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McGovern–Dole Mozambique Impact Evaluation and Literacy Assessment

Baseline Report

Prepared for

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MCGOVERN-DOLE MOZAMBIQUE IMPACT EVALUATION AND LITERACY ASSESSMENT:
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The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Government position, policy, or decision, unless so designated by other documentation.

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LIST OF ACRONYMS

ADPP	<i>Ajuda de Desenvolvimento de Povo para Povo</i> (Development Aid from People to People)
ANOVA	analysis of variance
CI	confidence interval
clpm	correct letters per minute
csspm	correct syllable sounds per minute
cwpm	correct words per minute
DEFF	Design Effect
EGRA	Early Grade Reading Assessment
EMIS	Education Management Information System
FAS	Foreign Agricultural Service
FGD	focus group discussion
GSA	U.S. General Services Administration
HT	head teacher
ICC	intra-class correlation
IFP	<i>Instituto de Formação de Professores</i> (Teacher Training Institute)
ORF	oral reading fluency
PAI	Planet Aid Incorporated
PSS	Professional Services Schedule
QC	quality control
SD	standard deviation
TTC	teacher training college
UP	<i>Universidade Pedagógica de Moçambique</i> (Mozambique Pedagogical University)
USAID	United States Agency for International Development
USDA	U.S. Department of Agriculture
WHO	World Health Organization
wpm	words per minute
WV	World Vision

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1. EXECUTIVE SUMMARY

Background: The McGovern-Dole Program in Mozambique

In 2012, the U.S. Department of Agriculture (USDA)'s Foreign Agricultural Service (FAS) selected World Vision (WV) and Planet Aid Incorporated (PAI) to implement McGovern-Dole activities in Mozambique. The key objective of the McGovern-Dole program is to reduce hunger and improve literacy and primary education. The program provides school meals, as well as teacher training, health, sanitation, and hygiene interventions and other activities.

Since 2012, WV has been implementing program activities in Nampula Province, and Planet Aid has been working in Maputo Province. In 2015, both partners received a second cycle of funding to continue the programs and enhance the literacy interventions. However, some schools in Maputo continued to receive only school meals without the literacy intervention.

The McGovern-Dole program theory of change posits that improved literacy, health, and hygiene instruction paired with regular school meals will lead to improved literacy, health, and dietary practices of students via various program impact pathways, including increased student and teacher attendance, improved student attentiveness, and increased knowledge of health and hygiene. The intended beneficiaries of the McGovern-Dole program are primary school students in targeted districts in Maputo and Nampula Provinces, their families, and communities.

Baseline Literacy Assessment and Impact Evaluation

In 2016, USDA contracted RTI International to design an independent impact evaluation of the McGovern-Dole Mozambique program and conduct a baseline assessment. RTI has no role in the implementation of the McGovern-Dole program and no relationship with either implementing partner. The evaluation considers three groups of schools: 1) those receiving school feeding and literacy interventions, 2) those receiving only the school feeding intervention, and 3) comparison schools not receiving any McGovern-Dole interventions. The impact evaluation is designed to compare the following key indicators across the three groups (also referred to as study arms): *reading ability, student attendance, student nutrition and hygiene knowledge and practices, and teacher attendance*.

The baseline survey was designed to support a quasi-experimental impact evaluation to be completed in 2021, which will compare changes in key indicators across the different study arms. The baseline report provides a *snapshot of the situation in 2017* and does not constitute an evaluation of the program or its impact until they can be analyzed in conjunction with midline and endline data. The results are intended to support decision makers with information about the situation in Nampula and Maputo and share with implementers a wider vision of the overall status in these provinces.

The school-based survey used to obtain the results was conducted in the third trimester of the school year to allow for adequate exposure of the students to standard education and school meals and, in the future, adequate exposure to the intervention. The instruments were developed to address the components of the theory of change, calculate the relevant indicators, address the research questions for the evaluation, and assess the similarities and differences between intervention and comparison schools at baseline. To assess literacy,

enumerators were trained to administer the Early Grade Reading Assessment (EGRA) tool developed by RTI,¹ which is an individually administered, 15-minute oral assessment that measures the basic skills a child must have to eventually be able to read fluently and with comprehension. The student survey also included questions on student attendance, the school feeding program, and nutrition and hygiene knowledge and practices. In addition, teachers, head teachers (HTs), and school cooks were interviewed to obtain information on teacher attendance, school amenities, and the school feeding program, among other factors. The survey was paired with qualitative data collection, which provides supplemental insight from parents about the McGovern-Dole program.

Baseline Findings

Most of the baseline indicators ranged across study arms, and in some instances, comparison schools outperformed the intervention schools. This was expected given the non-random selection of intervention districts and the limited options for comparison districts within intervention provinces.

Student Reading Ability	Literacy ability is generally very low; at least 40% of Grade 2 students in McGovern-Dole schools received zero scores on all EGRA subtasks. Grade 4 students scored higher than Grade 2 students across all components, as expected. Students in School Feeding Only schools generally scored higher than those in the other two groups; however, it is important to note that these schools are in Maputo only. A higher percentage of students scored zero in the listening comprehension subtask in both intervention groups than in Comparison schools, despite the level of the text read aloud being representative of texts used for instruction. This is an important finding given that that students’ receptive language skills will affect reading performance. In general, student data also show that at home, students speak languages other than Portuguese, which contributes an added challenge to literacy acquisition.
Student Attendance	At the time of the baseline survey, intervention schools had been providing school meals for nearly a full school year (and in most cases, four years.) The McGovern-Dole theory of change hypothesizes that providing school meals will increase student attendance, but no significant difference in attendance was detected between intervention and comparison schools at baseline. There was also no significant difference in absence between male and female students. The percentage of students reported absent at least one day in the past week was in the range of 25–30% across study arms.

¹ <https://globalreadingnetwork.net/resources/early-grade-reading-assessment-egra-toolkit-second-edition>

2. BACKGROUND & METHODOLOGY

2.1 Background

In 2012, the U.S. Department of Agriculture (USDA)/Foreign Agricultural Service (FAS) selected World Vision (WV) and Planet Aid Incorporated (PAI) to implement McGovern-Dole school feeding and some literacy activities in Mozambique. In 2015, both organizations received an additional cycle of funding to continue their work in providing school meals; further the quality of literacy activities; teacher training; school gardens; water, sanitation, and hygiene; and other activities that promote children’s health and nutrition to support children’s school enrollment, attendance, and capacity to benefit from education instruction. With the 2015 funding cycle, both implementing partners began rolling out enhanced literacy programs, including curriculum development and teacher training.

