherapy for soil-transmitted helminths among primary school children in an endemic area of Gurage zone: a prospective cross-sectional study. Research and Reports in Tropical Medicine, 10, 109–118. https://doi.org/10.2147/RRTM.S208473

Silveira, J. A., Taddei, J. A., Guerra, P. H., & Nobre, M. R. (2011). Effectiveness of school-based nutrition education interventions to prevent and reduce excessive weight gain in children and adolescents: a systematic review. Jornal de pediatria, 87(5), 382-392.

Sommer A. Vitamin A deficiency and clinical disease: an historical overview. The Journal of nutrition. 2008 Oct 1; 138(10):1835-9.

Tamiru, D., Argaw, A., Gerbaba, M., Nigussie, A., Ayana, G., & Belachew, T. (2016). Improving dietary diversity of school adolescents through school based nutrition education and home gardening in Jimma Zone: Quasi-experimental design. Eat Behav, 23, 180–186. https://doi.org/10.1016/j.eatbeh.2016.10.009

Tembon, A. and Drake, L. 2017. The Evolution of School Health and Nutrition in the Education Sector 2000–2015. Frontiers in Public Health. https://doi.org/10.3389/fpubh.2016.00271.

UNDP. 2020. Human Development Report http://hdr.undp.org/sites/default/files/hdr2020.pdf

UNECA, 2020. Macroeconomic and social developments in Eastern Africa 2020: Benchmarking performance towards national, regional and international goals. https://repository.uneca.org/bitstream/handle/10855/43801/b11985112.pdf?sequence=1&isAllowed=y

UNICEF. 2020. State of the World's Children 2019: Children, food and nutrition: Growing well in a changing world. https://data.unicef.org/resources/state-of-the-worlds-children-2019/

WFP, 2017. Country Programme Burundi (2011-2017). Available at; https://docs.wfp.org/api/documents/WFP-0000069822/download/ accessed February, 2021.

WFP, 2019. Home-Grown School Feeding in Rwanda. Available at; https://docs.wfp.org/api/documents/WFP-0000106253/download/ accessed February, 2021.

WFP. 2016. Burundi Country Portfolio Evaluation 2011-2015, October 2016

WFP. 2017. Regional Synthesis 2013-2017: East and Central Africa region, November 2017

WFP. 2018 a. WFP's USDA McGovern-Dole International Food for Education and Child Nutrition and Program's Support in Kenya 2016-2020: Evaluation Report: Midline Evaluation, October 2018.

WFP. 2018 b. Somalia: An evaluation of WFP's Portfolio (2012-2017), September 2018

WFP. 2018. SCHOOL FEEDING IN 2018 - World Food Programme. Available at; https://docs.wfp.org/api/documents/WFP-0000110344/download/

WFP. 2019 a. Ethiopia: Ethiopia: An evaluation of WFP's Portfolio (2012-2017) Evaluation Report, January 2019

WFP. 2019. b. WFP's USDA McGovern-Dole International Food for Education and Child Nutrition and Program's Support in Rwanda 2016-2020: Evaluation Report: Midterm Evaluation.

WFP. 2020. Impact of COVID-19 on Livelihoods, Food Security & Nutrition in East Africa: Urban focus, August 2020 https://docs.wfp.org/api/documents/WFP-0000118161/download/?_ga=2.254076488.1326145036.1608208920-1581032024.1584710794&_gac=1.263175422.1607077184.Cj0KCQiA2af-BRDzARIsAIVQUOeYFFBHwaAzAfjxVTOlTsUYxDvhoOlNVDjL-iPLdNJ2FlBuFTZFPSQaAkdhEALw_wcB

Wichaidit, W., Steinacher, R., Okal, J. A., Whinnery, J., Null, C., Kordas, K., ... & Ram, P. K. (2019). Effect of an equipment-behavior change intervention on handwashing behavior among primary school children in Kenya: the Povu Poa school pilot study. BMC public health, 19(1), 1-12.

World Health Organization (2019). World Malaria Report 2019. Geneva, WHO https://www.afro.who.int/sites/default/files/2019-12/9789241565721-eng.pdf

World Health Organization. (2012). Accelerating work to overcome the global impact of neglected tropical diseases: a roadmap for implementation: executive summary (No. WHO/HTM/NTD/2012.1). World Health Organization. Available at: https://apps.who.int/iris/bitstream/handle/10665/70809/WHO_HTM_NTD_2012.1_eng.pdf

World Health Organization. (2017). Integrating neglected tropical diseases into global health and development: fourth WHO report on neglected tropical diseases. World Health Organization.

Yohannes, A., Kassahun M. The effect of School Feeding Program on the school performance of primary public school children in Arada Sub City, Addis Ababa. Addis Ababa University. Available at; http://localhost/xmlui/handle/123456789/1176

Zenebe, M., Gebremedhin, S., Henry, C. J., & Regassa, N. (2018). School feeding program has resulted in improved dietary diversity, nutritional status and class attendance of school children. Ital J Pediatr, 44(1), 16. https://doi.org/10.1186/s13052-018-0449-1

Zhang, C., Mosa, A. J., Hayward, A. S., & Matthews, S. A. (2013). Promoting clean hands among children in Uganda: a school-based intervention using 'tippy-taps'. Public health, 127(6), 586.

Zimmermann, M. B. (2009). Iodine deficiency. Endocrine reviews, 30(4), 376-408.

Acronyms

AU	African Union
CI	Confidence Interval
CLEAR-AA	Centre for Learning on Evaluation and Results – Anglophone Africa
COMESA	Common Market for Eastern and Southern Africa
DALY	Disability-adjusted life year
EAC	East Africa Community
ECCAS	Economic Community of Central Africa States (ECCAS)
EFFA	East African Farmers Federation
FAO	Food and Agriculture Organization of the United Nations
HPV	Human papillomavirus
IFAD	International Fund for Agricultural Development
IGAD	Intergovernmental Authority for Development in Eastern Africa
LDC	Least developed country
LIC	Low-income country
MIC	Middle-income country
OR	Odds Ratio
RBD	Regional Bureau: Dakar
RBJ	Regional Bureau: Johannesburg
RBN	Regional Bureau: Nairobi
SAMS	Smallholder Agriculture Market Support
SDG	Sustainable Development Goal(s)
SFP	School feeding programme
SBDW	School-based deworming
SBNE	School-based nutrition education
STH	Soil-Transmitted Helminth
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene

WB	World Bank
WFP	World Food Programme
WHO	World Health Organization

ANNEX A: Methodology

This annex sets out the common methodology used for the systematic review for the three regional studies.

Search strategy

We conducted literature search in key academic and grey literature sources listed below:

- Academic databases:
- African Index Medicus
- Campbell Collaboration
- Cumulative Index to Nursing and Health Allied Literature (CINHAL)
- DOPHER
- EMBASE
- JBI collaboration
- PubMed via Ovid Medline
- Scopus
- The Cochrane Library
- Trial registers (e.g. Pan African Clinical Trials Registry, Cynical Trials.gov, WHO clinic trials)
- Web of Science
- Google Scholar (additional resources).

Grey and non-academic literature sources

- Government health departments or ministries
- Government education departments or ministries
- Government departments or ministries responsible for social protection/development
- Sub-national government entities responsible for health, welfare, nutrition
- National school feeding/food/meals programmes and agencies
- National and local non-governmental organizations
- International non-governmental organizations
- Private foundations and philanthropic organizations
- Bilateral and multilateral organizations or agencies (for example: FAO, IFAD, UNDP, UNICEF, WFP, WHO, World Bank, UK AID/DFID, USAID, OECD)
- Continental and regional institutions: African Union Commission, and African Union Development Agency, UN Economic Commission for Africa, ECOWAS, East African Community, SADC, African Development Bank.

Supplementary searches

We conducted further supplementary searches as follows:

- Checked all the reference list of the included studies (backward chasing), and citation follow up (forward chasing) with the aim of identifying additional papers/reports that may have been missed by the database and grey literature searches.
- We consulted the WFP regional offices focal persons to help us identify any policy documents and other relevant reports in their possessing.

Inclusion/exclusion criteria

The studies were included in the review if they met the following criteria:

- Focus on school-aged children and adolescents (5-19 years) in East and Central Africa
- Studies that assessed one or more of our focused school-based interventions: school feeding and/or supplementation, health education and deworming
- We considered studies that attempt to explain why these interventions worked or failed to work.

Outcomes of interest were categorised as:

- Level 1: nutritional outcomes (stunting, thinness, overweight and obesity, nutrient and energy intake, nutrition knowledge and dietary diversity
- Level 2: health outcomes (haemoglobin level or prevalence of anaemia, prevalence of parasitic infection such as hookworm, malaria, etc.) We also captured other health outcomes if the studies reported them.
- Level 3: educational outcomes (for example, school enrolment, and attendance, retention and academic performance/completion rate). Studies published between January 2010 and November 30, 2020.

Study selection for inclusion

[This only covers Phase 1]

As one regional consultant was expected to conduct study selection for each region, one reviewer conducted the selection for inclusion using the pre-defined inclusion criteria described above. The selection was however conducted twice to eliminate any selection bias. First, the reviewer screened all the titles, followed by the abstracts and full texts of the potentially qualified titles and abstract. This was done after removal of any duplicate studies/reports.

Data collection and analysis

171. We extracted both qualitative textual and quantitative statistical data from only the included studies using a data extraction form. Similar to the approach that we adopted in the selection of the studies, one reviewer performed the data extraction twice. Following the data extraction, a narrative synthesis of the data was performed with a tabulation of the results (see appendix for complete data extraction tables). We had planned to conduct a meta-analysis of the statistical data to estimate the pull effect of each nutrition intervention. However, following the completion of the data extraction it was not possible to perform this analysis because of the heterogeneity of the included studies - the data reported were not always similar, and there were several missing important statistical information for

intervention and control groups, making it difficult for a meta-analysis to be performed. Therefore, we extracted the quantitative data that were reported in the studies, and use it to support the qualitative narrative synthesis of the findings.

172. Quantitative papers were pooled into statistical meta-analysis using the Review Manager Software (Rev Man 5). Odds ratios and their 95% confidence intervals were calculated for the analysis. Studies that fulfilled inclusion criteria but with no optimal data set for meta-analysis were subjected to narrative descriptive synthesis. We undertook sensitivity analysis where the statistical heterogeneity measured by 12 above 50%.

Quality assessment of included studies

Ideally, for any systematic review, a quality of risk bias assessment of the included studies need to be carried out using an appropriate quality assessment/risk of bias tool, and the aim is to evaluate the methodological quality and the strength of the evidence (Booth et al, 2016). However, in this review we took a decision, in consultation with the commissioners of the review, not to do a quality assessment of the studies due to time constraints.

Figure 12:
PRISMA flow diagram illustrating the study selection process: School feeding

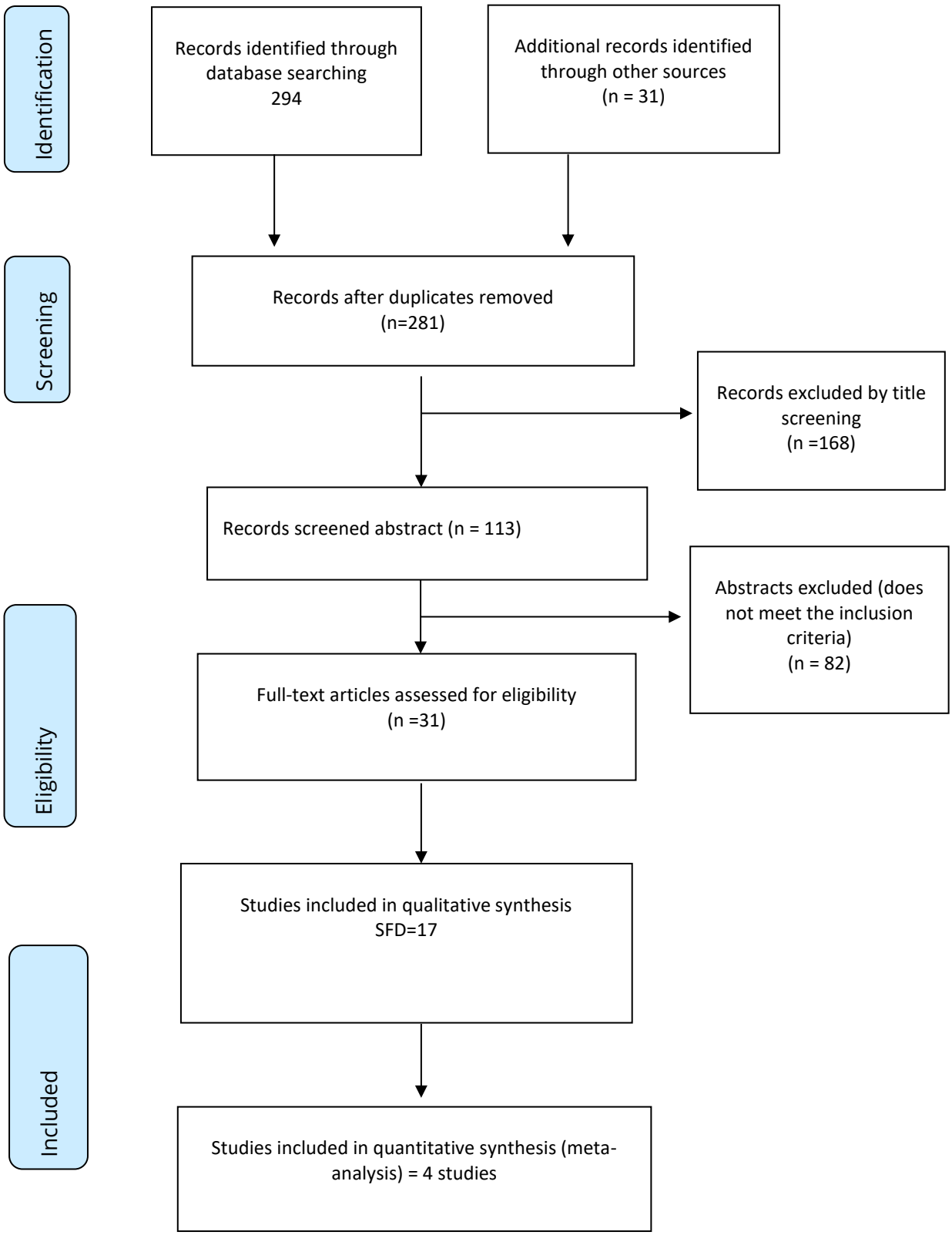


Figure 13
PRISMA flow diagram illustrating the study selection process: Deworming

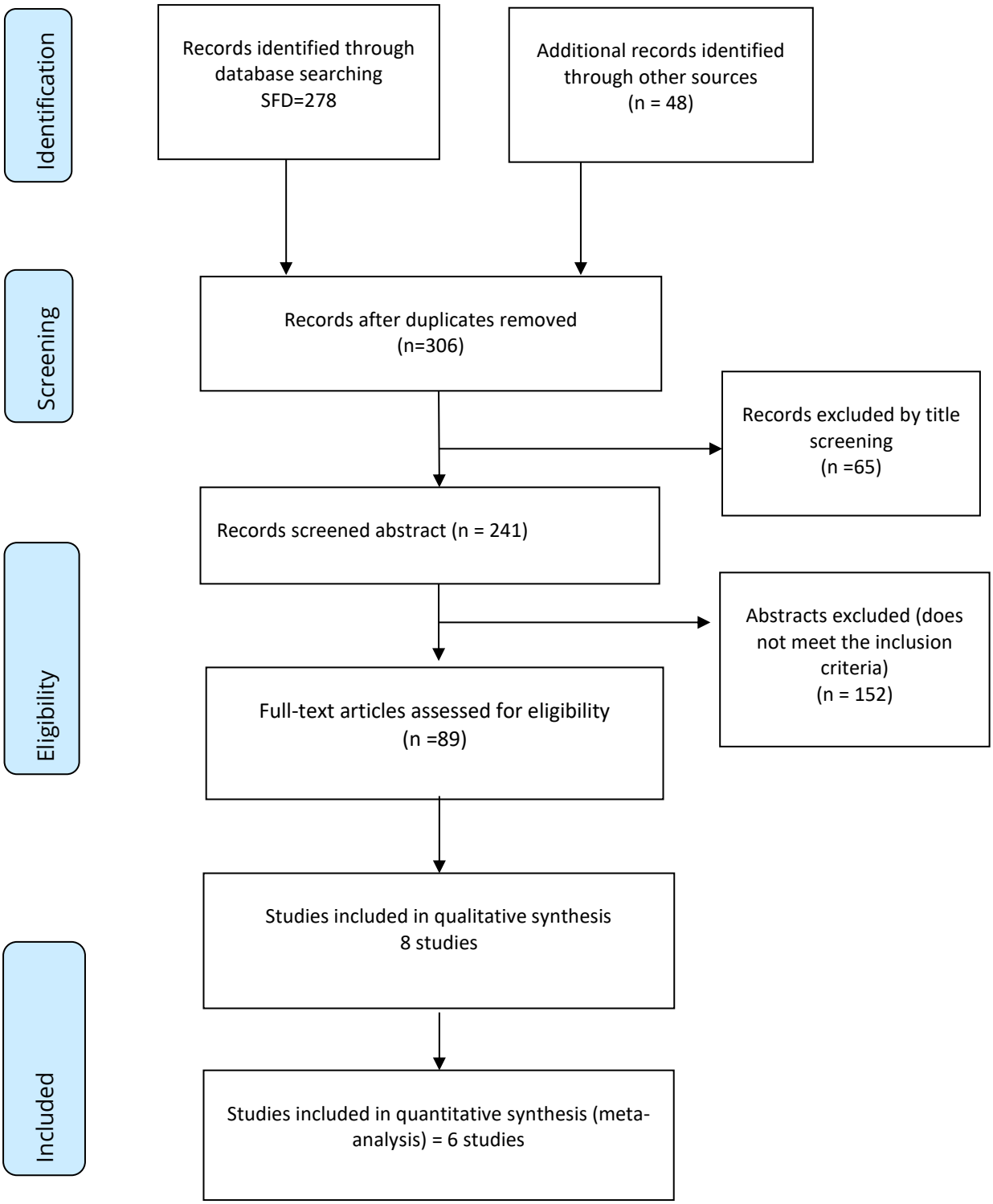


Figure 14
PRISMA flow diagram illustrating the study selection process: Nutrition education