The coverage zones for each organization are shown in Figure 1. Schools covered in 2015 were the same schools where the program has been active since 2012, except for a small number of new schools that opened because of enrollment overflow in pre-existing schools.

Although the goals of the intervention are the same, the two implementers take slightly different approaches. What different intervention schools receive to achieve their targets also varies within each implementer. For example, for PAI in Maputo Province, not all McGovern-Dole schools receive literacy interventions: some receive school feeding only, while other (larger) schools receive both school feeding and literacy. In addition, some schools receive the literacy program in Portuguese only, whereas other schools receive both the mother tongue and Portuguese (bilingual) programs. The relatively new bilingual programs were incorporated by McGovern-Dole taking into consideration of evolving educational priorities in Mozambique. In contrast, WV delivers both school feeding and literacy across all targeted schools and implements the program in Portuguese only.

Under RTI’s U.S. General Services Administration (GSA) Professional Services Schedule (PSS) No. GS00F354CA, the USDA/FAS awarded to RTI International Task Order No. D16PD00635 for the “McGovern-Dole Mozambique Impact Evaluation and Literacy Assessment.” USDA requires RTI to design a robust impact evaluation and conduct the baseline data collection for its McGovern-Dole Food for Education projects in Mozambique. RTI has no role in the implementation of the McGovern-Dole program and no relationship with either implementing partner. The baseline assessment was conducted independently from the implementing partners.

Figure 1. McGovern-Dole Program Coverage in Mozambique



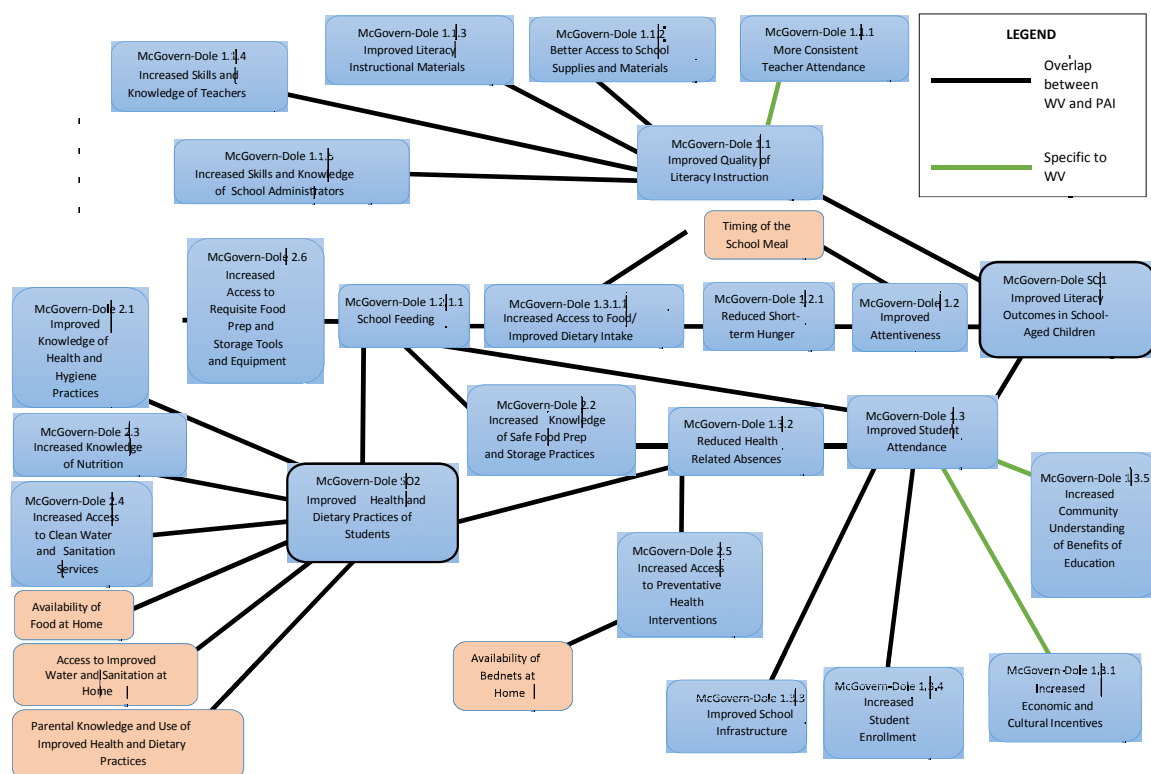
2.2 Methodology

The main objective of the impact evaluation design and the baseline data collection is to set the stage to answer the following overarching question: “What is the impact of the McGovern-Dole program on literacy of Grade 2 and 4 students?”

2.2.1 Theory of Change

To guide the evaluation, RTI developed a theory of change that links the literacy, health, hygiene, nutrition, and dietary components of the McGovern-Dole program and is based on the McGovern-Dole learning agenda. The theory of change serves as a framework for the design of the impact evaluation, the indicators, and the instruments used to collect baseline data. At the highest level, the McGovern-Dole program posits that improved literacy instruction paired with regular school meals will lead to both improved literacy and improved health and dietary practices of students via various program impact pathways. The linkages between the key elements of the McGovern-Dole program and the other factors that may contribute to improved outcomes are shown in the theory of change diagram (Figure 2).

Figure 2. Theory of Change



2.2.2 Impact Evaluation

The impact evaluation uses a quasi-experimental design in which comparison schools serve as the counterfactual (i.e., our best estimate of what would have happened in the absence

of the McGovern-Dole program). An experimental design with randomized assignment of schools would have more accurately estimated the causal effect, but this was not possible because intervention districts and schools were pre-determined since phase one in 2012, long before the impact evaluation was planned.

Because of the variations in interventions described above and the goal of measuring the impact of phase two of the interventions, the impact evaluation design was structured to compare outcomes across three groups of schools:

- Literacy & School Feeding: Schools receiving a “full package” of McGovern-Dole interventions, including both the literacy and school feeding interventions;
- School Feeding Only: Schools receiving McGovern-Dole school feeding interventions without any McGovern-Dole literacy intervention (Maputo only); and
- Comparison: Schools not receiving any McGovern-Dole intervention.

It is important to note the following:

- The aim is not to compare outcomes between the two implementing partners nor between Maputo and Nampula but rather to focus on the impact of the McGovern-Dole program across both intervention provinces in Mozambique.
- At the impact evaluation design stage, no schools were identified to receive the literacy intervention only (i.e., without school feeding); thus, we are not pursuing a full factorial design.
- Schools in the School Feeding Only group are exclusively in Maputo Province, creating some level of imbalance that should be considered during analysis and when interpreting the results.
- The McGovern-Dole program in Mozambique targets Grades 1–3 for the literacy component and Grades 1–6 for the school feeding component. We assessed Grade 2 and 4 students for two main reasons. First, we expect to see more variability in Grades 2 and 4 reading ability, which would allow us to detect significant differences. Second, Grade 4 students will have more years of cumulative exposure to the intervention, which should yield a better understanding of changes over time associated with the intervention activities.

2.2.3 Research Questions

We have subdivided the overarching evaluation question into a set of primary and secondary questions (Table 1).

Table 1. Research Questions

Primary Research Questions	
Literacy	How does reading ability among Grade 2 and 4 students who attend schools with the McGovern-Dole Literacy & School Feeding program compare with that of students who attend 1) schools with the McGovern-Dole School Feeding Only program and 2) schools without any McGovern-Dole program (Comparison)?
	Is there a larger increase in students' reading skills from Grade 2 to Grade 4 in schools with the McGovern-Dole Literacy & School Feeding program than in 1) schools with the McGovern-Dole School Feeding Only program and 2) schools without any McGovern-Dole school feeding/literacy program (Comparison)?
Student Attendance	Is there higher student attendance at schools with the McGovern-Dole Literacy & School Feeding program than in 1) schools with the McGovern-Dole School Feeding Only program and 2) schools without the McGovern-Dole school feeding/literacy program (Comparison)?
Secondary Research Questions	
Health & Nutrition	Do a greater proportion of Grade 2 and 4 students attending schools with the McGovern-Dole Literacy & School Feeding program have knowledge of recommended health and nutrition practices than students at 1) schools with the McGovern-Dole School Feeding Only program or 2) schools without any McGovern-Dole school feeding/literacy program (Comparison)?
	Do a greater proportion of Grade 2 and 4 students attending schools with the McGovern-Dole Literacy & School Feeding program report recommended health and nutrition practices , including dietary diversity and meal frequency, than students in 1) schools with the McGovern-Dole School Feeding Only program or 2) schools without any McGovern-Dole school feeding/literacy program (Comparison)?
Teacher Attendance	Is there higher teacher attendance at McGovern-Dole Literacy & School Feeding schools than at 1) schools with the McGovern-Dole School Feeding Only program or 2) schools without any McGovern-Dole school feeding/literacy program (Comparison)?
	Do McGovern-Dole Literacy & School Feeding schools have a higher percentage of teachers present on any given day compared to 1) schools with the McGovern-Dole School Feeding Only program or 2) schools without any McGovern-Dole school feeding/literacy program (Comparison)?

2.2.4 Indicators

To answer the above research questions, a set of indicators linked to the theory of change was developed and used as the basis for questionnaire design, data management, and analysis. Table 2 highlights some of the main indicators.

Table 2. Literacy, Nutrition and Health, and School Management Indicators

Literacy Indicators	Data Level Reported
% of schools with access to teaching and learning materials	School
% of teachers who are present at the school	
Student performance on EGRA subtasks (Portuguese)	Student
% of students who report being absent or late the past week	
% of students who report being absent because of sickness	
% of teachers who report attending the teacher training designed to prepare them to use the teaching and learning materials supported by the reading program	Teacher/ Classroom
% of schools where teachers are using the teaching and learning materials needed to teach reading and promoted by the program/Ministry of Education	
% of teachers with access to materials for reading instruction promoted by the program (i.e., teacher guides, student books, and supplementary readers)	
% of teachers who report that students are attentive before/after a meal	
Nutrition and Health Indicators	
% of students fed a school meal	School
% of schools where meals were served on time	
% of schools where cooks have correct knowledge about safe food preparation and handling	
% of schools with improved sanitary facilities	
% of schools where students receive deworming medication	
% of students who consumed minimum meal frequency on the previous day	Student
% of students who consumed the minimum number of food groups on the previous day	
% of students receiving a minimum acceptable diet	
% of students with correct knowledge of nutrition practices taught by the program	
% of students with correct knowledge of hygiene and sanitation practices	
% of students reporting hand washing before meals	
% of trained teachers with copies of nutrition education and hygiene education materials	Teacher/Classroom
% of students who report that their school meal replaces a meal at home	Household
School Management Indicators	
% of schools that have enrollment and (updated) attendance registers for students, teachers, and HTs (i.e., attendance rate, dropout rate, transfer rate, and lateness rate by gender and grade)	School
% of schools that have and maintain an updated inventory of food/cooking supplies	
% of schools that have a place to properly store food/cooking supplies	

Note: EGRA = Early Grade Reading Assessment; HT = head teacher; USDA = U.S. Department of Agriculture.

2.2.5 Instruments

Based on these indicators, RTI developed several data collection instruments, which are listed in Table 3.

Table 3. Instruments for Data Collection at Each School

Instrument	Source	Data Level	Notes:
HT Questionnaire and School Inventory	HT	School	
Cook Questionnaire and Kitchen Inventory	Cook	School	Schools with 1 or more cooks
Teacher Questionnaire	Teacher	Classroom	1 Grade 2 & 1 Grade 4
Classroom Inventory	Assessor w/ Teacher's help	Classroom	1 Grade 2 & 1 Grade 4
Student EGRA	Student	Student	8 Grade 2 & 8 Grade 4
Student Questionnaire	Student	Student	8 Grade 2 & 8 Grade 4
Parent Focus Group Discussion Guide	Parents	Parents	In selected Literacy & School Feeding and School Feeding Only schools

Note: EGRA = Early Grade Reading Assessment; HT = head teacher.