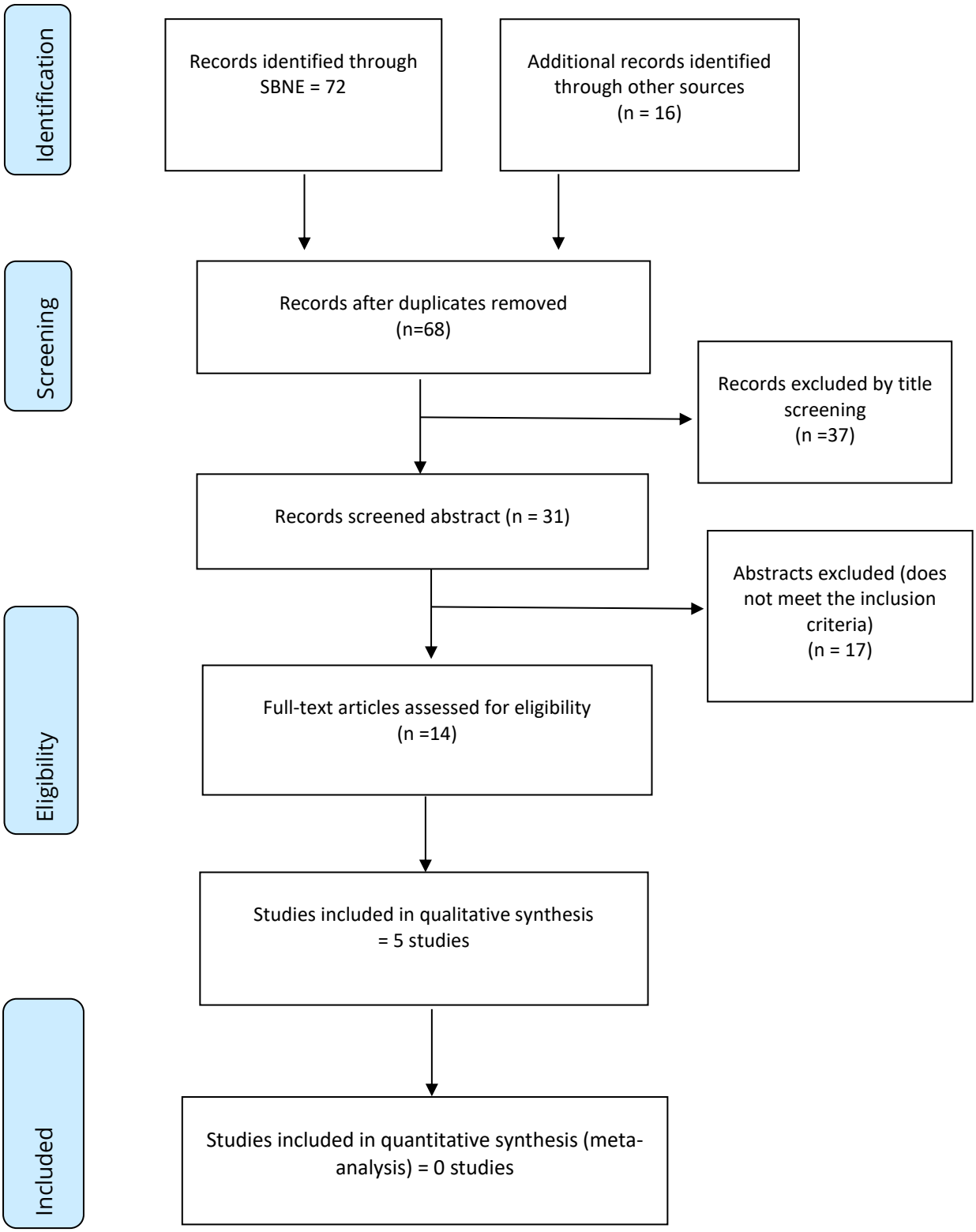


Figure 15
PRISMA flow diagram illustrating the study selection process: HIV

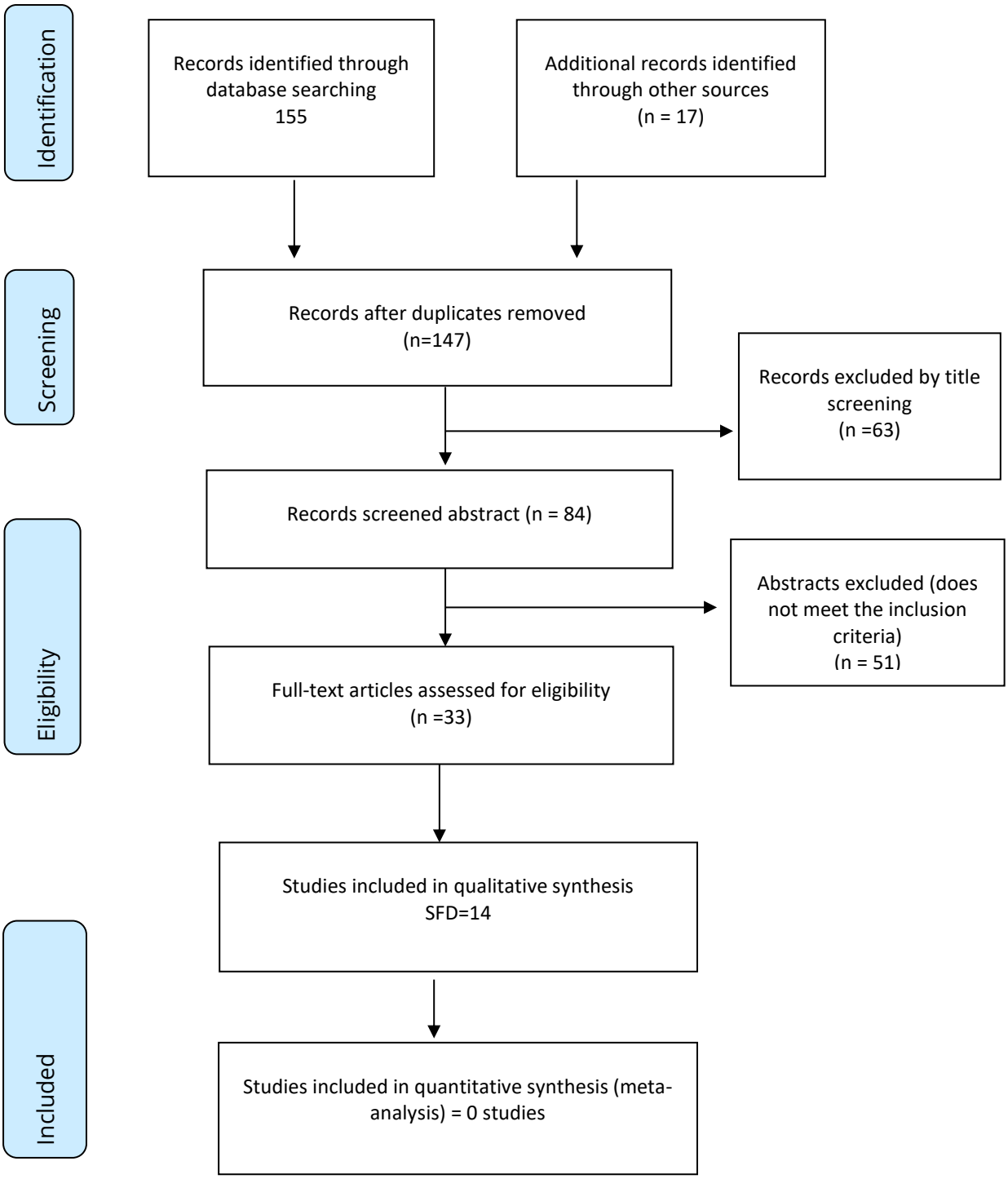


Figure 16
PRISMA flow diagram illustrating the study selection process: WASH

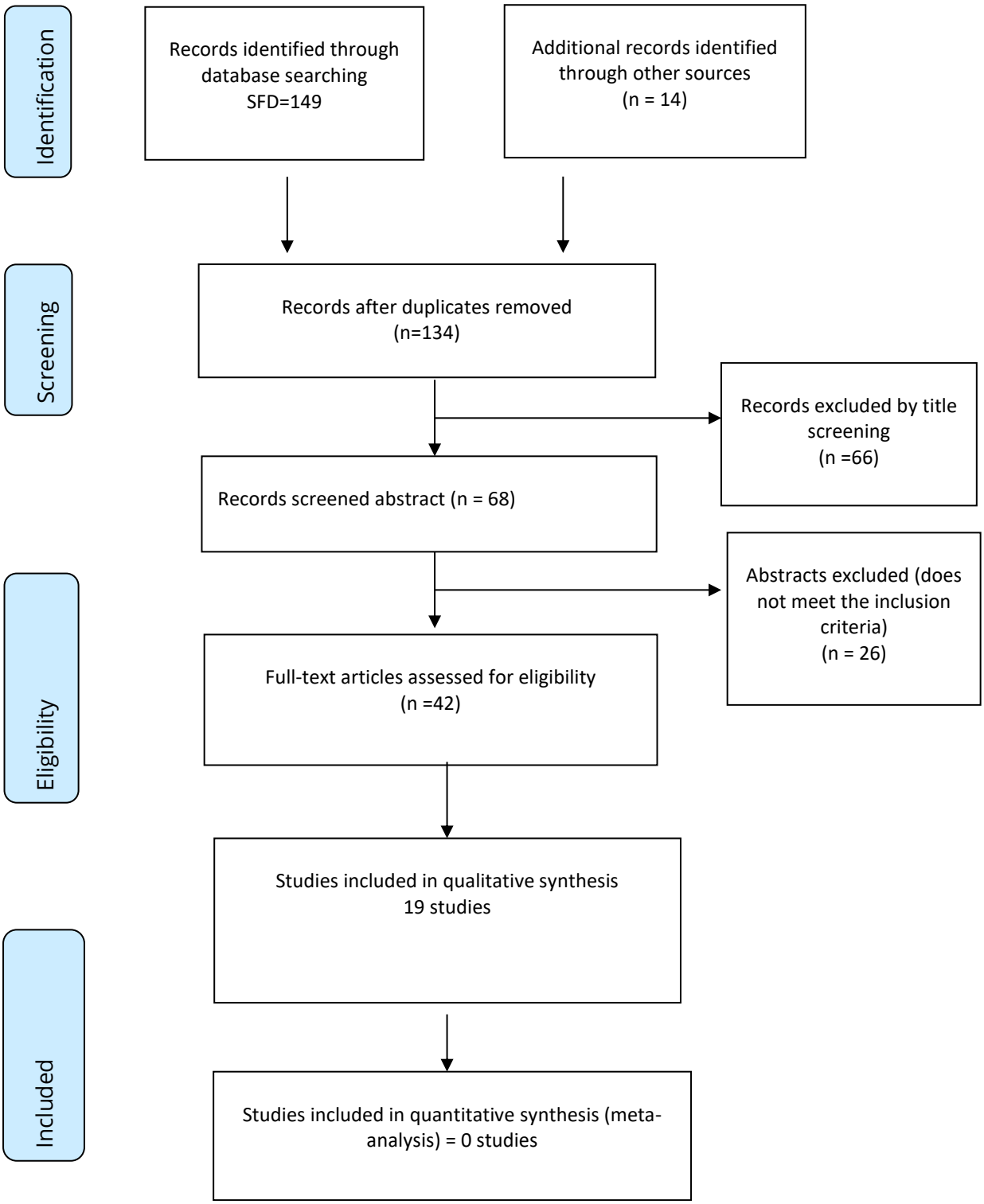


Table 13: Example of Medline search strategy (school feeding)

1	((((((((((((((((((((((((("School feeding"[Title) OR (Meals[MeSH Terms])) OR (meal*[Title])) OR (Lunch[MeSH Terms])) OR (Lunch[Title])) OR (Breakfast[MeSH Terms])) OR (breakfast[Title])) OR (snacks[MeSH Terms])) OR (snack*[Title])) OR (menu[Title])) OR (Food Assistance[MeSH Terms])) OR (Food Assistance[Title])) OR (stamp[Title])) OR (voucher[Title])) OR (gardens[MeSH Terms])) OR (garden[Title])) OR (food[MeSH Terms])) OR (food[Title/Abstract])) OR (Beverages[MeSH Terms])) OR (Beverages[Title]) AND (y_10[Filter]) AND (y_10[Filter]) AND (y_10[Filter])) AND (((((("Child"[Mesh]) OR "Adolescent"[Mesh])) OR (Child[tiab] OR Children[tiab] OR Schoolchildren[tiab] OR Kids[tiab] OR Kid[tiab] OR teen*[tiab] OR adolescen*[tiab] OR Preteen*[tiab])) AND ((("Child"[Mesh]) OR "Adolescent"[Mesh])) OR (Child[tiab] OR Children[tiab] OR Schoolchildren[tiab] OR Kids[tiab] OR Kid[tiab] OR teen*[tiab] OR adolescen*[tiab] OR Preteen*[tiab]))) AND ((("Nutritional Status"[Mesh]) OR ("Health Status"[Mesh])) OR (Stunting [tiab] OR wasting[tiab] OR "under nutrition"[tiab] OR "under nutrition"[tiab] OR Thinness[MeSH] OR Overweight[MeSH] OR Obesity[MeSH]))) AND ((Africa South of the Sahara[MeSH Terms]) OR (Angola*[tiab] OR Botswana*[tiab] OR Burkina Faso[tiab] OR Burundi*[tiab] OR Cabo Verd*[tiab] OR Cape Verd*[tiab] OR Cameroon*[tiab] OR Central African*[tiab] OR Chad*[tiab] OR Comoros[tiab] OR Congo[tiab] OR Cote d'Ivoire[tiab] OR Ivory Coast[tiab] OR Djibouti[tiab] OR Eritrea*[tiab] OR Ethiopia*[tiab] OR Gabon*[tiab] OR Gambia*[tiab] OR Ghana*[tiab] OR Guinea*[tiab] OR Kenya*[tiab] OR Madagascar*[tiab] OR Malawi*[tiab] OR Mauritania*[tiab] OR Mauriti*[tiab] OR Mozambique[tiab] OR Namibia*[tiab] OR Niger*[tiab] OR Rwanda*[tiab] OR Sao Tome[tiab] OR Principe[tiab] OR Senegal*[tiab] OR Sierra Leone*[tiab] OR Somalia*[tiab] OR South Africa*[tiab] OR Sudan*[tiab] OR Tanzania*[tiab] OR Uganda*[tiab] OR Benin*[tiab] OR Guinea-Bissau*[tiab] OR Lesotho*[tiab] OR Liberia*[tiab] OR Madagascar*[tiab] OR Mali*[tiab], Nigeria*[tiab] OR Togo*[tiab] OR Uganda*[tiab] OR Zaire*[tiab] OR Zambia*[tiab] OR Zimbabwe*[tiab])) AND (y_10[Filter]))
2	((((("School feeding"[Title/Abstract]) OR ("School lunch"[Title/Abstract])) OR ("School meal"[Title/Abstract])) OR ("Food assistance"[Title/Abstract])) OR (voucher[Title/Abstract])) OR (stamp[Title/Abstract])) AND (((((("Child"[Mesh]) OR "Adolescent"[Mesh])) OR (Child[tiab] OR Children[tiab] OR Schoolchildren[tiab] OR Kids[tiab] OR Kid[tiab] OR teen*[tiab] OR adolescen*[tiab] OR Preteen*[tiab])) AND ((("Child"[Mesh]) OR "Adolescent"[Mesh])) OR (Child[tiab] OR Children[tiab] OR Schoolchildren[tiab] OR Kids[tiab] OR Kid[tiab] OR teen*[tiab] OR adolescen*[tiab] OR Preteen*[tiab]))) AND ((("Nutritional Status"[Mesh]) OR ("Health Status"[Mesh])) OR (Stunting [tiab] OR wasting[tiab] OR "under nutrition"[tiab] OR "under nutrition"[tiab] OR Thinness[MeSH] OR Overweight[MeSH] OR Obesity[MeSH]))) AND ((Africa South of the Sahara[MeSH Terms]) OR (Angola*[tiab] OR Botswana*[tiab] OR Burkina Faso[tiab] OR Burundi*[tiab] OR Cabo Verd*[tiab] OR Cape Verd*[tiab] OR Cameroon*[tiab]