All instruments and instructional dialogues (for explaining instructions to the respondents and asking for consent) were developed in English and circulated for peer review internally, with USDA, and with literacy consultants in Mozambique (for the Early Grade Reading Assessment [EGRA] portion). The instruments were never shared with the implementing partners. Once these instruments were finalized, they were adapted and translated into Portuguese and reviewed for accuracy.

The only exception was the EGRA, which is an individually administered, 15-minute oral assessment that measures the basic skills a child must have to eventually be able to read fluently and with comprehension—the goal of reading (Tobia & Bonifaci, 2015). The EGRA instrument used at baseline consisted of six subtasks and was developed directly in Portuguese and administered to Grade 2 and Grade 4 students in Portuguese³ (Table 4).

Table 4. Description of Baseline EGRA Subtasks

#	Subtask	Students must:	Reading Skill
1	Letter–Name Knowledge (clpm)	Provide the name of 100 upper- and lowercase letters presented in random order; timed at 1 minute.	The ability to read the letters of the alphabet naturally and without hesitation.
2	Syllable Reading (csspm)	Provide the sound represented by 50 upper and lowercase letters presented in random order; timed at 1 minute.	The ability to recognize graphemic features of a letter and accurately map it to its corresponding sound.

³ Note that EGRAs in local languages was not developed at baseline since curriculum in local language was still under development. EGRAs in local languages are recommended as part of the efforts for midline and endline instrument updates and data collection.

#	Subtask	Students must:	Reading Skill
3a	ORF	Read a narrative text of 57 words. Timed at 1 minute.	The ability to read connected text with accuracy, little effort, and at a sufficient rate of speed.
3b	Reading Comprehension	Respond to 5 questions (4 literal and 1 inferential) about the entire text or parts they have read; 15 seconds to start to answer each question.	The ability to make meaning from (understand) what they have read.
4	Listening Comprehension	Listen to a connected text of approximately 30 words and respond correctly to 5 questions (4 literal and 1 inferential); 15 seconds to start to answer each question.	The ability to make sense of oral language and vocabulary (considered a necessary skill for reading comprehension).
5	Dictation	Write and correctly spell five words; 20 seconds to scribe each word.	The ability to listen to individual words and spell (encode) them correctly.

Note: clpm = correct letters per minute; csspm= correct syllable sounds per minute; ORF = oral reading fluency

The EGRA adaptation and development process included a review of relevant curriculum materials. For this adaptation, RTI worked with a Mozambican literacy specialist, developed short reading passages using appropriate words that can be used across Grades 2 and 4, and developed appropriate reading comprehension questions to complement the short passages. The adaptation process covered language analysis, the selection of appropriate subtasks for the language and grade levels (Grades 2 and 4), the verification of instructions, and the translation of directions.

2.2.6 Programming

All assessments and questionnaires⁴ mentioned above were programmed into Tangerine™, an open-source suite of software developed by RTI for education and health surveys. Data were collected offline on tablets in schools and later uploaded to RTI's server when data collectors could connect to the internet. RTI programmed and tested tablet-based scripts for the questionnaires before beginning data collector training. During and after data collector training, RTI updated the Tangerine instruments to accommodate any adjustments in terminology or survey question items resulting from issues identified in pilot testing.

2.2.7 Field Work

Data collection tools and procedures were piloted and adjusted prior to the full-scale assessor training conducted in each province before data collection. Detailed reports of the piloting and adaptation process are available separately. The full-scale training for survey data collection included practice visits to two schools in each province. Data collection occurred in the third trimester of the academic year (September and October 2017) to allow the students to be exposed to a full school year. Quantitative assessment teams consisted of four members: one supervisor, one teacher/classroom assessor, and two student assessors. One assessment team visited one school per day.

⁴ Excluding the qualitative FGD guide, which cannot be administered via tablet.

Qualitative data collection teams worked separately from the quantitative teams. Qualitative teams consisted of two members: a moderator and a note-taker. They contacted selected schools in advance (the school selection process is described in the Sampling section below) and asked the head teacher (HT) to help them invite parents to participate in the focus group discussion (FGD). At each of the selected schools, one FGD was held with parents of students. Lead observers were hired to periodically attend FGDs to provide technical oversight and ensure proper implementation of the data collection methods. During the FGDs, hand-written notes and audio recordings were used to record the data.

2.2.8 Sampling

Province- and District-level Sampling Frame

At the time of this baseline assessment, PAI was implementing the McGovern-Dole program in 273 schools across four districts in Maputo, and WV was implementing in 150 schools across two districts in Nampula. Although PAI in Maputo Province covers schools with both Portuguese and local language literacy programs, and WV in Nampula Province covers Portuguese literacy programs only, the baseline literacy assessment was performed in Portuguese because the local language curriculum was still under development. At the time of the baseline, only Grade 1 students would have begun to receive the local language curriculum, so the Grade 2 and 4 students being assessed would not have been exposed.

Selection of Comparison Districts

We used the following criteria for selecting comparison districts:

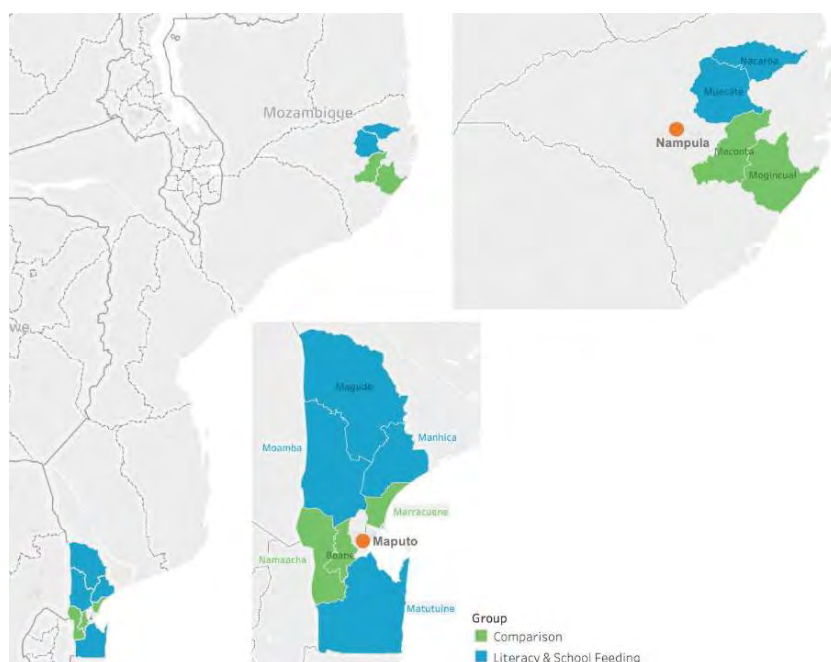
- located within the same province as the intervention districts (Nampula and Maputo)
- does not have any other known literacy interventions taking place or planned for the foreseeable future (5 years)
- geographically close to districts with intervention schools
- has similar urban/rural makeup to the intervention districts
- has similar numbers of students and schools (thus, similar numbers of students in each school)
- has similar makeup of languages spoken at home

Based on these criteria, schools in the remaining districts in Maputo, except for the City of Maputo, were automatically selected as comparison schools. The City of Maputo was not selected because of its all-urban make up. Despite this deliberate choice, Maputo comparison districts still tended to be more urban than the Maputo intervention districts. Maputo comparison districts were also more likely to speak Portuguese at home than any of the intervention districts.

The two Nampula comparison districts were selected by eliminating districts in Nampula that have or are planning to have some type of (non-USDA) literacy intervention or are primarily urban (City of Nampula) or coastal. This choice was made because such districts tend to have different demographic profiles than the intervention districts.

The selected comparison districts are as follows: Meconta and Mogincual in Nampula Province; and Boane, Marracuene, and Namaacha in Maputo Province (Figure 3).

Figure 3.
Intervention and
Comparison
Districts



Target Population within Districts

The population of interest within the targeted districts included the HTs, teachers, cooks, and Grade 2 and 4 students attending government schools in intervention and comparison districts. Table 5 lists the total number of schools and the expected numbers of Grade 2 and 4 students in each province and study arm. School lists were compiled from the list frames provided by the Ministry of Education, PAI, and WV.

Table 5. Target Population across Intervention and Comparison Districts

Province	Group	Districts & Primary Language*		No. of Schools	N Students		Sample Frame
					Grade 2	Grade 4	
Maputo	Literacy & School Feeding	Magde	Changana	139	11,475	8,544	School and enrollment figures provided by PAI/ADPP.
		Manhiça	Changana				
		Matutuine	Changana/Rhonga				
		Moamba	Changana/Portuguese				
	School Feeding Only	Magde	Changana	134	4,745	3,323	School and Enrollment figures provided by PAI/ADPP.
		Manhiça	Changana				
		Matutuine	Changana/Rhonga				
		Moamba	Changana/Portuguese				
	Comparison	Boane	Portuguese/Changana	133	19,382	12,722	2016 EMIS data
		Marracuene	Portuguese/Changana				
		Namaacha	Changana/Portuguese				

Nampula	Literacy & School Feeding	Muecate Nacarôa	Macua	152	16,300	10,985	WV 2016 Status Report
	Comparison	Meconta Mogincual	Macua	150	15,832	11,123	2016 EMIS data

*Note: ADPP = Ajuda de Desenvolvimento de Povo para Povo (Development Aid from People to People); EMIS = Education Management Information System; PAI = Planet Aid Incorporated; WV = World Vision. Number of students is based on available data at the time of design in 2016. *Primary language based on student reports of language spoken at home. See Table 20 for further detail.*

Sampling Design

We selected separate samples for the quantitative and qualitative components of the baseline study. The quantitative sampling design was a multi-stage stratified cluster probability based random design aiming to represent each of the targeted populations (schools, students, teachers, and cooks). However, for the qualitative component, the sampling was purposive, aimed at giving good representation of parents with different characteristics in a subset of the schools from the quantitative sample. The strategies for selecting both samples are described in below in more detail.

Quantitative Survey Sampling Design

For the quantitative sample, we used a three-stage stratified cluster probability-based design to select a representative random sample of schools, classrooms, teachers, head teachers, cooks, and students. Schools were stratified by province, district, and intervention arm and then sampled with equal allocation. The use of equal allocation rather than probability proportional to size was because enrollment information was missing for many schools in the frame, and even when this information was available, it was determined to be inaccurate based on comparison with other sources.

Classrooms and students were sampled once the data collection team reached the school. One Grade 2 classroom and one Grade 4 classroom were randomly sampled with equal probability within the sampled and verified schools. Eight students within each sampled Grade 2 and eight students within each sampled Grade 4 classroom were then selected with equal probability. Table 6 provides the details of the final targeted sample.

Table 6. Summary of the Sampling Methodology and Target Sample Size

Stage #	Item Sample (Sample Size)	Stratification (Strata Description)	Sample Allocation	Probability of Selection
1	Schools (450)	Province x Intervention (5)	Equal (90 per stratum)	Equal
2	Classrooms (900)	Grade (2 & 4)	Equal (one Grade 2 + one Grade 4 per school)	Equal
3	Students (7,200)	None	Equal (8 students in selected Grade 2 classroom + 8 students in selected Grade 4 classroom)	Equal

Verification of Schools

Once the sample was drawn, and prior to data collection, district officials were visited to verify that each sampled school met the following inclusion criteria.

Intervention schools must

- be an active part of the McGovern-Dole School Feeding Only or Literacy & School Feeding intervention;
- be located in the specified district;
- have Grade 2 and Grade 4 enrollment;
- instruct (or intend to instruct) Grade 2 in either Changana, Ronga, or Portuguese (if in Maputo); and
- instruct (or intend to instruct) Grade 2 in Portuguese only (if in Nampula).

Comparison schools must

- not be a part of any intervention and have no plan to be a part of an intervention for the foreseeable future (~5 years);
- be located in the specified district; and
- have Grade 2 and Grade 4 enrollment.

Additional information collected/verified at the verification processes includes

- the number of classroom shifts in the school;
- the start and end times of shift(s);
- the total number of Grade 2 classes and Grade 4 classes;
- the total Grade 2 enrollment and Grade 4 enrollment;
- the location; and
- the HT name.

Replacement Schools

The verification process also helped the team compare the information provided in the list frames with what was on the ground. If a school did not have the required attributes for inclusion, it was replaced with the school that was most similar based on geographic location. A total of 32 schools were replaced. Seventeen comparison schools in Nampula were replaced because they were involved in a literacy intervention. Eight schools were replaced because they did not have Grade 4 enrollment. Another three schools had no Grade 4 enrollment but were not replaced because no additional replacement schools were available. The field team was instructed to proceed with the data collection in these schools. Additionally, seven schools were replaced because they were used in the pilot or practice sessions.