	OR Central African*[tiab] OR Chad*[tiab] OR Comoros[tiab] OR Congo[tiab] OR Cote d'Ivoire[tiab] OR Ivory Coast[tiab] OR Djibouti[tiab] OR Eritrea*[tiab] OR Ethiopia*[tiab] OR Gabon*[tiab] OR Gambia*[tiab] OR Ghana*[tiab] OR Guinea*[tiab] OR Kenya*[tiab] OR Madagascar*[tiab] OR Malawi*[tiab] OR Mauritania*[tiab] OR Mauriti*[tiab] OR Mozambique[tiab] OR Namibia*[tiab] OR Niger*[tiab] OR Rwanda*[tiab] OR Sao Tome[tiab] OR Principe[tiab] OR Senegal*[tiab] OR Sierra Leone*[tiab] OR Somalia*[tiab] OR South Africa*[tiab] OR Sudan*[tiab] OR Tanzania*[tiab] OR Uganda*[tiab] OR Benin*[tiab] OR Guinea-Bissau*[tiab] OR Lesotho*[tiab] OR Liberia*[tiab] OR Madagascar*[tiab] OR Mali*[tiab], Nigeria*[tiab] OR Togo*[tiab] OR Uganda*[tiab] OR Zaire*[tiab] OR Zambia*[tiab] OR Zimbabwe*[tiab])) AND (y_10[Filter]))
3	Search: ((((((((((((((((((((((((("School feeding"[Title) OR (Meals[MeSH Terms])) OR (meal*[Title])) OR (Lunch[MeSH Terms])) OR (Lunch[Title])) OR (Breakfast[MeSH Terms])) OR (breakfast[Title])) OR (snacks[MeSH Terms])) OR (snack*[Title])) OR (menu[Title])) OR (Food Assistance[MeSH Terms])) OR (Food Assistance[Title])) OR (stamp[Title])) OR (voucher[Title])) OR (gardens[MeSH Terms])) OR (garden[Title])) OR (food[MeSH Terms])) OR (food[Title/Abstract])) OR (Beverages[MeSH Terms])) OR (Beverages[Title]) AND (y_10[Filter]) AND (y_10[Filter]) AND (y_10[Filter])) AND (((((((("Child"[Mesh]) OR "Adolescent"[Mesh])) OR (Child[tiab] OR Children[tiab] OR Schoolchildren[tiab] OR Kids[tiab] OR Kid[tiab] OR teen*[tiab] OR adolescen*[tiab] OR Preteen*[tiab])) AND ((("Child"[Mesh]) OR "Adolescent"[Mesh])) OR (Child[tiab] OR Children[tiab] OR Schoolchildren[tiab] OR Kids[tiab] OR Kid[tiab] OR teen*[tiab] OR adolescen*[tiab] OR Preteen*[tiab]))) AND ((("Nutritional Status"[Mesh]) OR ("Health Status"[Mesh])) OR (Stunting [tiab] OR wasting[tiab] OR "under nutrition"[tiab] OR "under nutrition"[tiab] OR Thinness[MeSH] OR Overweight[MeSH] OR Obesity[MeSH]))) AND ((Africa South of the Sahara[MeSH Terms]) OR (Angola*[tiab] OR Botswana*[tiab] OR Burkina Faso[tiab] OR Burundi*[tiab] OR Cabo Verd*[tiab] OR Cape Verd*[tiab] OR Cameroon*[tiab] OR Central African*[tiab] OR Chad*[tiab] OR Comoros[tiab] OR Congo[tiab] OR Cote d'Ivoire[tiab] OR Ivory Coast[tiab] OR Djibouti[tiab] OR Eritrea*[tiab] OR Ethiopia*[tiab] OR Gabon*[tiab] OR Gambia*[tiab] OR Ghana*[tiab] OR Guinea*[tiab] OR Kenya*[tiab] OR Madagascar*[tiab] OR Malawi*[tiab] OR Mauritania*[tiab] OR Mauriti*[tiab] OR Mozambique[tiab] OR Namibia*[tiab] OR Niger*[tiab] OR Rwanda*[tiab] OR Sao Tome[tiab] OR Principe[tiab] OR Senegal*[tiab] OR Sierra Leone*[tiab] OR Somalia*[tiab] OR South Africa*[tiab] OR Sudan*[tiab] OR Tanzania*[tiab] OR Uganda*[tiab] OR Benin*[tiab] OR Guinea-Bissau*[tiab] OR Lesotho*[tiab] OR Liberia*[tiab] OR Madagascar*[tiab] OR Mali*[tiab], Nigeria*[tiab] OR Togo*[tiab] OR Uganda*[tiab] OR Zaire*[tiab] OR Zambia*[tiab] OR Zimbabwe*[tiab])) AND (y_10[Filter])) AND (y_10[Filter])) AND (Schools[MeSH Terms]) Filters: in the last 10 years

Table 14: Google Scholar search strategy

Examples
• allintitle: Ethiopia "school based nutrition education"

• allintitle: Ethiopia “mebendazole OR albendazole OR deworming OR Praziquantel "school based " • allintitle: Ethiopia “supplement OR supplementation OR micronutrient OR nutrient "school based"
• allintitle: Kenya, "school based nutrition education" • allintitle: Kenya “mebendazole OR albendazole OR deworming OR Praziquantel "school based " • allintitle: Kenya “supplement OR supplementation OR micronutrient OR nutrient "school based"
• allintitle: Kenya, "school based nutrition education" • allintitle: Kenya “mebendazole OR albendazole OR deworming OR Praziquantel "school based " • allintitle: Kenya “supplement OR supplementation OR micronutrient OR nutrient "school based"
• allintitle: South Sudan, "school based nutrition education" • allintitle: South Sudan “mebendazole OR albendazole OR deworming OR Praziquantel "school based " • allintitle: South Sudan “supplement OR supplementation OR micronutrient OR nutrient "school based"

Table 15: Policy documents search strategy

(((Policy[MeSH Terms]) AND ((((((“School feeding"[Title/Abstract]) OR ("School lunch"[Title/Abstract])) OR ("School meal"[Title/Abstract])) OR ("Food assistance"[Title/Abstract])) OR (voucher[Title/Abstract])) OR (stamp[Title/Abstract])))) AND ((Africa South of the Sahara[MeSH Terms]) OR (Angola*[tiab] OR Botswana*[tiab] OR Burkina Faso[tiab] OR Burundi*[tiab] OR Cabo Verd*[tiab] OR Cape Verd*[tiab] OR Cameroon*[tiab] OR Central African*[tiab] OR Chad*[tiab] OR Comoros[tiab] OR Congo[tiab] OR Cote d'Ivoire[tiab] OR Ivory Coast[tiab] OR Djibouti[tiab] OR Eritrea*[tiab] OR Ethiopia*[tiab] OR Gabon*[tiab] OR Gambia*[tiab] OR Ghana*[tiab] OR Guinea*[tiab] OR Kenya*[tiab] OR Madagascar*[tiab] OR Malawi*[tiab] OR Mauritania*[tiab] OR Mauriti*[tiab] OR Mozambique[tiab] OR Namibia*[tiab] OR Niger*[tiab] OR Rwanda*[tiab] OR Sao Tome[tiab] OR Principe[tiab] OR Senegal*[tiab] OR Sierra Leone*[tiab] OR Somalia*[tiab] OR South Africa*[tiab] OR Sudan*[tiab] OR Tanzania*[tiab] OR Uganda*[tiab] OR Benin*[tiab] OR Guinea-Bissau*[tiab] OR Lesotho*[tiab] OR Liberia*[tiab] OR Madagascar*[tiab] OR Mali*[tiab], Nigeria*[tiab] OR Togo*[tiab] OR Uganda*[tiab] OR Zaire*[tiab] OR Zambia*[tiab] OR Zimbabwe*[tiab]))

Annex B: School feeding programmes in WFP East and Central Africa region

Main source of information: African Union (2018). Sustainable school feeding across the African Union. Addis Ababa, January 2018. https://au.int/sites/default/files/documents/36100-doc-sustainable_school_feeding_1.pdf

Table 16: Mapping school feeding programmes in WFP East and Central Africa Region

Context 1: : Crisis or humanitarian settings (WFP providing operational support)									
	Primary SFP; year started; SFP part of national policies	**Actors involved in implementation**	**Multiple SFP models**	**Targeting**	**Beneficiaries and/or coverage (% of children)**	**Meals**	**Complementary interventions**	**Primary funders**	**Food sources and procurement**
Burundi	WFP School Feeding, 2003 Part of national policies	WFP, Ministry of Education of Superior Teaching and Scientist Research, Ministry of Health, iNGOs, nNGOs	1) WFP school feeding; 2) HGSF	Geographic and categorical - Localities chosen based on food security and education indicators.	441,634 children ECD and primary school grade 1 to 9	In-school meals: served at midday	Deworming; fortification; school gardens; SAFE initiative	Government of Burundi, WFP	Food sourced mostly from abroad. Home-grown school feeding sources cereals, beans, rice and corn Procurement centralised through WFP
Somalia	WFP Somalia School Meals Programme, 2003 Part of	WFP, Ministry of Education, various iNGOs and local NGOs	1) WFP school meals programme; 2) Girl Education Challenge model	Geographic - Accessible, food insecure areas in North-West, North-East and	139,195 children Primary and middle school, grades 1-8	In-school meals provided twice daily, at mid-day and	Fuel-efficient stoves; trainings on nutrition, health, sanitation	WFP	Food sourced from abroad

	national policies		complements some WFP schools with supplementary vegetables through establishing kitchen/ school gardens	South-Central Somalia.		noon. THR rations provided to girls who maintain 80% attendance rate.			
South Sudan	Food for Education, 2003 Part of national policies	WFP	No	Geographic - Targeting based on the IPC food security classification, with prioritisation of food insecure areas.	300,000 Primary school, grades 1-8	In-school meals: Daily meal served at noon. THR distributed at the end of month to girls in grades 3-8, and conditional on attaining at least 80% of attendance.	Deworming	WFP	Food sourced from abroad
Sudan	WFP PRRO School Meals, 1969 Not part of national policies	WFP, Federal and State structures of Ministry of Education, iNGOs/local NGOs	No	Geographic and categorical - Rural schools in high and moderate food insecure areas	909,141 children Primary school	Both - In-school meals provided in 11 States and THR in 2 States	Deworming; distribution of micronutrient powder (2015) with continuation subject to	WFP	Food sourced mostly from abroad Procurement centralised in WFP Country

				with lower education indicators, enrolment rates and gender parity index; and schools in IDP camps.		(Red Sea and Kassala States). THR pilot focused on improving gender parity in the areas with worst indexes reported by WFP M&E system: Daily meal served at 11AM.	available resources		Office.
Context 2: Stable low-income or lower middle-income countries									
Djibouti	Support to the National School Feeding Program in Djibouti, 2013 (SFP in place prior to 2013) Part of national policies	WFP, Office for School Catering under Ministry of Education	No	Geographic - Schools in all rural areas and two schools situated at the periphery (semi-urban area).	18,000 Pre-primary and primary school (grades 1-9)	In-school meals: Two daily meals served at 7AM and 11.30AM; THR	No	Ministry of Education, WFP	Food sourced mostly from abroad
Ethiopia	School feeding, 1994	Ministry of Education, Regional Education Offices,	1) WFP uses mixed model of HGSF	Geographic - Targeting based on food	470,000; an additional 57,000	In-school meals: Daily meal	Deworming; trainings on nutrition,	WFP, Dubai cares, Brazilian	Food sources: domestic, home-

	Part of national policies	WFP, First Lady Initiative, private donors, FAO, NGOs	and imported food; 2) Government emergency school feeding uses WFP HGSF model of procurement; 3) First Lady Initiative and private donors provide lunch through organised women groups.	insecurity, enrolment rates, gender parity levels, and drop-out rates.	supported by First Lady Initiative and NGOs Pre-primary and primary school, grades 0-8	served mid-morning; THR once per month	health, sanitation, school gardens, energy saving stoves, and infrastructure building (WASH, store and kitchen and feeding shelters)	Government, private donors, Government of Ethiopia and the Regional Education bureau	grown supplies Partially decentralised and handled at Regional Offices, that procure from farmers organisations through direct procurement (adopted from WFP P4P).
Kenya	National School Feeding Programme, 1980 Part of national policies	Ministry of Education, WFP, FEED	1) Home Grown School Meals Programme by Government of Kenya and WFP; 2) WFP model providing food and transitional cash transfer	Geographic - Semi-arid and arid areas with low education achievements and high food insecurity, and unplanned settle-ments/slums of Nairobi.	1,617,000 Primary school, grades 1-8	In-school meals: Daily meal served at 12.30PM.	Deworming; micronutrient supplementation; trainings on nutrition, health, sanitation	Ministry of Education, WFP	Food sources: Domestic Decentralised - Cash transferred to schools which then procure food from local suppliers (HG-SMP); central procurement for food and cash provided to schools for

									decentralised pro-curement from local suppliers (WFP)
Rwanda	Home Grown School Feeding, 2002 Not part of national policies	WFP, Ministry of Education (MINEDUC), Ministry of Agriculture (MINAGRI), Ministry of Health, World Vision, FAO	1) One cooked meal per day in primary schools under WFP model; 2) MINEDUC provides a fixed amount of funding to secondary schools, boarding and day schools to allow them to buy food for schools meals; 3) MINAGRI: One Cup of Milk Per Child provided twice weekly for early childhood development and primary 1-3 students.	Geographic - Most food insecure parts of the country (WFP). Universal for secondary, boarding and day schools (Government).	89,000 (WFP); 89,000 total projected for MINEDUC and MINAGRI models Primary and secondary school, boarding schools `	In-school meals: Daily meal served at noon; one cup of milk per child served twice weekly.	Deworming; trainings on nutrition, health, sanitation; early grade reading support; books and supplementary teaching materials; infrastructure support – kitchens, stores, energy saving stoves, and latrines.	WFP (primary schools under WFP model), Ministry of Education (secondary, boarding and day schools)	Food sources: Domestic Both - Centralised procurement (WFP); decentralised procurement, with each school purchasing its own food based on requirements (Government)
Uganda	Home Grown	WFP, Office of	1) WFP school	Geographic -	116,400 children	In-school	Trainings on	WFP, Govern	Food sources:

	School Feeding, 1983	the Prime Minister (OPM), district local governments	feeding; 2) ad hoc support through NGOs and faith - based organisations; 3) parent- and school-led feeding	Universal primary school coverage in the Karamoja sub-region.	Primary school (grades 1-7), secondary and tertiary schools	meals: Mid-morning and midday meals provided.	nutrition, health, sanitation, post-harvest handling for cooks, OPM, district local governments, School management committees, teachers, store keepers, and non-food items provision	ment, the Irish Government, Lift a Life Foundation, private donors	Domestic Centralised - WFP tenders are published in the local newspapers and following receipt of applications, a committee approves the vendors.

Annex C: School health and nutrition policies of countries in the WFP East and Central Africa region

A. Mapping of policies on school feeding, school health, food security and nutrition

Table 17
School feeding and school health policies in East African countries

East and Central Africa					
Country	**Policy Type**	**Document Title**	**Years**	**Brief Description**	**Link if Available**
Burundi	School feeding	National School Feeding Policy	2018	The policy has five main objectives: • Increase consumption of adequate, nutritious food to reduce food insecurity among school-aged children • Promote development of agriculture and local communities; • Improve school performance rates • Establish a stable market for food produced by local smallholder farmers • Promote intersectoral partnerships and coordination and strengthen governance of the school feeding programme	https://centrodeexcelencia.org.br/en/burundi-aprova-politica-de-alimentacao-escolar/
	Nutrition	Strategic Multi-sectoral plan for Food and Nutritional Security	2014-2018	The document has five strategic outcomes: • Crisis-affected populations, including refugees in camps, internally displaced persons and returnees in targeted areas are able to meet their basic food needs all year round. • Food-insecure households in targeted areas have safe access to adequate and nutritious food all year round. • Children aged 6–59 months, adolescent girls and pregnant and lactating women and girls in the targeted provinces and communes have improved nutrition status all year round. • Food-insecure smallholders and communities in targeted areas have enhanced livelihoods that better support food security and nutrition needs by 2020. • Government, humanitarian and development partners have access to effective supply chain management and logistics all year round	https://docs.wfp.org/api/documents/4547d847-9f3e-4a7b-abe1-07051bb240e1/download/

	Nutrition	National Nutrition Policy	2013	The policy has five main objectives; • Ensure a political, social and economic environment conducive to the establishment of conditions for reducing poverty and the permanent maintenance of peace by equitably involving all sections of the population (men, women and youth). • Permanently improve the physical and economic accessibility of all to sufficient, nutritious and healthy food. • Establish mechanisms for supplying food to households in a sustainable manner by developing food production and the rural sector through participatory and sustainable methods, while ensuring that natural resources are maintained. • Establish policies for food and agricultural trade and trade in general so as to enhance food security for all through a trading system that is both fair and market-oriented. • Establish mechanisms for rapid responses to natural disasters and man-made crises, including preparing for them and meeting emergency provisional food needs in a way that strengthens the capacity to meet future needs. • Allocate and optimally use public and private investment to advance human resources, the sustainable food and agricultural system, and rural development in all regions of the country.	https://extranet.who.int/nutrition/gina/en/node/8035
	Social protection	National Social Protection Policy	2011	Three key strategic and one cross-cutting objectives are presented in this policy: • Increase access to basic social services such as health, water and sanitation, and education • Ensure food and basic income security both for those that can exit extreme poverty sustainably and for those that will remain vulnerable their whole life • Strengthen natural and social risks management: social protection's role is to strengthen the resilience of vulnerable groups i.e. their capacity to better manage the risks they face, without resorting to damaging adaptation strategies • Cross-cutting objective: Contribute to decreasing young children's chronic malnutrition.	http://documents1.worldbank.org/curated/en/900951482030099834/pdf/148203009855 9-000A10458-PAD-Burundi-SSN-11282016.pdf
Eritrea	Health	National Action Plan for	2017-2021	Promote health information dissemination targeting adolescents and youth; strengthen routine supplementation with vitamin A, iron, and zinc.	https://extranet.who.int/sph/docs/file/1469

		Health Security			
Ethiopia	School health	National school health and nutrition strategy	2015	The Ministry of Education in collaboration with the Ministry of Health and other pertinent stakeholders has developed health and nutrition strategies and guidelines for schools to promote the overall health, hygiene and nutrition of students. Linkages are promoted among regular health and nutrition services with school activities including regular monitoring of nutritional status of school-age children/students, oral treatment for micronutrient deficiencies and worm infections	https://www.iapb.org/wp-content/uploads/Ethiopia_National-School-Health-Nutrition-Strategy.pdf
	Agriculture	Agriculture Sector Policy and Investment Framework	2010-2020	This document has four strategic objectives; • To achieve a sustainable increase in agricultural productivity and production. • To accelerate agricultural commercialisation and agro-industrial development. • To reduce degradation and improve productivity of natural resources. • To achieve universal food security and protect vulnerable households from natural disasters.	http://faolex.fao.org/docs/pdf/eth149550.pdf
	Nutrition	Seqota Declaration	2015	Launched in 2015 as Ethiopia's commitment to end child malnutrition by 2030. The key goals of this Declaration include, amongst others, to achieve the following by 2030: (1) Zero stunting in children less than 2 years; (2) 100 percent access to adequate food all year round; (3) Transformed smallholder productivity and income; (4) Zero post-harvest food loss through reduced post-harvest loss; (5)Innovation around promotion of sustainable food systems (climate smart); (6) Continue to improve the accessibility and coverage of adequate and safe drinking water supply,100 percent open defaecation free kebeles by 2030 and irrigation for supporting agriculture as well as access to water source; (7) Increase efforts to educate women and girls, especially rural girls (8) Focus on poverty reduction and resilience building through predictable cash transfer to the most vulnerable group, and in addition, targeted support to school feeding programmes, pregnant and lactating women as well as children under 2 years.	https://www.exemplars.health/-/media/resources/stunting/ethiopia/seqota-declaration-implementation-plan-(20162030).pdf
Kenya	School feeding	National school meals and nutriti	2017-2022	The strategy has six strategic objectives: • To increase awareness and intake of adequate, locally available and nutritious foods among school children and their communities	https://www.wfp.org/publications/2018-national-school-

		on strategy		• To improve the enrolment, attendance, retention, completion and learning of school children with equity • To promote local and inclusive development • To develop and implement a sustainable national school meals and nutrition programme • To promote partnerships and multi-sectoral coordination for complementary support and effective implementation of the school meals and nutrition programme • To strengthen governance and accountability in implementation of the school meals and nutrition programme	meals-and-nutrition-strategy-2017-2022-kenya
	Education	Education Sector Strategic Plan	2018-2022	Makes brief reference to provision of school meals for children from poor and marginalized communities to reduce disparities in access and retention to primary schools	https://www.dlci-hoa.org/assets/upload/education-documents/20200804011612362.pdf
	Nutrition	National Food and Nutrition Security Policy	2011	The policy makes provision for nutrition education and awareness in schools, implementation of school feeding programmes, regular monitoring of the nutritional status of children, detection and referral of malnourished children to health facilities, counselling and social protection programmes, and extension of school food gardens	https://extranet.who.int/nutrition/gina/en/node/8241
Rwanda	Agriculture	Strategic Plan for Agriculture Investment	2018-2024	The strategic plan adopts a food systems approach for enhanced nutrition and household food security. It proposes approaches and interventions to ensure the nutrient quality of commodities is preserved or enhanced throughout the entire value chain. In addition, resilience and risk mitigation strategies will continue to be developed, particularly at the household level.	http://faolex.fao.org/docs/pdf/rwa180543.pdf
	School feeding	Food for Education and Child Nutrition	2016 to 2020	A Programme to support the government in setting up a national school feeding programme, with a view to build capacity and complete a full handover of activities by 2020.	https://www.wfp.org/publications/rwanda-food-education-and-child-nutrition-2016-2020-