Final Quantitative Sample Counts and Estimates

A total of 448 schools were visited during September 4–October 6, 2017. The final sample included 429 HTs, 214 cooks (intervention schools only), 239 warehouse managers

(intervention schools only), 412 Grade 2 teachers, 394 Grade 4 teachers, 3,420 Grade 2 students, and 3,289 Grade 4 students (Table 7).

Overall, the response rate was high and reflects a good representation of the targeted population with most of the response rates exceeding 85%, except for the population of cooks. Letters from the Ministry and districts helped with school collaboration and reducing non-response. Non-respondents were individuals who did not consent to be interviewed or were not present during data collection. As will be highlighted in the results sections, teachers and HTs report an average 25% rate of absenteeism, which is one of the main reasons for non-response. In addition, it is important to note that cooks are volunteer parents who do not necessarily go to schools daily and are not obligated to be in the school during the full school day, which resulted in lower response rates for this population specifically. However, compared to industry standards, the response rate of 79.3% of cooks is considered good for a population of volunteer workers.

Table 7. Final Sample Counts

Provinces	Study Arm	Schools	HT	Cooks	Warehouse Managers	Teachers		Students	
						Grade 2	Grade 4	Grade 2	Grade 4
Maputo	Literacy & School Feeding	90	84	62	82	83	78	661	638
	School Feeding Only	90	85	70	79	82	72	704	681
	Comparison	89	86	n/a	n/a	86	83	666	616
Nampula	Literacy & School Feeding	89	85	82	78	79	80	699	678
	Comparison	89	89	n/a	n/a	82	81	690	676
Actual Total		448	429	214	239	412	394	3,420	3,289
Expected Total		450	450	270	270	450	450	3,600	3,600
Overall Response Rate		99.6%	95.3%	79.3%	88.5%	91.6%	87.6%	95.0%	91.4%

Note: HT = head teacher

Qualitative Sample

For the qualitative sample, we stratified schools that had completed survey data collection before qualitative data collection started by number of Grade 2 classes (as a proxy for school size), HTs' satisfaction with parental involvement, and rural/urban location. We then randomly selected schools to represent those categories across Maputo and Nampula Provinces. FGDs were conducted at 18 schools in Maputo and 12 schools in Nampula. In Maputo, FGDs were held in Magude (four FGDs), Manhiça (six FGDs), Matutuine (three FGDs), and Moamba (five FGDs) districts. In Nampula, FGDs were held in Muecate (six FGDs) and Nacarôa (six FGDs). A larger number of schools was selected from Maputo to achieve

representation in both the School Feeding Only and the Literacy & School Feeding study arms.

2.2.9 Data Management

Data Monitoring and Processing

Data monitoring and quality control (QC) were conducted daily throughout data collection. Data were downloaded from the Tangerine site daily for each of the six instruments and checked by statisticians. Some checks were performed at the individual assessor level to check whether assessors were making common data collection errors. Regular communication between the RTI office and field teams ensured that any errors were addressed immediately.

Preliminary analysis of variable distribution and logic QC were also conducted, such as checking that enrollment was larger than or equal to the number of students present and that the students' ages were credible given their grade.

Weights Calculation

Final sample weights were calculated for each stage of sampling (i.e., at the school, classroom, and student levels). The final weights consisted of the sampling weights adjusted for non-response. Sampling weights were calculated as the inverse of the probability of selection at each stage. School weights were calibrated to the known populations of schools by province and study arm. To account for appropriate inference to the target population and for the clustering effect in the sample, weights were calculated at each stage of the sampling. The complex sampling plan provides the stratification, clustering, sampling units, finite population correction, and final sampling weights for each stage. Unless explicitly mentioned otherwise, all estimates provided in the report were analyzed using the appropriate weights reflecting the complex sample design and adjusting for non-response.

Sample Size Calculation

The sample size calculation was derived using 95% confidence intervals (CIs) with a standard deviation (SD) of 14.5 and the average number of words read per minute in the EGRA reported in the "Aprender a Ler Impact Evaluation Baseline Report"⁵. Some of the other assumptions driving the sample size calculation included aiming for a balanced sample design while accounting for an intra-class correlation (ICC) coefficient of 0.15 and a design effect of 3.25. The sample size and the sampling methodology were developed together to obtain the most cost-effective and statistically rigorous sample possible. The sample size and sampling methodology were aimed to provide a 95% CI of ± 2.5 words per minute (wpm) for students in each province and study arm⁶. Annex B provides full mean and precision estimates.

⁵ This EGRA was conducted with Grade 2 and 3 students in Nampula and Zambezia provinces at the beginning of the 2013 school year. The assessment was conducted by International Business & Technical Consultants Inc. and funded by the United States Agency for International Development (USAID).

⁶ USAID typically uses sample sizes and methodologies that provide 95% CIs of ± 3.5 wpm.

2.3 Analysis Methodology

The baseline analysis consists of calculating descriptive statistics and testing hypotheses to compare the core indicators across the Literacy & School Feeding, School Feeding Only, and Comparison schools. As a baseline, these results provide a snapshot of indicators at a moment in time and should not be interpreted as reflecting the impact of the program. Impact will be assessed using difference-in-differences analysis at midline and endline.

2.3.1 Basic Quantitative Analysis

The quantitative analysis consisted of running both un-weighted and weighted frequencies and means across all variables to explore the data overall. The weighted frequencies and descriptive statistics were followed by crosstabulations by relevant groups (e.g., grade level). This report highlights the results of the weighted analysis.

For core indicators, two types of testing were conducted:

- 1) For continuous variables: Analysis of variance (ANOVA) F-tests were conducted to investigate whether a significant difference exists between the two intervention groups and the comparison group, followed by multiple comparisons to detect the source of this significant difference.
- 2) For categorical variables: Chi-square tests were conducted to compare the two intervention groups and the comparison group across response categories, followed by Kruskal-Wallis tests to investigate two-by-two comparisons to detect the source of the significant difference.

2.3.2 Advanced Quantitative Analysis

Schools across districts and provinces vary in their performance because of many exogenous factors, such as urban versus rural setting, the resources available to these schools, accessibility, and socio-economic level. When the comparison group outperformed the intervention groups across some indicators, it was not clear whether this difference was related to the purposeful selection of the intervention districts and schools because of their need or to other unknown reasons. For a more robust comparison across schools, RTI attempted to run propensity score matching at the school level to account for the variability among schools across the three study arms, provinces, and districts. A multinomial logistic regression was conducted, as were several logistic regression models. School enrollment was the only significant variable that could match the schools and was not linked to the main indicators of interest. With school enrollment, the model explained only 8% of the variability and was, therefore, not considered to be a robust model for matching schools. Although school-level information was not sufficient to achieve robust matching between schools across the study arms, we believe that matching at the student and teacher levels within schools should be conducted as part of the impact evaluation analysis effort.

2.3.3 Qualitative Analysis

Qualitative research methods were used to provide greater contextual understanding of the quantitative baseline results and account for parents' perspectives and experiences with the program. These methods consisted of conducting FGDs among parents with children enrolled in School Feeding Only program and Literacy & School Feeding schools. Our goal

was to use the qualitative data to better understand parents' experiences with the impact of the McGovern-Dole program on their children; therefore, we did not conduct parent FGDs in Comparison schools

Recordings of the FGDs were transcribed and translated from the local languages into English for analysis. Once translated, the transcripts were coded according to 10 themes using the qualitative data analysis program Dedoose. Coded themes included parental involvement in schools, parents' perception of school, parental involvement in reading and writing activities at home, parents' perception of the school literacy program (when applicable), parents' perception of the school feeding program, parents' perception of how school meals affect children's diet at home, children's reading and writing activities at home, language regarding literacy materials and the school literacy program, parents' perception of children's health education and application, and parents' perception of school gardens (when applicable). Reports compiling all FGD content relating to each of the themes were then generated. Researchers analyzed these reports to identify common topics corresponding to each of the themes in the original transcripts.

3. ANALYSIS

This part of the report is divided into two subsections. The first subsection focuses on the indicators linked to the primary research questions and an assessment of differences between the two intervention groups and the comparison group. The second section provides descriptive statistics for all other indicators, reflecting a wider snapshot of the situation at baseline, including qualitative analysis of the focus group data.

3.1 Baseline Indicators

In this section, we present key indicators related to the primary and secondary research questions for the baseline and document statistical differences in the indicators across the study arms at baseline. The primary research questions focus on literacy ability and student attendance. The secondary research questions focus on students' health knowledge and practices and teacher attendance.

3.1.1 Literacy

The key indicator addressing the primary research questions on the literacy ability of students in Grades 2 and 4 is student performance on the EGRA. EGRA results are presented by subtask in Tables 8–13 in the sections below. The tables include mean scores for timed subtasks (i.e., letter identification, syllable reading, and oral reading fluency [ORF]) and mean percent scores for all non-timed subtasks (i.e., reading comprehension, listening comprehension, and dictation). Zero scores for each subtask are representative of students who could not, for example, identify a single letter or read a single word of connected text.

When comparing across the study arms, it is important to consider that the School Feeding Only study arm exists exclusively in Maputo, whereas the Literacy & School Feeding and Comparison study arms represent averages from across Maputo and Nampula Provinces.

For EGRA scores, we provide p-values to show the statistical significance of the difference between the score of each treatment group and that of the comparison group. Smaller p-values ($p < 0.05$) are indicative of strong statistical significance.

At baseline, Grade 2 students in the Comparison group had fewer percent zero scores across all subtasks, indicating this group had stronger basic literacy skills compared to Grade 2 students in both intervention groups. Grade 4 students in the Comparison group had fewer percent zero scores than Grade 4 students in both intervention groups on the listening comprehension, ORF, and reading comprehension subtasks. In contrast, Grade 4 students in the School Feeding Only group had fewer percent zero scores on the letter identification, syllable reading, and word dictation subtasks than Grade 4 students in the Comparison and Literacy & School Feeding groups. The section below presents student performance on the EGRA by subtask, grade level, and study arm.

Listening Comprehension Subtask:

Although listening comprehension is not a reading ability assessment, it is a prerequisite that students be able to understand the target language of instruction. The percentage of

students with zero scores in this subtask indicate that these students were not able to correctly respond to a single listening comprehension question.

In Grade 2, the percent of students with zero scores on listening comprehension varied: 33.8% (Comparison), 50.8% (School Feeding Only), and 62.7% (Literacy & School Feeding). This difference was statistically significant, with a p-value of less than 0.001 in both intervention groups. Grade 2 students in the Comparison schools performed better on the Listening comprehension subtask than Grade 2 students in the intervention schools. The higher percentage of zero scores among Grade 2 students in both intervention groups suggests that these students did not understand the meaning of the words read aloud in the passage.

Table 8. Listening Comprehension Subtask Scores

	GRADE 2			GRADE 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Percent Zero Scores	33.8	50.8	62.7	21.2	25.6	42.4
Mean Percent Scores	33.0	21.2	15.0	45.0	39.0	28.6
p-values		<0.001*	<0.001*		0.043*	<0.001*

The p-values shown represent the statistical significance of differences in mean percent scores relative to the Comparison group.

In Grade 4, students in Comparison schools performed better than students in both intervention schools. This difference was statistically significant, with p-values of 0.043 and less than 0.001, respectively. Grade 4 students in the Literacy & School Feeding intervention showed the highest percentage of zero scores in the listening comprehension subtask compared to Grade 4 students in the other two groups.

A higher percentage of Grade 2 and 4 students scored zero in the listening comprehension subtask in both intervention groups compared to Grade 2 and 4 students in Comparison schools. This finding suggests these students struggled to listen with understanding to a story read aloud in the target language of instruction, although the level of the text was representative of texts used for literacy instruction in Grades 2 and 4. This is an important finding given that research shows that students' receptive language skills affect reading performance (Scarborough, 2001).

In general, student data also show that at home, students speak languages other than the target language of instruction. This finding may pose an added challenge to reading acquisition given that there is a mismatch between the language of instruction and the language spoken at home language (Heugh et al., 2007).

Letter Identification Subtask:

In the letter identification subtask, zero scores indicate the percentage of students not able to correctly name a single lower- or upper-case letter. Grade 2 students in the Literacy & School Feeding intervention had a lower percentage of students with zero scores (42.9%)

than Grade 2 students in the School Feeding Only group (49.4%). This difference was statistically significant in the Literacy & School Feeding group, with a p-value of 0.003.