		(2016-2020). Home Grown School Feeding Programme			mid-term-evaluation
	Education	Education Sector Plan	2018-2020	Emphasizes the need for support for learners and groups at greatest risk levels, through expanding WASH and school feeding programmes	http://minecofin.gov.rw/fileadmin/templates/documents/NDPR/Sector_Strategic_Plans/Education.pdf
Somalia	Education	Education Sector Strategic Plan	2017-2022	Encourages the coordination of the Ministry of Education and the Ministry of Agriculture and development partners to seek technical support for school gardening and farming projects. Such support is needed to build capacities of school stakeholders to initiate and manage food production that can also be used for school feeding	https://www.globalpartnership.org/content/education-sector-strategic-plan-2018-2020-somalia
South Sudan	Nutrition	National Nutrition Policy and Key Strategies	2009	Emphasizes the need for addressing the nutritional needs of school age children and adolescents. School gardens, iron supplementation and nutrition education are mentioned as important school- based interventions	
Sudan	Nutrition	Food and Nutrition Policy	2003 updated 2018	Emphasizes the need for addressing the nutritional needs of school age children and adolescents. More specifically school garden, Iron supplementation and, nutrition education was mentioned as important school-based interventions	https://extranet.who.int/nutrition/gina/en/node/17832
Uganda	Nutrition	Uganda Nutriti	2011-	The ultimate goal of the Uganda Nutrition Action Plan (UNAP) is to reduce levels of malnutrition among women of reproductive age, infants, and young children	https://www.health.go.ug/docs/

		on Action Plan	2016	through 2016; ensuring that all Ugandans are properly nourished will enable them to live healthy and productive lives.	UNAP_11_16.pdf
	Development	National Development Plan II	2015/16 to 2019/20	The Plan sets key four objectives to be attained during the five- year period. These are: (i) increasing sustainable production, productivity and value addition in key growth opportunities; (ii) increasing the stock and quality of strategic infrastructure to accelerate the country's competitiveness; (iii) enhancing human capital development; and (iv) strengthening mechanisms for quality, effective and efficient service delivery.	https://consultations.worldbank.org/sites/default/files/materials/consultation-template/materials/ndpii-final11.pdf
	Health	Health Sector Development Plan	2015/16 to 2019/20	The goal of the NHP II is "To attain a good standard of health for all people in Uganda in order to promote healthy and productive lives". The priority areas are: Strengthening health system in line with decentralisation; reconceptualising and organising supervision and monitoring of health systems at all levels; establishing afunctional integration within the public and private sector; and addressing the human resource crisis	https://health.go.ug/sites/default/files/Health%20Sector%20Development%20Plan%202015-16_2019-20.pdf
	Agriculture	National Agriculture Policy	2013	The Agriculture Sector Strategic Plan (ASSP) of 2015/16 to 2019/20 lays out the priorities and interventions that are crucial to transforming smallholder farmers into commercial farmers. The five- year strategy focuses on improving the accessibility of critical farm inputs such as, fertilizers as wells value addition and markets for the agricultural produce. However, the strategy is constrained by unfavourable conditions for agricultural transformation such as, inadequate participation of women and youth and limited extension services.	https://www.agriculture.go.ug/wp-content/uploads/2019/04/National-Agriculture-Policy.pdf
	Agriculture	National Agriculture Extension Policy	2016	The National Agricultural Extension Policy (NAEP), 2016, was developed to provide long term strategic direction for agricultural extension services in Uganda. The agricultural extension services facilitate smallholder farmers to sustain agricultural production and shift from subsistence farming to market-oriented and commercial farming.	https://www.g-fras.org/en/countries.html?download=546:national-agricultural-extension-policy-of-uganda

B: Mapping of policies on school-based WASH and HIV

Table 18
WASH and HIV policies in East African countries

Country	Policy title	What policy says about WASH	What policy says about HIV	Link
Rwanda	National School Health Strategic Plan 2017-18	Strategic objective 3.5.5 covers the promotion of environmental health in schools. The key output is "All school children and youth have access to improved hygienic and healthy environments in schools." The plan has five key strategies for achieving the objective: 1. Provision of safe water to the children and staff in the schools; 2. Provision of gender-sensitive sanitation facilities in schools 3. Promotion of hygiene, including menstrual hygiene management 4. Operationalization of solid waste management systems in schools 5. Promotion of environment protection.	Strategic objective 3.5.2. covers the prevention of HIV and other sexually transmitted infections. The key output is "All school children and youth reached by comprehensive HIV and STIs prevention and control programmes" Key strategies for achieving this output are: 1. Knowledge of HIV and STIs; 2. Supportive environment for HIV-positive students and teachers; 3. M&E activities in the context of HIV, AIDS and other STIs. Strategic objective 3.5.3. pertains to sexual and reproductive health and rights. The key output is: "Adolescent and young adults reached by friendly sexual and reproductive health programmes: Key strategies: 1. Intergenerational communication and information about SRH&R; 2. Promotion of education on sexual and reproductive health.	http://extwprlegs1.fao.org/docs/pdf/rwa201718.pdf

Country	Policy title	What policy says about WASH	What policy says about HIV	Link
Ethiopia	National school health and nutrition strategy 2016	The school management in collaboration with the communities should be encouraged and assisted to provide adequate, safe and potable drinking water and hand washing facilities to be constructed in each school. Separate latrines to be built for boys and girls and in a way that meets the special needs of children and all age groups. Standards for toilets/latrines and all other sanitation facilities shall be regularly checked and monitored and their status' should updated. Hygiene promotion is to be child/student centred.	All existing policies on HIV / AIDS and STI control is to be adhered to. There will be no discrimination of HIV positive students, teachers, and staff. Those affected by HIV / AIDS shall be allowed and encouraged to access treatment including Antiretroviral Therapy (ART) and regular check-ups. Efforts shall be made to strengthen Anti- AIDS clubs in schools in order to prevent spread of the disease	https://www.iapb.org/wp-content/uploads/Ethiopia_National-School-Health-Nutrition-Strategy.pdf
	Education Sector Strategic Plan, 2016	The intervention put in place for WASH would be to build water, sanitation and hygiene facilities in pre-primary schools.	The sector plan discusses programmes for preventing new HIV infections in learning institutions. These are informed by studies showing that knowledge of HIV and AIDs among learners in Kenya is quite low; that learners still engage in unprotected sexual activities; and those infected by HIV and AIDS face stigma and discrimination and lack adequate family support.	https://www.globalpartnership.org/sites/default/files/2016-06-ethiopia-education-sector-plan-vi_0.pdf
Somalia	Education sector strategic plan 2018 - 2020	Services that will be integrated to preparedness and response activities will include expanding WASH and school feeding programmes to ensure that they are retained in education during periods of emergency. The plan also refers to the rehabilitation of existing school buildings to ensure safe and healthy learning environments with gender-sensitive WASH facilities.	No mention of HIV	https://www.globalpartnership.org/sites/default/files/federal_government_of_somalia_essp.pdf

Country	Policy title	What policy says about WASH	What policy says about HIV	Link
Uganda	School Health Policy 2008	The School Health Policy states that every school shall have adequate safe drinking water, bathing facility and gender sensitive sanitary facility	The School Health Policy includes promotion of school-based health clubs and safe spaces that provide sexual and reproductive health counselling as well as reintroducing adolescent mothers into education.	http://library.health.go.ug/download/file/fid/2189
Kenya	Kenya School Healh Policy 2018	The policy covers the responsibility of school boards of management to: 1. Ensure the availability of adequate safe drinking water points that are well maintained in all schools in Kenya. 2. Adequate and well-maintained facilities for handwashing, including provision of soap within the vicinity of toilet/latrine, eating and playing areas. 3. Ensure acceptable management of solid and liquid waste in schools. 4. Ensure appropriate food safety and hygiene measures in schools. The policy includes hygiene promotion that is learner-centred and ongoing to positively influence behaviour change. It also encourages the participation of school boards and parents. The policy promotes gender sensitive designs of sanitation facilities in addition to age-specific faciliities and catering for children with special needs. Menstrual hygiene management is mentioned in the policy and recognises the importance of upholding	The school health policy includes HIV and AIDS. It places an obligation on the Ministry of Education and the Ministry of Health to: 1. Contribute to the prevention of new HIV infections among members of the school community. 2. Contribute to the reduction of AIDS related deaths among members of the school community 3. Contribute to the reduction of HIV stigma and discrimination among members of the school community 4. Strengthen institutional capacity to manage HIV and AIDS scourge	https://www.ncikenya.or.ke/documents/KENYA%20SCHOOL%20HEALTH%20POLICY%20BOOK%20_20_11_2018.pdf

		dignity, gender equality and human rights of girls.		

Annex D: Stakeholders in WFP East and Central Africa region

(Countries **bolded** are those covered by the WFP Regional Bureau, Nairobi)

Table 19
Mapping of stakeholders in WFP East and Central Africa region

Name of organization	Countries covered/ Member countries	Stakeholder category	Position on school health and nutrition	Sources of information
FAO Africa Regional Conference (ARC)	All Sub-Saharan Africa excluding Sudan	FAO Intergovernmental body	ARC's role is to provide guidance on priorities for FAO's work in the Africa region. And is an important platform for advocacy on food security and nutrition. Ending Hunger is one of FAO's Regional Initiatives supported by ARC. The Regional Initiative focuses on strengthening capacities of regional and national institutions in policies, planning, measurement, governance etc. of food security and nutrition. A second Regional Initiative that focuses on value chains includes nutrition-sensitive value chains, briefly mentions school gardens. The third Regional Initiative focuses on building resilience in areas affected by climate change and conflict (working with WFP).	. http://www.fao.org/3/nc610en/nc610en.pdf
FAO Sub-regional office for Eastern Africa (Addis Ababa)	Serves as technical hub for **Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South**	United Nations entity	The Sub-Regional Office provides technical support to FAO Country Offices in supporting governments with policies and strategies to improve the food security and nutrition, in line with FAO Africa Regional Initiative of Ending Hunger. The **FAO School Food and Nutrition Framework (2019**) is informed by recommendations adopted at the Second International Conference on Nutrition (ICN2). The framework seeks to guide FAO's support to countries in leveraging synergies presented by schools as platforms for a holistic approach to raising levels of	. http://www.fao.org/africa/eastern-africa/en/ . http://www.fao.org/3/ca4091en/ca4091en.pdf

	Sudan and Uganda. Also plays important liaison role to the African Union Commssion, UNECA and Regional Economic Communities		nutrition, reducing poverty, and enabling inclusive food systems. These synergies are aimed at benefiting children and adolescents' diets, nutrition and well-being, as well as the school's and community's development and empowerment. FAO is one of the contributors to the **Home Grown School Feeding Framework**, and is expected to collaborate with WFP and IFAD and other stakeholders in supporting governments to design and implement Home Grown School Feeding.	.
IFAD Eastern & Southern Africa regional group	Countries covered: Angola, Comoros, **Eritrea**, Eswatini, **Ethiopia, Kenya**, Lesotho, Madagascar, Malawi, Mozambique, **Rwanda**, UR Tanzania, **Uganda**, Zambia, Zimbabwe	United Nations entity	IFAD is one of the contributors to the Home Grown School Feeding Framework, and is expected to collaborate with WFP and IFAD, focusing on the supply of food for schools from smallholder producers. The mapping did not identify any projects	https://www.ifad.org/en/web/operations/regions/esa
UNAIDS	Countries in Sub-Saharan Africa	United Nations entity	The Joint United Nations Programme on HIV/AIDS (UNAIDS) unites the efforts of 11 UN organizations—UNHCR, UNICEF, WFP, UNDP, UNFPA, UNODC, UN Women, ILO, UNESCO, WHO and the World Bank. The 'Education Plus' initiative is a high-profile, high-level political advocacy drive to accelerate actions and investments to prevent HIV. It is centred on the empowerment of adolescent girls and young women and the achievement of gender equality in sub-	https://www.unaids.org/en

			Saharan Africa—with secondary education as the strategic entry point.	
UNECA Sub-regional office for Eastern Africa (Kigali, Rwanda)	Countries covered: **Burundi**, Comoros, Democratic Republic of Congo, **Djibouti, Ethiopia, Eritrea, Kenya,** Madagascar, **Rwanda,** Seychelles, **Somalia, South Sudan**, Tanzania and **Uganda.**	United Nations entity	Provides Member States with capacity building and advisory services to assist structural transformation of economies in the region. Also serves the East African Community (EAC) and the Inter-Governmental Authority on Development (IGAD), the Indian Ocean Commission, the Economic Community on the Great Lakes, and the International Conference on the Great Lakes Region. UNECA report on Macroeconomic and Social Developments in Eastern Africa 2020 finds that although Eastern Africa is the fastest growing region in Africa, the current pace of economic transformation is too slow to ensure achievement of SDGs by 2030. The report discusses the on-going challenge of fighting hunger and malnutrition, and concludes with the need to urgently address poverty and its impact on health and nutrition, and in turn on human development and the economy.	https://www.uneca.org/publications/macroeconomic-and-social-developments-eastern-africa-2020
UNECA Sub-regional office for Central Africa (Yaounde, Cameroon)	Not stated	United Nations entity	No information available	https://www.uneca.org/sro-ca
UNICEF Eastern and Southern Africa Regional Office (Nairobi)	Angola, Botswana, **Burundi**, Comoros, **Eritrea**, Eswatini, **Ethiopia, Kenya**, Madagascar, Malawi, Namibia, Mozambi	United Nations entity	UNICEF's 2019 State of the World's Children report focuses on food and nutrition of children. Key messages include: - Investing in nutrition for children and young people is a cornerstone investment if the world is to achieve the Sustainable Development Goals by 2030. - Improving children's nutrition requires food systems to deliver nutritious, safe, affordable and sustainable diets for all children. The report stresses the importance of middle childhood 5-9 years as an opportunity for children who experienced stunting to catch up. Nutrition habits are also established during	https://www.unicef.org/media/60831/file/SOWC-2019-ESA.pdf

	que, **Rwanda, Somalia**, South Africa, **South Sudan, Uganda**, UR Tanzania, Zambia, Zimbabwe		this period. The report notes data on what school-aged children eat are limited. - Adolescents 10-19 years diets in low and middle-income countries are generally nutritionally poor. UNICEF' Child Friendly Schools Framework (CFS) promotes a child rights and holistic approach to education that includes the promotion of the physical and emotional health of children by addressing their key nutritional and health care needs and equipping them with knowledge for the future. WASH - UNICEF supports over 100 countries in establishing and rehabilitating WASH facilities in schools. They work directly with schools to improve access to basic water, sanitation and handwashing facilities. The WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) expanded its global databases to include WASH in schools which includes tracking 'basic' drinking water, sanitation and hygiene services in pre-primary, primary and secondary schools. HIV - Preventing new HIV infections and improving access to testing and treatment saves lives and are the pillars of UNICEF's HIV response. They have set targets for ending AIDS in their Strategic Plan results and Start Free Stay Free AIDS-free frameworks, in which they play a global leadership role. The HIV and AIDS programme focuses on many of the issues and indicators targeted by the SDGs have been at the core of principles and strategies underlying UNICEF's HIV programme. In its Strategic Plan 2018–2021, UNICEF's core objectives are: 1. 'Finishing the job' of eliminating mother-to-child transmission. 2. Seeking opportunities to prevent HIV in adolescents and young women. 3. Timely initiation and retention of children and adolescents in treatment and care	
WHO Inter-country Support Team: Eastern & Southern Africa	Covers 20 countries: Botswana, Comoros, **Eritrea**, Eswatini, **Ethiopia, Kenya**, Lesotho, Madagascar, Malawi, Mauritius,	United Nations entity	WHO Regional Committee for Africa adopted the Strategic Plan to reduce the double burden of malnutrition in the Africa Region: 2019 – 2025 (in August 2019). The strategy aims to reduce all forms malnutrition throughout the life course. Its objectives are to strengthen policies and regulatory frameworks, strengthen national capacity and evidence base for nutrition programming. Its guiding principles include a life-course approach, multisectoral collaboration, universal health coverage and partnerships. One of the priorities in the strategic plan is to strengthen multisectoral collaboration to prevent malnutrition, and advocates for strong collaboration between health and education sectors for educating school-aged children on nutrition.	https://www.afro.who.int/about-us/organizational-structure https://www.afro.who.int/sites/default/files/2019-08/AFR-

	Mozambique, Namibia, **Rwanda**, South Africa, Seychelles, **South Sudan,** Tanzania, **Uganda**, Zambia, Zimbabwe		WASH - WHO and UNICEF, through the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), have produced regular updates on water, sanitation and hygiene (WASH) since 1990. Together, they are responsible for monitoring Sustainable Development Goal (SDG) targets 6.1 and 6.2 which is universal access to WASH and SDG target 4.a – inclusive and effective learning environments for all	RC69-7%20Strategic%20Plan%20to%20reduce%20the%20double%20burden%20of%20malnutrition.pdf
WHO Inter-country Support Team: Central Africa	Covers 10 countries: Angola, **Burundi,** Cameroon, Central African Republic, Chad, Congo, DR Congo, Equatorial Guinea, Gabon, Sao Tome and Principe	United Nations entity	WHO Regional Committee for Africa adopted the Strategic Plan to reduce the double burden of malnutrition in the Africa Region: 2019 – 2025 (in August 2019). The strategy aims to reduce all forms malnutrition throughout the life course. Its objectives are to strengthen policies and regulatory frameworks, strengthen national capacity and evidence base for nutrition programming. Its guiding principles include a life-course approach, multisectoral collaboration, universal health coverage and partnerships. One of the priorities in the strategic plan is to strengthen multisectoral collaboration to prevent malnutrition, and advocates for strong collaboration between health and education sectors for educating school-aged children on nutrition.	https://www.afro.who.int/about-us/organizational-structure https://www.afro.who.int/sites/default/files/2019-08/AFR-RC69-7%20Strategic%20Plan%20to%20reduce%20the%20double%20burden%20of%20malnutrition.pdf
World Bank	Global, with regional (Africa) and sub-regional offices. Presence in 26 countries	Bretton Woods Institution	Reducing all forms of malnutrition is central to WB goals of reducing extreme poverty and increasing prosperity, as well as building resilience and preventing instability. The Bank is concerned about the slower rate of reduction in stunting in Sub-Saharan Africa compared to other regions and sees accelerating the reduction in stunting as key to maximizing return on investments in early childhood development, education, and policies aimed at fostering and enhancing human capital accumulation	http://documents1.worldbank.org/curated/en/126621505397202676/pdf/119719-WP-ASA-Full-

	in Eastern & Southern Africa; and 22 countries in Western & Central Africa.		and job creation. The Bank supports countries to develop investment cases for reducing stunting and other forms of malnutrition. It publishes country nutrition profiles on all Sub-Saharan African countries including those where it is not supporting nutrition-related activities. The Bank hosts the **Global Database on Child Growth and Malnutrition** with WHO, UNICEF. WASH – Fast Track Initiative Grant III for Basic Education. The main policy areas to be supported in this project are: 1) launching multi-grade teaching; 2) including the Community/school based local education management (COGES) in the decentralization process for school construction; 3) launching a new distance education program for students training to become secondary level math and science teachers; 4) increasing the actual number of teaching hours in basic education; 5) launching a system for the utilization of the results of student assessment to improve student learning in primary and secondary education; 6) introducing a system of dual apprenticeship training in technical education and vocational training; and 7) including school health, nutrition and HIV and AIDS in the upper secondary school curricula.	Report-V7-WEB-PUBLIC.pdf www.worldbank.org
African Union	All African countries member states	Continental Intergovernmental Organization	AU adopted the revised Africa Regional Nutrition Strategy 2015-2025 that mirrors nutrition targets adopted by African countries at the World Health Assembly in 2011. The AU works with Member States to improve nutrition and knowledge/evidence – for example, the Cost of Hunger in Africa study. The AU strongly supports school feeding. It has the AU School Feeding Initiative where the AU is working with Member States to implement school feeding. The AU commissioned a major study on Sustainable School Feeding in Africa (2018) with support of WFP. The African Day of School Feeding was instituted in January 2016 through AU Decision by African Union Heads of State and Government in recognition of the value of home-grown school feeding.	https://au.int/en/about-au-school-feeding https://au.int/en/documents/20181008/sustainable-school-feeding-report
NEPAD/African Union Development Agency	Supports all Member States of the African Union	Implementing agency of the African Union	School feeding is one of NEPAD/AUDA's flagship projects under the Food and Nutrition Programme. Recently published the Home Grown School Feeding Handbook based on lessons learned from Botswana, Ghana, and Nigeria. HIV – SADEV (Health and Development): Youth, Gender and HIV/AIDS a non-governmental organisation working in the Republic of Niger. SADEV	https://www.nepad.org/publication/home-grown-school-

			used the disbursement from the NEPAD Spanish Fund for African Women Empowerment to carry out several awareness-raising activities reaching 12,390 young people from selected schools. Prevention activities included educational lectures, cultural evenings for young girls and boys, as well as debates and screenings of HIV/AIDS films.	feeding-handbook
African Development Bank	Continental (Regional) All African states are members.	Development Finance Institution	Overarching objective is to spur sustainable economic development and social progress in Regional Member Countries by mobilizing and allocating resources for investment in RMCs; and providing policy advice and technical assistance to support development efforts. Nutrition forms part of the AfDB Human Capital Development Strategy. The African Leaders for Nutrition (ALN) is in partnership with the AU and Bill & Melinda Gates Foundation, aimed at sustaining high-level political will and investments in nutrition across the continent. ALN use two advocacy tools – Nutrition Accountability Scorecard (2019) that highlights country progress and provides a snapshot of Africa's progress against global nutrition targets; and the Economic Investment Case for Nutrition (was to be launched in 2019) – a bi-annual review of economic studies of cost-effective nutrition interventions in Africa to identify gaps and needs to finance nutrition targets. Banking on Nutrition – AfDB programme that seeks to unlock the nutrition potential in the bank's investment portfolio. Bank launched its 2018-2025 Multi-sectoral Nutrition Action Plan in December 2018. The plan targets nutrition-smart investments in agriculture, water and sanitation, and social protection, and projects a 40 per cent reduction in stunting by 2025. The Action Plan includes the use of school-based food and nutrition interventions covering school feeding, micronutrient supplements, deworming, health promoting behaviours, WASH and an enabling school environment.	https://www.afdb.org/en/topics-and-sectors/sectors/human-capital-development/nutrition https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Banking_on_Nutrition_Action_Plan_A4_V1d_single.pdf
Common Market for Eastern & Southern Africa (COMESA) **HQ in Zambia**	Burundi, Comoros, DR Congo, Djibouti, Egypt, Eritrea, Eswatini, Ethiopia, Kenya, Libya, Madagascar,	Regional intergovernmental organization	COMESA's 2016 Health Charter identifies poor nutrition as one of the major drivers of disease burdens in the COMESA region and on the Continent, and urges COMESA States to (i) review national agricultural policies to align them to CAADP; (ii) prioritize rural agriculture and infrastructure in national development planning; (iii) mainstream nutrition in national development and social protection policies and programmes; and (iv) progressively make access to food, clean water and sanitation by all justiciable.	https://www.comesa.int/wp-content/uploads/2020/05/ENG_COMESA-Health-Framework.pdf https://www.comes

	Malawi, Mauritius, Rwanda, Seychelles, Somalia, Sudan, Tunisia, Uganda, Zambia, Zimbabwe		COMESA adopted the COMESA Social Charter (2015) that aims to promote the welfare of people in the region, and improve the quality of life. The charter has the well- being of the child as one of its pillars. There is reference to maternal and child health, but the emphasis is on children under 5 years.	a.int/wp-content/uploads/2020/05/ENG_COMESA-Social-Charter.pdf
Intergovernmental Authority on Development in Eastern Africa (IGAD)	Member countries: Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan	Regional Intergovernmental organization	IGAD's mission is to assist Member States to achieve (i) food security and environmental protection (ii) promotion and maintenance of peace and security and humanitarian affairs, (iii) economic cooperation and integration. Among IGAD's objectives are (a) to achieve regional food security, as well as encourage and assist efforts to collectively combat drought and other natural or human-made disasters (b) initiate and promote programmes and projects to achieve regional food security and sustainable development of natural resources and environmental protection. IGAD Strategy 2016-2020 identifies reduction in stunting prevalence in the region as a priority. It has a nutrition programme that aims to increase the IGAD regional nutrition momentum for accelerated achievement of better child and maternal nutrition outcomes among pastoralists and cross-border populations. IGAD is considered one of the most food insecure regions in the world according to IGAD's Strategy, with the situation worsened by COVID-19 and climatic shocks. The IGAD Food Security Task Force developed the IGAD Food Security and Nutrition Response Strategy in 2020 to guide actions to reduce food insecurity and malnutrition. IGAD has a draft strategy for Nutrition Advocacy that was validated in late 2019, but the current status is unknown.	https://igad.int/about-us https://igad.int/documents/6-igad-rs-implementationplan-final-v6/file https://reliefweb.int/sites/reliefweb.int/files/resources/78230.pdf
East Africa Community (EAC) **HQ in Tanzania**	Burundi, Kenya, Rwanda, South Sudan, United Republic of Tanzania, Uganda	Regional Economic Community	EAC agenda includes harmonization of policies on agriculture and food security and implementing joint programmes; harmonization of education systems; and joint action on communicable and non-communicable diseases. It has a Reproductive, Child, Adolescents Health and Nutrition Unit, but there is no evidence of any nutrition interventions.	https://www.eac.int/health/reproductive-health-and-nutrition

Economic Community of Central Africa States (ECCAS)	Angola, **Burundi,** Cameroon, Central African Republic, Chad, DR Congo, Equatorial Guinea, Gabon, **Rwanda**, Republic of Congo, São Tomé and Príncipe	Regional Economic Community	ECCAS' priorities are organized around five pillars: peace and security; common market; environment and natural resources; land use planning and infrastructure; and gender and human development. There is limited information on its website. The AUDA/NEPAD website indicates that all ECCAS Member States have signed the CAADP (Comprehensive Africa Agriculture Development Programme)	https://ceac-eccas.org/en/#presentation
East African Farmers Federation	Member countries: **Burundi**, Djibouti, DR Congo, **Eritrea, Ethiopia, Kenya, Rwanda, South Sudan,** Tanzania, **Uganda**	Regional farmers organization	The EAFF is a network of more than 20 million smallholder farmers in 10 Eastern African countries. Its mandate and functions include enhancement of food security, food sovereignty, and poverty alleviation; active engagement of women and youth in agricultural development; and empowering farmers through lobbying and advocacy for pro-poor policies. The EAFF is a member of the Pan-African Farmers Organization (PAFO) and committed to participating in awareness of COVID-19 preventative measures and doubling efforts to produce and supply more food to feed Africa.	https://www.eaffu.org/
Africa Research Universities Alliance Centre of Excellence in Food Security	Led by University of Pretoria, South Africa in collaboration with University of Ghana, Legon and **University of Nairob**i. Has association with University of	Continental research body. Has links with IPFRI and FANR in SADC	Concern about triple burden of malnutrition, and high intake of low nutrient higher energy food leading to malnutrition, and impact on vulnerable groups especially children. Also notes that many on the continent rely on agriculture for livelihoods. One of its research focus areas is to explore pathways to providing sufficient, safe, nutritious and consumer driven food for populations of 21st century Africa. Objectives are to design foods with local and indigenous African plants and animals that are affordable, marketable and convenient, nutrient dense, and implement appropriate food processing technologies for SMMEs to manufacture convenient African foods; policies and programmes to ensure nutrient adequate foods are available, culturally acceptable, accessible and affordable to African populations.	https://arua.org.za/centres-of-excellence/coe-food-security/

	Western Cape and University of Fort Hare (historically disadvantaged universities)			
Global Alliance for Improved Nutrition (GAIN)	Offices in African countries: Ethiopia, Kenya, Mozambique, Nigeria and Tanzania	International NGO	GAIN's aim is to make healthier diets more affordable and accessible in the countries GAIN works in. It supports large-scale food fortification in Ethiopia, Kenya, Mozambique, Nigeria and Tanzania; better diets for children in Ethiopia, Mozambique and Nigeria; and adolescent nutrition in Mozambique.	https://www.gainhealth.org/homepage
Action Against Hunger	Burkina Faso, Cameroon, Central African Republic, Chad,Cote d' Ivoire, DR Congo, Kenya, Liberia, Madagascar, Mali, Mauritania, Niger, Nigeria, Senegal. Sierra Leone, **Somalia, South Sudan**, UR Tanzania, **Uganda**, Zimbabwe	International NGO	Operates in 40 countries globally. Funded through private sector foundations and individual donors. Operations cover health and nutrition, food security and WASH. Also covers humanitarian crises. Does not have a specific focus on school health and nutrition.	https://www.actionagainsthunger.org/

CARE East and Central Africa (Nairobi)	Covers: **Burundi, Djibouti**, DR Congo, **Ethiopia, Kenya, Somalia, South Sudan, Sudan,** Tanzania, **Uganda**	International NGO	Operates in over 100 countries globally. Work includes food and nutrition, education and health. Its health, food and nutrition programmes focus on children under-five years. CARE also works with adolescent girls on improving health - reducing anaemia and sexual reproductive health especially for married adolescent girls. CARE supports smallholder agriculture, especially women farmers, to meet their food needs and develop sustainable livelihoods. There is no reference to school health and nutrition in the organization's description of its programmes.	https://care.org/our-work/food-and-nutrition/
Project Concern International (PCI)	Botswana, **Burundi, Ethiopia, Kenya**, Malawi, Tanzania, Zambia	International NGO	PCI food security programmes are designed to end hunger and malnutrition by imparting climate-smart and nutritionally-targeted agriculture practices, strengthening livelihoods; improving health nutrition and hygiene practices; and supporting integrated school feeding programmes. School feeding programmes form part of an integrated approach that includes training teachers, parents, volunteers and students in healthy eating and personal hygiene, working with schools and community leaders to keep girls in school, supporting government-led vaccination and health days and distribution of deworming kits, and improving school infrastructure with an emphasis on water and sanitation. PCI also works with government agriculture extension officers and schools to establish school gardens, and partners with local farmers and schools to establish a local supply of fresh, nutritious food.	https://www.pciglobal.org/school-feeding/
World Vision International	Angola, **Burundi,** Central African Republic, Chad, DR Congo, Eswatini, Ethiopia, Ghana, **Kenya**, Lesotho, Malawi, Mali, Mauritania, Mozambique, Niger,	International NGO	Health Sector and Nutrition Approach 2020-2030 sets the high- level goal: Ensure healthy lives and promote well-being for all children. While children under-five years are the main target of World Vision, the new approach recognises the need to improve the health and nutrition of adolescent girls to reduce under-five mortality and maternal mortality. The approach makes provision for improving dietary diversity and addressing micronutrient and iron deficiency in adolescents 12-18 years. Health and nutrition interventions are linked with other interventions, for example, WASH, child protection, mental health, infectious and neglected tropical diseases. WASH - World Vision seeks to reach the most vulnerable children around the world, implementing WASH in schools programming in 40 countries. World Vision is prioritising WASH service levels beyond basic access. This includes improved water, equitable access to toilets, and facilities for menstrual hygiene.	https://www.wvi.org/africa https://www.wvi.org/sites/default/files/2020-06/HN%20Sector%20Approach%20%281%20June%202020%29.pdf

	Rwanda, Senegal		World Vision has partnered with Sesame Workshop to roll-out a school-based program called WASH UP! The program uses fun and engaging learning materials, featuring the puppet Raya to teach children to learn, practice, and share healthy WASH habits. Raya also serves as a role model for school-aged girls and provides educational resources to teachers as well. HIV – Under the World Vision International objective of ending discrimination and stigma there is a program in Zimbabwe specifically for young girls that gives them the opportunity to focus on their education and avoid early teenage pregnancy. It is called for The IGATE Club. Through the club, CoH helped to empower the girls and boost their self-confidence.	
Save the Children (International)	Burkina Faso, DR Congo, **Ethiopia, Kenya,** Malawi, Mozambique, Niger, Nigeria, **Rwanda**, Sierra Leone, **Somalia, South Sudan, Sudan**, Tanzania, **Uganda,** Zambia, Zimbabwe	International NGO	Save the Children subscribe to the FRESH framework for School Health and Nutrition (SHN), and within the organization, the SHN programme is linked with the Education Sector programmes and seen as a continuation of the Early Childhood Development Programme. Save the Children's SHN programme operates in 30 countries globally. Interventions are adapted to country contexts and needs and include providing school children with access to improved WASH facilities; access to deworming and micronutrient supplementation, vision and hearing screening, oral health promotion, malaria prevention and treatment, obesity reduction; skills-based health education for developing lifelong health behaviours, including HIV and AIDS prevention; ensuring national policies support schools and communities. Save the Children produced a Health Education Manual (2013) to assist SHN Programme Managers to design and implement health education in schools, for children aged 8-10 years. The lessons cover WASH, Infectious Diseases including Neglected Tropical Diseases, Taking care of our bodies, Preventing diseases and injury, Nutrition, Sexual Reproductive Health including HIV and AIDS prevention.	https://www.savethechildren.org/us/what-we-do/education/school-health-and-nutrition https://www.savethechildren.org/content/dam/global/reports/education-and-child-protection/health-ed-man.pdf

Annex E: Summaries of reviewed papers: WFP East and Central Africa region

Table 20
Summary of reviewed papers on impact of school feeding on nutrition, health and education outcomes for school-aged children

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Alderaman et al., 2019 (Uganda)	Clustered Randomised controlled trial, Adolescent girls aged 10-13 years, SFP: n=116 Control: n=65	SFP provides multiple-micronutrient-fortified porridge made from fortified corn-soy blend provided mid-morning, as well as beans and maize meal or rice provided at lunch.	Haemoglobin level and anemia	Statistically significant reduction in any anaemia and reduced moderate-to-severe anaemia for adolescent girls with SFP
Neervoort et al., 2013 (Kenya)	Non randomised controlled study SFP (n= 67 students) Controls (n=81) students	SFP provides a lunch combined with health education for a period of 3 months.	Anaemia and nutritional status	Children participating in the school feeding programme were less stunted (p = 0.02) and wasted (p = 0.02) than children in the control group, and levels of anaemia were lower (p = 0.01).
Gewa et al., 2013 (Kenya)	Randomised controlled trial Age: 6 to 11 years SFP: n=148 Control: n= 34	SFP provides vegetarian supplement (a feeding based on a traditional local dish (githeri) of maize, beans and vegetables); or milk supplement (githeri plus a glass (250 ml) of whole cows' milk); and (iv) meat supplement (githeri cooked with 85 g of minced beef) for a period of 2 years	School children's daily nutrient intake from home foods	There was no evidence that school children who received supplementary snacks at school experienced reduced intake at home or that intake by other family members were increased at the expense of the school child's intake (P>0.05).

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Hulet et al., 2014 (Kenya)	Randomised controlled trial Age: mean 7·1 years (SD 0·8) SFP: n=271 Control: n = 89	Snack of animal source food (ASF); a local plant-based stew (githeri) with meat, githeri plus whole milk or githeri with added oil. Period: 2 years	Primary school test scores	SFP with ASF resulted in improved academic performance, which can result in greater academic achievement.
Neumann et al., 2013 (Kenya)	Clustered randomised controlled trial Age; mean 7·1 (SD 0·8) SFP: n=690 Control: n= 212	School snacks of a local plant-based dish, githeri, with meat, milk or extra oil added Period: 2 years	Morbidity including: malaria, fever, chills, diarrhoea with >3 watery stools per day, lower respiratory infection (pneumonia), typhoid, jaundice, and illnesses accompanied by reduced food intake and/or physical activity and being bedridden.	For nearly all morbidity outcomes the Control group had the highest Probability of Morbidity Outcome (PMO) and the least and central decline over time. The meat and plain Githeri (i.e. githeri + oil) groups showed the greatest declines in the probability of a morbidity outcome (PMO) for total and severe illnesses
Omwami, Neumann, Bwibo 2011 (Kenya)	Randomised controlled trial Age; mean 7, Range 5-15 years.	SFP provides fortified local staple-based snack (githeri meal) at morning recess as meat-githeri, milk-	School attendance rate	SFP groups performed better than the control group on the repeated measure of school attendance ($P<0.05$)

	SFP: n=893 Control: n= 113	githeri, and energy-githeri Period : 2 years		

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Zenebe et al., 2018 (Ethiopia)	Comparative cross-sectional SFP; n=145; mean age 12.3 ± 1.3 years Control: n= 145; mean age 11.8 ± 1.1 years	Meal prepared from wheat, corn or beans	Height for age Z score BMI for age Z score Dietary diversity score (DDS) Class attendance	SFP resulted in improved dietary diversity, nutritional status and attendance rates and reduced dropout rate Higher DDS higher mean (±SD) of DDS in SFP beneficiaries (5.8 ± 1.1) than the non-beneficiaries (3.5 ± 0.7)
Demlew and Nigussie, 2020 (Ethiopia)	Comparative cross-sectional SFP: n=718; mean age 12.12 ± 1.36 years Control n= 313; mean age 12.73± 1.46 years	Fortified blended food with 6 g vegetable oil and 3 g iodized salts	BMI-for-age and height for age	Non-SFP students were 2.6 times at higher odds of thinness [AOR = 2.6, 95% CI: (1.8, 3.8)] No difference in stunting between the groups
Dheressaa DK, 2011 (Ethiopia)	Comparative cross-sectional SFP: n =212 households Control: n= 206 households	School Meal; not specified	Household members School Enrolment Ratio (HER), Attendance Rate (AR) and Drop-out Ratio (DR)	No significant positive impact of SFP on household members School enrolment Ratio, attendance and dropout
Aregawi, F., Yusuf J., and Haji J.**,**	Comparative cross-sectional	Data of schools implementing SFP is	School enrolment rate	SFP had a positive impact in student enrolment (on average by 193 students)

2012 (Ethiopia)	SFP: n=47 schools Control: n= 47 schools	compared with non-SFP schools	Dropout rate	SFP did not make a significant difference to student dropout rates.

Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Gallenbacher, Ramin, 2018 (Ethiopia)	Comparative cross-sectional SFP: n=40 schools Control: n= 122 schools	Data of schools phasing out implementing SFP is compared with those implementing SFP	Enrolment, drop-out and attendance rates, and learning achievement (repeater rates)	Schools phasing out SFP showed 7% higher dropout rate among girls. No SFP on a particular day means attendance rates for male and female students drop by 19 and 8 percentage points. Repeater rate growth is slightly decreased with stopping food provision, potentially affected by the higher drop-out rate.
Baum, Miler and Gains 2017 (Uganda)	Non-randomised controlled trial, children aged 6-9 years SFP: n=185 Control: n=56	One egg or two eggs supplemented five days per week Period: 6 months	Weight, height, tricep skinfold thickness and mid-upper-arm circumference	Participants in the 2 eggs group had significantly higher growth and weight gain compared to the 0 eggs and 1 egg groups
Parker et al., 2015 (Burundi)	Randomised controlled trial Age: 7 to 11 years SFP: n=461 Control: n= 443	Lunch ration: Rice (150 g), beans (40 g), vitamin A-fortified vegetable oil (10 g), and salt (3 g) Multiple-micronutrient formulation provided: iron (17.8 mg), zinc (8.5 mg), thiamine (1.8 mg), and folic acid (600 mg)	Haemoglobin level Anaemia	No difference in the mean change in haemoglobin concentration (β = 0.09 g/dl, 95% CI: -0.21-0.38) and anaemia status (Odds ratio = 0.85, 95% CI: 0.51- 1.43).

		Period: 7 months		
Bagonza, Arthur 2013 (Uganda)	Non randomized controlled study SFP: n=220 schools Control: n = 220 schools	Porridge at break time	Academic performance Nutritional status	SFP resulted in better performance in mathematics and English Nutritional status did not differ (BMI-for-age 15.66 in SFP versus BMI-for-age 15.59 in control

Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Omar, Muturi and Samantar, 2019. (Somalia)	Comparative cross-sectional SFP: n=20 schools Control: n = 20 schools	Not specified	Student enrolment retention Academic achievement	Schools with SFP had higher retention rate by 9%, higher girls' enrolment (46%) compared to non-SFP (44%). Student enrolment in SFP schools increased by 110% compared to 89% of non-SFP schools. Failure rate 5% in non-SFP schools compared to 2.3% of schools with SFP.
Assefa and Tefera, 2015 (Ethiopia)	Comparative cross-sectional SFP: n=195 students Control: n= 228 students Primary school students	Not specified	Dropout rate Attendance rate Achievement Test Score	SFP resulted in significant increases in attendance rate and students' achievement test score. Dropout was 7.73% for SFP and 15.95% for non- SFP
Yohannes and Kassahun, 2017 (Ethiopia)	Comparative cross-sectional SFP: n=145 students	Not specified	Academic achievement Attendance	SFP resulted insignificant but positive effect on attendance rate and academic achievement (P>0.05)

	Control: n= 175 students			
Reta 2019, (Ethiopia)	Comparative cross-sectional Grade 4 students SFP: n=118 students Control: n= 133 students	One year	Academic achievement Attendance	SFP resulted in non-significant but positive effect of attendance and academic achievement (P>0.05)

Table 21
Summary of reviewed papers on impact of school-based deworming on health, nutrition and education outcomes for school-aged children

Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Pullan, Rachel L. et al., 2019 (Kenya)	Clustered randomised controlled trial, Children aged 2-14 years SBDW: n=7058 Control: n=7281	SBDW was compared with community-based approach Period: 24 months	Community hookworm prevalence, Ascaris lumbricoides and Trichuris trichiura prevalence, infection intensity of each soil-transmitted helminth species, and treatment coverage and costs	Relative to school-based treatment, the risk ratio for STH was lower in community-wide treatment (P<0.001)
Aiken et al., 2015 (Kenya)	Cluster quasi-randomized stepped-wedge trial SBDW: n=21,364	School-based health-education and drug-treatment intervention Period: 12-24 months	School attendance and examination performance	School-based drug-treatment and health-education intervention improved school attendance (a total increase in attendance of 3.9%) among treated children and no evidence of effect on examination performance.

	Control: n=10,081			
Janet et al., 2020 (Kenya)	Comparative cross-sectional survey School enrolled children =327 Non-enrolled children =326	School-based mas deworming program at regular intervals as recommended by World Health Organization	Differences in STH prevalence among enrolled and non-enrolled PSAC	School enrolled children had higher STH but not statistically significant (P>0.05).
Mwandawiro et al., 2019 (Kenya)	Pre-post comparison Mean age= 9 years SBDW: n=21,528 Control: n=21,045	National school-based deworming programme (NSBDP Period: Five years	Soil-transmitted helminth species	SBDW resulted in relative reduction of 58.2% over the five-year period
Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Shumbej et al., 2019 (Ethiopia)	Prospective cross-sectional method Age: 10.4 (5-15) years Baseline: n=597 End line: 310	Annual preventive mass chemotherapy for soil-transmitted helminths	Soil-transmitted helminth species	SBDW resulted in a substantial reduction in overall prevalence (41%) and mean geometric infection-intensity reduction (22.3%).
Peterson et al., 2011(Kenya)	Repeated a cross-sectional stool survey Age 6-13 years Baseline: 171 children End line: 211 children	School-based mass deworming program at regular intervals Period: 3 years	Soil-transmitted helminth species	STH has decreased by nearly a quarter over the 3-year period

Okoyo et al., 2016 (Kenya)	Repeated a cross-sectional stool survey in the same area in 2010 Mean age=10 years Baseline: 21,432 End line: 6,230	Two rounds of School based mass deworming program at regular intervals Period: 2 years	Soil-transmitted helminth species	The school-based deworming programme has substantially reduced STH infections (32.3 to 16.4%)
Ali et al., 2019 (Ethiopia)	Repeated a cross-sectional stool survey Age 5-15 years Baseline: 542 End line: 250	School based mass deworming program at regular intervals, health education and water sanitation, can lead to sustained control of helminthic infections in school children Period: 4 years	Soil-transmitted helminth species	Mass drug administration with health education and water sanitation, can lead to sustained control of helminthic infections in school children decreasing from 52.8% at the beginning to 6.4% at the end.

Table 22
Summary of reviewed papers on impact of school-based health and nutrition education on health, nutrition and education outcomes for school-aged children

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Tamarat et al., 2017 (Ethiopia)	Quasi-experimental design N= 1000 students NEP=500 Control=500	Intervention schools received school-based health and nutrition education using a combination of strategies including: peer-groups, school media and health clubs, and family and community participation. Period: 8 months	Individual dietary diversity	Findings of this study showed that the dietary diversity of school adolescents was significantly improved from 34.8% at baseline to 74.7% at end-line

Gitau et al., 2016 (Kenya)	Before- after study N= 154 children	Comparison of three nutrition education strategies: Peer, agriculture staff, and researcher facilitated with controls	Dietary diversity score, Haemoglobin levels	Dietary intakes increased significantly after the interventions in the experimental schools as compared to the control school There was a statistically significant difference in the Haemoglobin levels before and after the interventions. Peer facilitated 12.8+0.9 versus 13.4+1.0 control
Florence et al., 2020 (Kenya)	Cluster-Randomized Controlled Trial Age 15-18 years NEP=111 Control=111	The Nutrition and Physical Education Intervention aimed at improving the knowledge, attitudes and skills to enhance healthy eating behaviour and to improve physical activity levels among adolescents	Weight status of adolescent students for a period of 8 weeks	The intervention group had lower mean waist circumference and lower mean BMI for age Z scores in contrast to the control group, at 6 months post intervention.

Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Dargie et al., 2018 (Ethiopia)	School based randomized controlled trial Age 10-14 years NEP=101 Control=101	Peer-led pulse nutrition education intervention Period: Six months	Knowledge, attitude, practice of pulse consumption and nutritional status	NEP resulted in significant (p=0.01) differences in BAZ mean score of the children which was reflected in decreased prevalence of thinness
Loechl et al., 2010 (Uganda)	Post-post comparison, Comparative cross-sectional survey	Four groups were compared. Agricultural Technologies/ Extension & Nutrition Education	Food consumption data using a modified interactive 24-hour recall	Only 25% of respondents in the control group had consumed orange-fleshed sweet potato (OFSP) while Nutrition education resulted in 68% OFSP consumption

	Age 10-14 years N=657	Agricultural Technologies/Extensions only Nutrition Education only No intervention (control division) School children were trained separately .	anthropometric measurements of all index children	

Table 23
Summary of reviewed papers on impact of school-based WASH interventions on health, nutrition and educational outcomes for school-aged children

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Zhang et al et al., (2013) **Uganda**	Pre-/post intervention study Eight schools (398 students). Ages 7–13 years.	Four intervention schools were given tippy-taps, soap and educational materials, while four control schools received only educational materials 1 month	Handwashing behaviour, use of tippy-taps, stomach pain and student–parent idea dissemination	In the intervention group; 'always' or 'often' washing hands at school increased from 3.5% at baseline to 100.0%, 'always' washing hands after using the toilet increased from 5.5% to 65.0%, use of soap increased from 13.5% to 84.5%, washing their hands three or more times/day increased from 5.5% to 93.0%, students reporting no stomach pain episodes increased from 7.0% to 80.0%
Dreibelbis et al., 2017 **Kenya**	Cluster-randomized trial among 185 schools 3523 children younger than 5 years with an older sibling attending a program school	45 schools each: (1) hygiene promotion and water treatment (HP&WT), (2) HP&WT plus additional school latrines (Sanitation + HP&WT), and (3) Control. 1 year	Diarrheal disease among children younger than 5 years	Measurable reduction in diarrheal diseases (45%-65%) among children younger than 5 years whose siblings attend intervention schools was observed.

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Garn et al., 2016	A cluster-randomized trial	Water-available schools were randomly allocated into three	Pupil-reported diarrhoea	Lower prevalence of A. lumbricoides (PR = 0.23, 95% CI: 0.045, 1.2) and hookworm (PR =

Kenya	Water-available group= 135 schools Water-scarce group= 50 schools	study arms of equal size: (1) Water-available control arm; (2) Hygiene promotion and water treatment arm; and (3) Hygiene promotion and water treatment, plus sanitation improvement arm. Water-scarce group, 50 schools were randomly allocated into two study arms of equal size: (1) Water-scarce control arm and (2) Hygiene promotion and water treatment, plus sanitation, plus water supply improvement arm.	Soil-transmitted helminth infection	0.26, 95% CI: 0.055, 1.2) with the intervention Increased adherence to two or more intervention components was associated with a reduced prevalence of diarrhoea (PR = 0.28, 95% CI: 0.10, 0.75
Chard et al, 2019 **Kenya**	WASH HELPS cluster-randomized trial Intervention (n = 50) or control (n = 50) A total of 3993 pupils were enrolled	Intervention schools received a school water supply, sanitation facilities, handwashing facilities, drinking water filters, and behaviour change education and promotion. Control schools received the intervention after research activities ended.	Class attendance, enrolment, dropout, and progression . Health impacts included diarrhoea, symptoms of respiratory infection, and conjunctivitis/non-vision related eye illness	No impact of the intervention on any primary (pupil absence) or secondary (enrolment, dropout, grade progression, diarrhoea, respiratory infection, conjunctivitis, STH infection) impacts. Even among schools with the highest levels of fidelity and adherence, impact of the intervention on absence and health was minimal.
Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**

Garn et al., 2014 **Kenya**	Cluster-randomized trial N=135 schools	135 were randomly selected – stratified into three arms of 45 schools each: 1) HP&WT 2) HP&WT and sanitation improvement, and 3) "water available" control arm. 2 years	Total enrolment and the proportion of enrolled students who were girls	The proportion of girls enrolled in school increased by 4% (prevalence ratio (PR) =1.04 [1.00, 1.07] p=0.02). Among schools with better baseline water access during the dry season (schools that didn't receive a water source), we found no evidence of increased enrolment in schools that received a HP&WT intervention (β=0.016 [-0.039, 0.072] p=0.56) or the HP&WT and sanitation intervention (β=0.027 [-0.028, 0.082]p=0.34), and there was no evidence of improved gender parity (PR=0.99 [0.96, 1.02] p=0.59, PR=1.00 [0.97, 1.02] p=0.75, respectively)
Freeman et al., 2014 **Kenya**	Cluster-randomized trial N=135 schools	135 schools were randomly allocated into one of three intervention arms: (1) hygiene promotion and water treatment (HP&WT), which included teacher training on hygiene behaviour change, containers for safe drinking water storage, buckets with taps to be used for handwashing, and a 1-year supply of WaterGuard (a liquid chlorine-based sodium hypochlorite solution used for point-of-use water treatment); (2) HP&WT with the addition of school latrines (HP&WT+ Sanitation), which included up to seven ventilated improved pit latrines, depending on existing pupil: latrine ratios; or (3) Control, to receive the intervention after	Diarrhoeal disease	Pupils attending 'water-available' schools that received hygiene promotion and water treatment (HP&WT) and sanitation improvements showed no difference in period prevalence or duration of illness compared to pupils attending control schools. Those pupils in schools that received only the HP&WT showed similar results. Pupils in 'water-scarce' schools that received a water-supply improvement, HP&WT and sanitation showed a reduction in diarrhoea incidence and days of illness

		data collection was complete. 1 year		

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Gelaye et al., 2014 Ethiopia	Pre-Post longitudinal study N=630 students	The school implemented the following improvements in sanitation and hygiene. A low cost 8 eight seat Ventilated Improved Pit (VIP) latrines were newly constructed for female students. Another existing eight seat pit latrine was refurbished; contents were emptied and became functional for use of male students. Two fiberglass water tankers were installed, separately for both males and females. Tankers were filled every other day with clean water from nearby protected spring water source using Jerry cans of 10 and 20 litres capacity to promote hand washing after toilet use as well to encourage students wash their faces. A student led Health Club was formed to educate students every morning before class starts during morning assembly and using special sessions about basic hygiene and sanitation.	Trachoma and Intestinal Parasitic Infection	At baseline 15% of students had active trachoma while 6.7% of them were found to have active trachoma post intervention ($p<0.001$). At baseline 7% of students were reported to have helminthic infections and 30.2% protozoa infections. However, only 4% of students had any helminthic infection and 13.4% ($p<0.001$) of them were found to have any protozoa infection.

		18 months		
Jessica Huynh (2019) Ethiopia	Comparative study N=3844 adolescent girls, Ages; 14- 19 years	Schools that provide menstrual hygiene management (MHM) spaces (a private place to wash menstrual rag and/or a place where female student can wash themselves privately) and those that do not provide MHM spaces were compared	Math and English test scores	The potential effects of MHM spaces on achievement tests in this study are small, other individual, family, and school characteristics measured in this study were found to be more important.
Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Kansiime et al., 220 Uganda	A longitudinal study with pre–post evaluation 369 students Age= mean 16.2 (SD=1.5; range 13–21)	The intervention comprised training teachers to improve delivery of government guidelines for puberty education, training in use of a menstrual kit and pain management, a drama skit, provision of analgesics and improvements to school water and sanitation hygiene facilities	Knowledge of puberty and menstruation, Attitudes towards menstruation and menstrual practices Knowledge and use of effective pain management methods Psychosocial well-being School attendance	There were high levels of uptake of the individual and behavioural intervention components (puberty education, drama skit, menstrual hygiene management (MHM) kit and pain management). The proportion of girls reporting anxiety about next period decreased from 58.6% to 34.4%, and reported use of effective pain management increased from 76.4% to 91.4%. Most girls (81.4%) reported improved school toilet facilities, which improved their comfort managing menstruation. The diary data and qualitative data indicated a potential intervention impact on improving menstrual-related school absenteeism.
Muduwa, Ddembe & Nakawoo ya (2019)	Before and after evaluation study 5 schools; with a total student	Provision of WASH facilities Rain water harvesting tank, Tiva Water Filters to ensure safe water for drinking, hand washing facilities, placed near	School enrolment Absenteeism Fee default rates	School enrolment increased tremendously in a very short period of time; 380 at the time of intervention in 2010 to over 800 by the end of 2012 (416 girls and 384 boys)

Uganda	population of 5200 of which 2750 are girls and 2450 are boys	the kitchen, toilets and throughout the school compound, 5 garbage bins for management of rubbish in the schools. Awareness was created for the teachers and pupils. School Health Clubs (SHCs) were formed Stances pour flush toilet constructed for pupils.		Teachers lobby to be placed at this school Absenteeism rates dropped by 38% and this had had a direct impact on academic performance according to testimonies from teachers and the school management Fee default rates dropped from about 37% in mid-2011 to less than 20% by the end of 2012
Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Pasewaldt et al., (2018) **Kenya and Uganda**	Pre/ post intervention surveys Kenya (n = 38) and Uganda (n = 57) Grade 4-7 students	A school-based handwashing program consisting of two interventions: a hand-hygiene curriculum and group handwashing station 6 months	A school-based handwashing program consisting of two interventions: a hand-hygiene curriculum and group handwashing station	Paired t tests for pre/post surveys demonstrated an increase in students' knowledge ($p<.001$) and frequency of handwashing ($p<.001$). After 6 months, students were still engaging in daily group hand washing. The curriculum increased knowledge, and the handwashing station enabled students to translate their knowledge in to action. (13) (PDF) Impact of a Hand Hygiene Curriculum and Group Handwashing Station at Two Primary Schools in East Africa. Available from: https://www.researchgate.net/publication/329869857_Impact_of_a_Hand_Hygiene_Curriculum_and_Group_Handwashing_Station_at_Two_Primary_Schools_in_East_Africa [accessed May 10 2021].
Belay et al. **Ethiopia**	Pre- post-intervention study https://obgyn.onlinelibrary.wiley.com/action/doSearch?ContribAuthorStored=Bel	Over 12 211 educational booklets were distributed to students and 5991 menstrual hygiene kits were distributed to schoolgirls.	School absences	After the intervention, girls had 24% fewer school absences than boys

	ay%2C+Shewaye N= 8839 Grades 7-12 students	1 year		

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Saboori et al, 2013 **Kenya**	A cluster-randomized trial 60 public primary schools Control (N = 20 schools; 575 pupils) HW (N = 20 schools; 582 pupils) LC+HW (N = 20 schools; 552 pupils) Mean age= 12-13 among the arms	The trial consisted of three arms, including a hand washing (HW) intervention arm (N = 20), a latrine cleaning plus hand washing (LC+HW) intervention arm (N = 20), and a control arm (N = 20) that received no intervention The HW group received one 3.5-kg bag of powdered soap and 10 500-mL plastic bottles. The LC+HW arm also received the HW intervention supplies and training described above. Additionally, they received a latrine cleaning supply package	Hand washing with soap (HWWS). The presence of E. coli on pupils' hands in a subset of schools.	The proportion of pupils observed practicing hand washing with soap (HWWS) events was significantly higher in schools that received a soap provision intervention (32%) and schools that received soap and latrine cleaning materials (38%) compared with controls (3%). Girls and boys had similar hand washing rates. There were non-significant reductions in E. coli contamination among intervention school pupils compared with controls.
Penelope A Phillips-Howard 2016 **Kenya**	3-arm single-site open cluster randomised controlled pilot study 30 primary schools in rural western Kenya	1 insertable menstrual cup, or monthly sanitary pads, against 'usual practice' control. All participants received puberty education pre intervention, and hand wash soap during intervention. Schools received hand wash soap.	School attrition (drop-out, absence); secondary: sexually transmitted infection (STI) (Trichomonas vaginalis, Chlamydia	Of 751 girls enrolled 644 were followed-up for a median of 10.9 months. Cups or pads did not reduce school dropout risk (control=8.0%, cups=11.2%, pads=10.2%). Self-reported absence was rarely reported and not assessable. Prevalence of STIs in the end-of-study survey among controls was 7.7% versus 4.2% in the cups arm (adjusted prevalence ratio (aPR) 0.48, 0.24

	Primary schoolgirls 14-16 years 250 girls (10 schools with an average of 25 girls per school)	12 months	trachomatis, Neisseria gonorrhoea), reproductive tract infection (RTI) (bacterial vaginosis, Candida albicans); safety: toxic shock syndrome, vaginal Staphylococcus aureus.	to 0.96, p=0.039), 4.5% with pads (aPR=0.62; 0.37 to 1.03, p=0.063), and 4.3% with cups and pads pooled (aPR=0.54, 0.34 to 0.87, p=0.012). RTI prevalence was 21.5%, 28.5% and 26.9% among cup, pad and control arms, 71% of which were bacterial vaginosis, with a prevalence of 14.6%, 19.8% and 20.5%, per arm, respectively. Bacterial vaginosis was less prevalent in the cups (12.9%) compared with pads (20.3%, aPR=0.65, 0.44 to 0.97, p=0.034) and control (19.2%, aPR=0.67, 0.43 to 1.04, p=0.075) arm girls enrolled for 9 months or longer. No adverse events were identified.
Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Wichaidit et al. 2019 K**enya**	Stepped-wedge cluster-randomized trial, we randomly selected 30 schools and divided them into 3 groups of 10.	Povu Poa (“Cool Foam”) handwashing stations combined with a behaviour intervention designed to change social norms and use disgust as a behavioural trigger. Intervention sequentially (Group 1: 3-5 weeks after baseline; Group 2: 6-8 weeks; Group 3: 19-24 weeks).	[1] Availability of handwashing materials at handwashing places, and; 2) observed handwashing behaviour after toilet use among schoolchildren) at baseline and in three follow-up rounds.	Water and soap/soapy water were available at 2% of school visits before intervention, and at 42% of school visits after intervention. Before intervention, we observed handwashing with water after 11% of 461 toilet use events; no one was observed to wash hands with soap/soapy water. After intervention, we observed handwashing after 62% of 383 toilet use events (PR = 5.96, 95% CI = 3.02, 11.76) and handwashing with soap/soapy water after 26% of events (PR incalculable). Foaming soap dispenser caps were cracked in 31% of all observations, but were typically still functional.
Freeman et al., 2014 **Kenya**	A cluster-randomized trial 107 schools were randomly selected for	A cluster-randomized trial of school-based WASH Arm 1 was hygiene promotion and water treatment (HP & WT), arm 2 was hygiene promotion and water	pupil absence	no overall effect of the intervention on absence. However, among schools in two of the geographical areas not affected by post-election

	the pupil baseline study 6036 pupils in 135 primary schools at baseline (2619) and follow-up (3417).	treatment plus sanitation and arm 3 was the control group, which received all interventions at the conclusion of the study Schools in the HP & WT intervention arm received a 3-day training of teachers on HP, behaviour change and WT methods and regular follow-up visits throughout the school year. The programme provided handwashing and drinking water containers and a one-time, 1-year supply of WaterGuard (a 1.2% chlorine-based point-of-use water disinfectant		violence, those that received WT and HP showed a 58% reduction in the odds of absence for girls (OR 0.42, CI 0.21–0.85). In the same strata, sanitation improvement in combination with WT and HP resulted in a comparable drop in absence, although results were marginally significant (OR 0.47, 0.21–1.05). Boys were not impacted by the intervention no overall effect of the intervention on absence. However, among schools in two of the geographical areas not affected by post-election violence, those that received WT and HP showed a58% reduction in the odds of absence for girls (OR 0.42, CI 0.21–0.85). In the same strata, sanitation improvement in combination with WT and HP resulted in a comparable drop in absence, although results were marginally significant (OR 0.47, 0.21–1.05). Boys were not impacted by the intervention

Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Green et al, 2013 **Kenya**	Cluster-randomized control trial 135 schools enrolled in the larger study, we randomly selected 17 intervention and 17 control schools where we collected	Three arms 1. A hygiene promotion and water treatment (HP&WT) intervention that included buckets with lids and taps for handwashing and drinking water storage, and a year supply of WaterGuard, a locally available hypochlorite water disinfection	Escherichia coli contamination on pupils' hands	A hygiene promotion and water treatment intervention did not reduce risk of E. coli presence (relative risk [RR] = 0.92, 95% confidence interval [CI] = 0.54–1.56); the addition of new latrines to intervention schools significantly increased risk among girls (RR = 2.63, 95% CI = 1.29–5.34), with a non-significant increase among boys (RR = 1 A hygiene promotion and water treatment intervention did not

	hand rinse samples	solution. Teachers were trained on how to maintain drinking and handwashing facilities and to conduct behaviour change promotion lessons with pupils through health clubs or other venues. The hygiene promotion curriculum addressed the importance of handwashing with soap at key times for diarrhoea prevention and included training on proper handwashing techniques. 2. The same hygiene promotion and water treatment intervention with the added provision of up to seven new ventilated improved pit (VIP) latrines with concrete slabs to meet the GoK latrine ratio standards (Sanitation + HP&WT). 3. The control group, to receive the intervention at the conclusion of the study		reduce risk of E. coli presence (relative risk [RR] = 0.92, 95% confidence interval [CI] = 0.54–1.56); the addition of new latrines to intervention schools significantly increased risk among girls (RR = 2.63, 95% CI = 1.29–5.34), with a non-significant increase among boys (RR = 1.36, 95% CI = 0.74–2.49)..36, 95% CI = 0.74–2.49). A hygiene promotion and water treatment intervention did not reduce risk of E. coli presence (relative risk [RR] = 0.92, 95% confidence interval [CI] = 0.54–1.56); the addition of new latrines to intervention schools significantly increased risk among girls (RR = 2.63, 95% CI = 1.29–5.34), with a non-significant increase among boys (RR = 1.36, 95% CI = 0.74–2.49).

Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Patel et al., 2012 **Kenya**	Cluster-randomized control trial At baseline, 783 students from grades 4 to 8 were enrolled from 43 schools	Teachers in intervention schools were trained about handwashing and water treatment and provided instructional materials for their students. In intervention schools, water stations were installed near latrines	Hygiene practices and reported student illness.	Students in this school program exhibited sustained improvement in hygiene knowledge and a decreased risk of respiratory infections after the intervention. We did not observe differences in diarrheal diseases between

	(range 1–48 students per school). In the first follow-up survey, 478 (61%) students of the original 783 participated from 42 schools (range 1–35 students per school), and in the second follow-up, 327 students (42%) from 41 schools (range 1–23 students per school) participated;	for handwashing and classrooms for drinking. The water stations consisted of 60-L plastic buckets with a lid and tap placed on a metal stand produced by local artisans, and schools were given a 3-month "starter" supply of soap and WaterGuard water treatment solution (a locally available product). Schools were expected to provide their own commodities after exhausting free supplies. 1 year		the two groups during this period.

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Caruso et al, 2014 **Kenya**	Cluster-randomized control trial 20 schools per intervention arm and 20 schools in the control arm, assuming a mean enrolment of 300 pupils per school 17 564 pupils in 60 schools	Periodical roll-call among that had previously received WASH improvements as part of the SWASH+ project. Latrine Cleaning plus Handwashing (LC+HW) and Handwashing (HW) Schools in the LC+HW arm received reusable hardware (buckets, brooms, hand brushes, plastic scoop), consumables (bleach, powdered soap), toilet tissue, handwashing materials, sheets for pupils to monitor latrines conditions daily, and training for two teachers—the head teacher and health patron. Training sessions were conducted with one head teacher and one health patron from each school in the LC+HW arm The HW arm was included in order to determine if handwashing inputs alone have an impact on absenteeism	Latrine and handwashing conditions Latrine use and handwashing behaviour Absenteeism	No difference in latrine use and absence across arms. The additive impact of cleaning may not have been strong enough to impact absence above and beyond reductions attributable to the original WASH infrastructure improvements and basic hygiene education the schools previously received.

Table 24:
Summary of reviewed papers on impact of school-based HIV interventions on health and education outcomes for school-aged children

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Menna T, Ali A, Worku A (2015) **Ethiopia**	A quasi-experimental study. N=560 Randomly selected grade 11 students Intervention group = 280 Control group=280 84.3 % of the intervention group and 81.6 % of the control group students were in the age group of 15–18 years	Peer education on HIV related risky sexual behaviours Training was provided for peer educators Supplementary and relevant reference materials were provided Duration of the intervention= 12 months	Comprehensive knowledge of HIV/AIDS, Ever initiated sexual intercourse, Ever being tested for HIV, number of sexual partners, Frequency of condom use and willingness to go for HIV counselling and testing within 2 months after the survey.	Knowledge of HIV (P-Values =0.004) and willingness to go for HIV counselling and testing (P-value = 0.01) showed significant differences among intervention group students during post intervention period. Moreover, students in the intervention group were more likely to use condoms during post intervention period compared to students of the control group [AOR = 4.73 (95% CI (1.40-16.0)]. No change in Risky sexual behaviours like limiting number of sexual partners only to one and undertaking HIV counselling and testing
Cho et al., (2011) **Kenya**	Randomized Controlled Trial Orphaned children Intervention group = 53 Control group=52 Age 12–14 years	Keeping adolescent orphans in school; School fees, uniforms, and a "community visitor" who monitored school attendance and helped to resolve problems that would lead to absence or dropout. One year	Drop out of school, Attitudes supporting early sex, Sexual debut	Controls were more likely than interventions to: 1) drop out of school (12% versus 4%; p=.05), 2) begin sexual intercourse (33% versus 19%; p=.07), and 3) report attitudes supporting early sex (p<.001)

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Ruria et al., (2017), **Kenya**	A pre-post implementation evaluation of the pilot RCP program 50 Healthcare facilities (HCFs) and 25 boarding schools. HIV-infected adolescents (15–19 years) and youth (20–21 years). N = 559 adolescents	Red Carpet Program (RCP) training and sensitization was implemented RCP involves enhancing partnership between schools and health facilities 6 months	New adolescent and youth HIV diagnosis, linkage Retention in care and treatment	Linkage to care improved to 97.3% from 56.5% at pre-implementation period (P < 0.001). All (100.0%; n = 559) adolescents and youths received peer counselling and psychosocial support, and the majority (n = 430; 79.0%) were initiated on treatment. Compared to pre- implementation, the proportion of adolescents and youths who were retained on treatment increased from 66.0 to 90.0% at 3 months (P < 0.001), and from 54.4 to 98.6% at 6 months (P < 0.001).
E Maticka-Tyndale , R Mungwete , O Jayeoba (2013) **Kenya**	A quasi-experimental design Age range 11 to 16 years N= 40 matched pairs of schools, 26461 students from 110 primary schools 22 months	Primary School Action for Better Health (PSABH) model; an on-going component of the school curriculum, integrated into all subjects and combined with co-curricular activities that were available to all standard 6–8 pupils such as anonymous question boxes, a school health club and drama and music presentations with HIV/AIDS content	Student knowledge, Attitudes and reported behaviours related to sexual transmission of HIV. Self-efficacy	Half of the youth reported sexual activity before programme initiation compares to 29% of males and 9% of females after the intervention Improvements in knowledge, self-efficacy related to delaying sexual activity and using condoms, communication about sexuality and HIV/AIDS and postponement of sexual debut are realized in samples in seven of eight provinces

Reference	Study design, participants, sample size	Intervention and duration of study	Outcomes measured	Main findings
Paul A Odundo, Dorothy, and Anjuri, Thomas Odhiambo, (2013) **Kenya**	A static group comparison analysis N= 260 beneficiaries and 212 non-beneficiaries	Peer education club membership; thepeer-education project encouraged abstinence, faithfulness to a partner, condom use, and HIV testing. Members (beneficiaries) and non-members (non-beneficiaries) were compared	Adoption of preventive behaviours including abstinence, faithfulness to a partner, condom use, and HIV testing	Beneficiaries were about 1.1 times more likely to embrace abstinence than non-beneficiaries (β=0·136; p=0·068; CI=90%). Among those who reported sexual activity, 166 beneficiaries (71·2%) and 110 non-beneficiaries (53·9%) reported sexual relations with only one partner over the preceding 18-month period. The beneficiaries were about 2-4 times more likely to practise faithfulness than non-beneficiaries (β=0·856; p=0·021; CI=95%). Up to 142 beneficiaries (60·9%) compared with 99 non-beneficiaries (48·5%) used a condom during the last sexual encounter. Beneficiaries were about twice as likely to use condoms consistently as compared with non-beneficiaries (β=0·737; p=0·037; CI=95%). Furthermore, beneficiaries were about 1-3 times more likely to have been tested for HIV than non-beneficiaries (β=0·269; p=0·051; CI=90%).
Cho et al, (2018) **Kenya**	Clustered randomized controlled trial (RCT) 835 orphaned boys and girls in Grades 7 and 8 (mean age at baseline=15 years) Primary schools (N=26)	Participating students in intervention schools received a school uniform in Grades 7 and 9, and payment of secondary school fees. In addition, nurse research staff members visited schools in order to monitor school attendance and to assist them with resolving absenteeism problems.	Serologic testing to detect antibodies against HIV and HSV-2, School dropout, absenteeism, sexual debut, ever married, ever pregnant, transactional sex, age of sexual debut, forced sex, lifetime number of	Intervention youth were less likely to drop out of school and achieved a higher average grade level in school (p≤.001). The odds of circumcision for male participants were about two times higher among intervention participants vs. control (p=0.04). Among sexually active participants, intervention participants were less likely to report transactional sex (p=0.03) than control participants. Intervention participants were absent from school less frequently and believed they had better chances of completing college/university (p=0.01) No differences on HIV biomarkers were detected.

		7.2.1.1 Control's receiver health education only. Support continued for 36 months or until the student dropped out of school.	sexual partners, condom use in last year, new circumcision, quality of life,; Future Schooling Expectations	
Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Harper GW, et al. (2018) **Kenya**	Pre- post experimental design (N=1846; 52.1% girls, 47.9% boys; mean age=12) 46 different Catholic-sponsored public and private primary schools	Making Life's Responsible Choices (MLRC) course covering six modules: 1) self-awareness, 2) human sexuality, 3) healthy relationships, 4) drug/ alcohol abuse, 5) HIV/AIDS and other sexually transmitted infections, and 6) behaviour change. Course delivered in 40 weeks (one academic term).	Changes in knowledge and behavioural intentions	All six modules displayed statistically significant positive changes in the mean percentage of knowledge items answered correctly for the full sample. Statistically significant health-promoting changes were seen in 11 of the 18 behavioural intention items.
Njue etal., (2015) **Kenya**	Community-randomized controlled trial Age=10-19 years 3 districts with total population =85000	School based interventions as add on to community interventions compared to community- based intervention alone and controls; In school, life skill sessions offered using school teachers and School reproductive health activities were also undergone 42 months	Knowledge, attitudes, onset of sexual activity, risky of sexual behaviour	School based interventions as add on to community interventions resulted in delay of first sexual encounter among girls when compared to controls with no intervention. However, no change was observed on attitude regarding premarital sex. No difference was observed between school based interventions as add on to community interventions compared community intervention only.
Michielsen et al., (2012)	Non-randomized longitudinal	Peer education program to reduce sexual risk behaviour	HIV knowledge, attitudes	The effectiveness of peer education intervention in increasing knowledge, changing attitudes and

Rwanda	controlled trial N= fourteen schools (eight intervention and six control schools) having 1950 students Mean age (sd) = Intervention age; 17.60 (2.30), control 18.41 (2.18)	and to promote sexual and reproductive health in the secondary school communities by activating the anti-AIDS-clubs in the schools 18 months	and self-reported sexual behaviour	reducing sexual risk behaviour was limited. The intervention did not seem to effectively alter sexual risk behaviour. However, the intervention did significantly reduce enacted stigma
Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Rijsdijk et al., (2011) **Uganda**	Quasi-experimental A total of 48 schools (24 intervention and 24 comparison schools) Mean age: 16.1 Number: 1986	Intervention involves lessons focused on developing self-esteem, personal decision-making, gaining insights into a person's identity and sexual development, the role of the social environment (e.g., peers, family, close friends, teachers, and media), gender equity, sexual and reproductive rights, sexuality issues, sexual health problems and the life skills necessary to know how to avoid or deal with them. Activities: low-tech, computer-based interactive sex education. Participants also develop IT and creative skills, which improve their job prospects.	Condom use Noncoercive sex Delay in sexual intercourse Risk perception	Condom uses; The difference at post-test was marginally significant, F (1, 1319) = 3.27, p = .07, with an increase in positive attitude towards condom use among the intervention group Non-coercive sex; the mean score was significantly higher among the intervention group than in the comparison group, F (1, 1467) = 7.73, p =.006) Delay sexual intercourse; The students from the intervention group also held a stronger intention to delay sexual intercourse at post-test, F (1, 1257) = 7.22, p = .007, Risk perception: No significant effects were found on risk perception

		14 lessons over a period of six months.		
Maha et al., (2015) **Sudan**	Pre-post study. N= 400 (200 intervention and 200 controls) from 20 schools Secondary school students irrespective of their age were included.	The 200 peers were then subjected to a comprehensive training involving an eight-hour workshop session held for each group of 20 peers in their own school about STDs/HIV/AIDS as a causative agent, the routes of transmission, prevention measures, and the global and national situation concerning young people Three months	Knowledge Attitude Practice	The intervention program improved participants' knowledge from 75.5% to 83.2%. The attitudes scores of students significantly improved (70% to 83%) with regards to youth vulnerability to HIV but not HIV voluntary testing (15.7% to 8.5%). The practices of students changed from 70% to 83% when prompted about shaking the hands of an HIV infected person and also from 84.8% to 87.7% about sharing food with an HIV infected person (p > 0.05).

Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Duria Abdelrahim and Nagla Abdelrahim **(2014)** **Suda**	Quasi experimental study Age 15-24 N=500	Implementing the Sudanese National Aids Program (SNAP'S); a health education program in secondary schools alongside the school curriculum for students in the selected secondary schools for 8 months.	Attitude towards HIV and AIDS among secondary school students in Khartoum state	With the intervention; willing to care of a family member or friend who suffers with AIDS improved from 25.6% to 79.2%. Those who claim "HIV positive people should not be allowed to mix with people at mosque or church" decreased from 43 to 39.2%. In pre-test 63.8% of students said that a teacher who is HIV positive should not be allowed to continue teaching in their school, while 86.2% of these students changed their mind after intervention. Also prior to intervention 27.6 of the students accepted sharing same class with HIV infected student while 50.0% agreed after the intervention.
Kemigisha et al., (2019)	Cluster randomized trial 380 pupils in the	Lessons were delivered on puberty, relationships and emotions, decision making, self-esteem	Sexual and reproductive health knowledge	Greater improvements in sexual and reproductive health (SRH) knowledge among intervention schools (AOR: 2.18, 95% CI: 1.66–2.86) was observed.

Uganda	intervention arm and 484 pupils in the control arm 15 intervention schools and 18 control schools Mean age (SD) = 12.1 (1.13)	skills, reporting of physical and sexual violence, knowing one's rights, sexually transmitted infections, HIV/AIDS and stigma, prevention of pregnancy, sexuality and gender, and sexuality and media influence Board (CAB) 12 months	Sexual wellbeing and attitudes Sexual behaviour	There was not statistically significant difference in the proportion of pupils who ever had sex, in measures of self-esteem, body image or gender equitable norms.

Reference	**Study design, participants, sample size**	**Intervention and duration of study**	**Outcomes measured**	**Main findings**
Katahoire etal., (2019) Uganda	Cluster-randomized trial N= 22 government secondary schools Intervention= 849 Control n=851	Three interrelated components; 1)Fourteen 90-minute sessions that integrated sexual and reproductive health content, there was a corresponding homework assignment that students took home to discuss and complete with their parents/caregiver 2)Teachers in the intervention schools were trained in two 3-day workshops in preparation for delivery of the modified lesson plans 3) Three workshops for parents/caregivers who were mobilized	Adolescent-Parent/Caregiver Sexuality Communication; Communication Frequency—Sex and HIV/AIDS Related Topics, Quality of Sex-Related Communication, Openness, Parental Competence, Attitude Towards Sex-Related Communication, Parental	A significant stronger increase in 'Frequency of communication about sexuality and HIV/AIDS related topics' reported by both students and their parents/caregivers in the intervention group was observed as compared to that in the control group. The effect sizes were 0.27 ($t = 3.566$; $p < 0.001$) for parents/caregivers and 0.38 ($t = 4.915$; $p < 0.001$) for students. There were significant "effects" on 'Quality of sex-related communication; openness and parental competence' among parents/caregivers as well as among the students. The effect sizes were 0.36 ($t = 5.162$; $p < 0.001$) (parents/caregivers) and 0.26 ($t = 5.279$; $p < 0.001$) (students). 'Positive attitudes towards sex-related communication' were also significant with effect sizes equal to 0.31 ($t = 4.424$; $p < 0.001$) and 0.20 ($t = 2.772$; $p = 0.006$) for

		through the school's Parent Teachers Associations (PTAs)	Monitoring, Parents'/Caregivers' Legitimacy	parents/caregivers and for the students respectively There were no significant "effects" on 'Positive parenting and Parent monitoring

Annex F: Data tables on prevalence of illness among school-aged children (5 to 9 years) and general population in the WFP East and Central Africa region

Note: Except for data on stunting, all data in tables were extracted from the Global Burden of Disease database (2019)

Ascariasis	**Adolescents 5-19 years**			**All ages**		
	Value	**Upper value**	**Lower value**	**Value**	**Upper value**	**Lower value**
Burundi	11.09	7.19	16.23	8.47	5.49	12.40
Comoros	1.93	1.15	3.08	1.38	0.83	2.20
Djibouti	5.54	3.39	8.84	3.91	2.39	6.23
Eritrea	2.69	1.61	4.29	2.03	1.22	3.22
Ethiopia	4.38	2.68	6.69	3.39	2.07	5.19
Kenya	4.08	2.45	6.30	2.89	1.73	4.51
Rwanda	9.94	6.07	15.08	7.47	4.58	11.36
Somalia	33.95	24.60	44.65	26.30	19.00	34.67
South Sudan	1.75	1.06	2.71	1.35	0.82	2.10
Sudan	4.22	2.61	6.32	3.13	1.94	4.67
Uganda	4.32	2.84	6.30	3.37	2.21	4.91

Hookworm disease	Adolescents 5-19 years			All ages		
	Value	Upper value	Lower value	Value	Upper value	Lower value
Burundi	16.14	11.37	22.07	11.02	7.76	15.08
Comoros	5.46	3.57	7.81	3.46	2.25	4.94
Djibouti	1.62	1.07	2.35	1.00	0.66	1.45
Eritrea	17.66	12.07	24.67	11.88	8.09	16.67
Ethiopia	30.05	22.03	38.51	20.77	15.24	26.71
Kenya	5.41	3.62	7.86	3.51	2.35	5.10
Rwanda	13.60	9.96	18.06	9.10	6.66	12.11
Somalia	14.58	10.29	20.59	10.10	7.13	14.28
South Sudan	25.26	19.02	32.32	17.59	13.20	22.59
Sudan	4.11	2.71	5.87	2.72	1.79	3.89
Uganda	14.13	10.58	18.50	9.91	7.40	12.97

Trichuriasis	Adolescents 5-19 years			All ages		
	Value	Upper value	Lower value	Value	Upper value	Lower value
Burundi	12.73	8.63	17.79	9.62	6.50	13.52
Comoros	5.98	3.67	8.85	4.10	2.51	6.05
Djibouti	4.54	2.78	6.77	3.10	1.89	4.63
Eritrea	7.02	4.41	10.42	5.23	3.30	7.78
Ethiopia	8.14	5.20	12.04	6.12	3.91	9.06
Kenya	5.44	3.44	8.21	3.99	2.51	6.03
Rwanda	15.73	10.83	22.09	11.58	7.94	16.24
Somalia	6.60	4.15	9.95	5.07	3.19	7.65
South Sudan	4.42	2.97	6.37	3.32	2.22	4.79
Sudan	7.16	4.58	10.70	5.22	3.34	7.80
Uganda	9.44	6.61	12.86	7.33	5.13	9.97

Diarrheal diseases	Adolescents 5-19 years			All ages		
	Value	Upper value	Lower value	Value	Upper value	Lower value
Burundi	1.30	1.06	1.57	2.25	2.07	2.44
Comoros	1.34	1.10	1.64	2.20	2.01	2.38
Djibouti	1.08	0.86	1.33	1.73	1.58	1.91
Eritrea	1.59	1.26	1.95	2.34	2.13	2.58
Ethiopia	1.14	0.94	1.37	1.75	1.60	1.90
Kenya	1.07	0.87	1.30	1.63	1.50	1.76
Rwanda	1.05	0.84	1.29	1.71	1.57	1.86
Somalia	1.41	1.12	1.76	2.19	1.97	2.43
South Sudan	1.59	1.29	1.95	2.52	2.29	2.77
Sudan	2.24	1.78	2.78	2.32	2.10	2.55
Uganda	1.00	0.81	1.21	1.71	1.55	1.87

Dietary iron defiency	Adolescents 5-19 years			All ages		
	Value	Upper value	Lower value	Value	Upper value	Lower value
Burundi	17.20	13.36	21.67	16.53	14.46	18.77
Comoros	26.10	19.78	32.27	23.87	20.17	26.65
Djibouti	23.94	18.31	30.17	21.64	18.86	24.28
Eritrea	25.12	20.29	29.99	23.36	20.96	25.85
Ethiopia	16.40	14.38	18.52	16.36	15.42	17.39
Kenya	9.97	9.02	10.84	12.37	11.71	12.98
Rwanda	14.22	10.39	18.86	14.41	12.11	16.59
Somalia	25.13	20.65	29.64	25.61	23.24	27.96
South Sudan	23.38	17.45	29.20	23.19	19.90	26.51
Sudan	14.31	10.44	18.24	14.70	12.86	16.63
Uganda	15.59	12.09	19.37	15.05	13.28	17.00

Iodine deficiency	Adolescents 5-19 years			All ages		
	Value	Lower value	Upper value	Value	Lower value	Upper value
Burundi	1.25	0.83	1.83	2.25	1.75	2.88
Comoros	0.24	0.16	0.35	0.40	0.31	0.51
Djibouti	4.81	3.56	6.59	13.07	10.50	16.11
Eritrea	0.30	0.20	0.44	0.49	0.37	0.62
Ethiopia	4.06	3.03	5.34	8.76	7.04	10.94

Kenya	0.66	0.44	0.94	1.10	0.85	1.43
Rwanda	1.39	0.95	2.00	2.76	2.13	3.52
Somalia	7.19	5.44	9.80	16.06	13.34	18.87
South Sudan	0.87	0.59	1.28	1.47	1.15	1.90
Sudan	1.39	0.97	1.91	1.41	1.07	1.78
Uganda	0.50	0.33	0.72	0.79	0.60	1.03

Vitamin A deficiency	**Adolescents 5-19 years**			**All ages**		
	Value	**Lower value**	**Upper value**	**Value**	**Lower value**	**Upper value**
Burundi	1.06	0.70	1.50	1.05	0.81	1.29
Comoros	1.04	0.69	1.51	0.67	0.52	0.86
Djibouti	0.94	0.62	1.39	0.66	0.51	0.85
Eritrea	1.16	0.80	1.66	0.93	0.73	1.19
Ethiopia	1.30	0.91	1.78	1.17	0.93	1.42
Kenya	1.43	1.08	1.87	1.27	1.06	1.51
Rwanda	0.66	0.44	0.98	0.55	0.42	0.71
Somalia	3.50	2.81	4.19	2.78	2.43	3.13
South Sudan	1.15	0.81	1.60	1.00	0.79	1.26
Sudan	0.58	0.41	0.84	0.56	0.43	0.72
Uganda	0.59	0.39	0.84	0.64	0.51	0.80

Malaria	**Adolescents 5-19 years**			**All ages**		
	Value	**Lower value**	**Upper value**	**Value**	**Lower value**	**Upper value**
Burundi	41.35	26.40	53.51	35.35	22.54	45.82
Comoros	3.51	0.13	24.37	2.80	0.11	19.51
Djibouti	1.73	0.14	7.52	1.31	0.11	5.76
Eritrea	1.56	0.70	3.14	1.21	0.54	2.41
Ethiopia	5.19	2.95	8.92	4.29	2.44	7.48
Kenya	8.86	5.10	13.60	7.02	4.02	10.70
Rwanda	15.48	4.89	36.00	12.87	4.06	30.13
Somalia	5.46	2.94	10.07	4.70	2.52	8.70
South Sudan	19.50	4.10	39.27	16.72	3.52	33.78
Sudan	4.71	1.63	11.04	3.81	1.28	9.05
Uganda	40.66	35.26	49.56	35.29	30.58	43.06

Lower respiratory infections	Adolescents 5-19 years			All ages		
	Value	Lower value	Upper value	Value	Lower value	Upper value
Burundi	0.11	0.09	0.13	0.15	0.14	0.17
Comoros	0.11	0.10	0.13	0.16	0.15	0.18
Djibouti	0.10	0.09	0.12	0.14	0.13	0.15
Eritrea	0.14	0.12	0.17	0.19	0.17	0.20
Ethiopia	0.11	0.09	0.12	0.15	0.14	0.16
Kenya	0.11	0.09	0.12	0.15	0.14	0.16
Rwanda	0.11	0.09	0.13	0.15	0.14	0.17
Somalia	0.12	0.10	0.14	0.18	0.16	0.20
South Sudan	0.11	0.10	0.13	0.16	0.15	0.18
Sudan	0.10	0.08	0.12	0.12	0.11	0.13
Uganda	0.10	0.08	0.12	0.14	0.13	0.15

HIV/AIDS	Adolescents 5-19 years			All ages		
	Value	Lower value	Upper value	Value	Lower value	Upper value
Burundi	0.27	0.20	0.33	0.74	0.65	0.85
Comoros	0.00	0.00	0.01	0.02	0.01	0.06
Djibouti	0.29	0.17	0.45	1.16	0.64	2.07
Eritrea	0.12	0.08	0.17	0.39	0.29	0.53
Ethiopia	0.28	0.23	0.34	0.76	0.68	0.84
Kenya	0.89	0.72	1.05	3.46	3.08	3.88
Rwanda	0.27	0.21	0.34	1.70	1.52	1.89
Somalia	0.08	0.06	0.12	0.20	0.12	0.32
South Sudan	0.25	0.10	0.47	1.25	0.46	2.65
Sudan	0.04	0.02	0.10	0.27	0.08	0.75
Uganda	0.83	0.66	0.98	3.41	3.02	3.79

Sexually transmitted infections excluding HIV	Adolescents 5-19 years			All ages		
	Value	Lower value	Upper value	Value	Lower value	Upper value
Burundi	4.98	3.95	6.33	23.06	20.44	25.79
Comoros	5.91	4.67	7.38	29.84	26.59	33.36
Djibouti	4.48	3.55	5.63	26.03	23.08	29.30
Eritrea	4.95	3.97	6.12	23.25	20.65	26.17
Ethiopia	3.14	2.47	3.99	18.88	16.72	21.18
Kenya	4.57	3.55	5.83	26.16	23.23	29.26

Rwanda	5.49	4.35	6.94	26.50	23.50	29.75
Somalia	5.13	4.11	6.46	22.55	20.09	25.24
South Sudan	5.75	4.58	7.15	23.80	21.25	26.48
Sudan	3.03	2.35	3.84	13.67	12.24	15.18
Uganda	7.23	5.91	8.83	25.68	23.08	28.50

Trends in prevalence of stunting: children under-five years: 2010 to 2020 in selected East African countries

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Burundi	57.4	57	56.8	56.6	56.4	56.3	56.3	56.5	56.8	57.2	57.6
Comoros	34.7	33.5	32.3	31.0	29.8	28.7	27.4	26.2	24.9	23.7	22.6
Djibouti	30.8	31.2	31.7	32.2	32.7	33.1	33.5	33.7	33.9	34.0	34.0
Eritrea	49.4	49.8	50.1	50.3	50.3	50.4	50.3	50.2	49.9	49.5	49.1
Ethiopia	44.7	43.7	42.8	41.8	41.0	40.1	39.2	38.2	37.3	36.3	35.3
Rwanda	44.1	42.2	40.5	39.0	37.8	36.7	35.9	35.1	34.3	33.4	32.6
Somalia	31.9	31.5	31.1	30.7	30.2	29.7	29.3	28.8	28.3	27.9	27.4
South Sudan	32.8	32.4	32.1	31.8	31.6	31.4	31.3	31.2	31.0	30.8	30.6
Sudan	36.7	36.3	36.0	35.8	35.5	35.3	35.0	34.7	34.4	34.1	33.7
Uganda	36	35	34.1	32.9	31.8	30.7	29.9	29.3	28.8	28.4	27.9

Source: UNICEF/WHO/World Bank Joint Malnutrition Estimates Database, April 2021