Mean scores on the letter identification task (Table 9) show that on average, Grade 2 students in the Comparison group and the School Feeding Only group could name approximately 11 correct letters per minute (clpm), whereas Grade 2 students in the Literacy & School Feeding group correctly name approximately 8 clpm. Given that letter knowledge is a predictor of reading acquisition (Hammill, 2004), the finding that 34–49% of Grade 2 students across study arms could not correctly name a single lower or upper-case letter helps explain the high percentage of zero scores on the syllable reading task in Grade 2 across all study arms.

Table 9. Letter Identification Subtask Scores

	GRADE 2			GRADE 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Percent Zero Scores	34.0	49.4	42.9	10.2	8.6	13.9
Mean Percent Scores	11.4	11.0	8.6	33.0	37.7	24.4
p-values		0.708	0.003*		0.008*	<0.001*

The p-values shown represent the statistical significance of differences in mean percent scores relative to the Comparison group.

The percentage of Grade 4 students in the School Feeding Only group with zero scores (8.6%) was lower than the percentage of Grade 4 students in the Comparison group (10.2%) and the Literacy & School Feeding (13.9%) groups. The differences were statistically significant, with a p-value of 0.008 in the School Feeding Only group and a p-value of less than 0.001 in the School Feeding & Literacy group.

Mean scores on the letter identification subtask (Table 9) show that on average, Grade 4 students in the School Feeding Only intervention could correctly name more letters per minute (approximately 38 clpm) than students in the Comparison group (approximately 33 clpm) and School Feeding & Literacy group (approximately 24 clpm). In general, Grade 4 students performed better than Grade 2 students on the letter identification subtask.

Syllable Reading Subtask:

In the syllable reading subtask, zero scores indicate the percentage of students not able to correctly read a single syllable. In Grade 2, 68–75% of students across study arms scored zero on the syllable reading subtask.

Mean scores show on the syllable reading subtask (Table 10) show that on average, Grade 2 students in the Comparison group and the School Feeding Only group correctly read approximately 6 syllables per minute, whereas Grade 2 students in the School Feeding & Literacy group correctly read approximately 4 syllables per minute.

These results help explain low performance on the oral reading fluency subtask among Grade 2 students in both intervention groups. Research shows that when students struggle to read basic syllables, they often struggle with reading words made up of two or more syllables (Ficksman & Adelizzi, 2010).

Table 10. Syllable Reading Subtask Scores

	GRADE 2			GRADE 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Percent Zero Scores	68.2	69.7	74.7	29.8	22.1	41.0
Mean Scores	6.5	6.0	4.0	25.3	29.4	16.8
p-values		0.539	0.001*		0.019*	<0.001*

The p-values shown represent the statistical significance of differences in mean scores relative to the Comparison group.

In the syllable reading subtask, Grade 4 students in the School Feeding group had fewer zero scores (22.1%) than Grade 4 students in the Comparison group (29.8%) and the Literacy & School Feeding group (41.0%). These findings were statistically significant, with p-values of 0.019 in the School Feeding Only group and less than 0.001 in the Literacy & School Feeding intervention. The percentage of zero scores across study arms (22–41%) indicate that Grade 4 students still struggle to read basic syllables, with students in the Literacy & School Feeding intervention performing the lowest on this foundational skill.

Mean scores on the syllable subtask (Table 10) show that on average, Grade 4 students in the School Feeding Only Group could correctly read more syllables (approximately 29 syllables per minute) than Grade 4 students in the School Feeding & Literacy Group (approximately 16 syllables per minute) and the Comparison group (approximately 25 syllables per minute).

In general, Grade 4 students performed better than Grade 2 students. Across study arms, Grade 2 and 4 student performance on the syllable reading subtask is in line with Grade 2 and 4 student performance on the letter identification subtask. These findings align with research showing that when primary grade students struggle to correctly identify letter names, they often have difficulty learning about letter sounds and letter sound relationships, all of which are necessary steps in learning to correctly read syllables and simple words (Wood & McLemore, 2001) in the target language of instruction.

Oral Reading Fluency (ORF) Subtask:

In the oral reading fluency (ORF) subtask, zero scores indicate that students were not able to correctly read a single word in the passage. In Grade 2, 56% of students in the School Feeding Only schools and 52% of students in the Literacy & School Feeding schools could not read a single word, compared to 38% of students in Comparison schools (Table 11). Grade 2 students in Comparison schools could read slightly better than students in the intervention groups. The difference in performance on the ORF subtask is statistically significant, with p-

values of 0.013 for School Feeding Only schools and less than 0.001 for the School Feeding & Literacy schools.

Mean scores on the ORF subtask show that on average (Table 11), Grade 2 students in the Comparison schools could correctly read more words per minute (approximately 5 cwpm) than Grade 2 students in the School Feeding Only (approximately 4 cwpm) and School Feeding & Literacy (approximately 3 cwpm) schools. The average number of words read correctly per minute across study arms indicates that Grade 2 students struggled with reading connected text.

Table 11. Oral Reading Fluency Subtask Scores

	GRADE 2			GRADE 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Percent Zero Scores	38.5	56.5	52.1	23.0	24.1	33.1
Mean Scores	5.0	3.6	2.9	23.4	24.4	14.3
p-values		0.013*	<0.001*		0.595	<0.001*

The p-values shown represent the statistical significance of differences in mean scores relative to the Comparison group.

In Grade 4, the percentage of students with zero scores on the ORF subtask was 23–33% across study arms. Grade 4 students in the Literacy & School Feeding schools had the highest percentage of zero scores compared to Grade 4 students in the other two groups. This finding was statistically significant for the Literacy & School Feeding schools, with a p-value of less than 0.001.

Mean scores on the ORF subtask show that on average (Table 11), Grade 4 students in the Comparison and School Feeding Only study arms correctly read approximately 23–24 wpm, respectively. In contrast, students in the School Feeding & Literacy schools correctly read approximately 14 wpm. The average number of cwpm across study arms suggests that Grade 4 students struggled with reading the entire passage. Abadzi (2012) states that while reading rates necessary for reading comprehension may vary across languages, in general, students need to correctly read 45–60 wpm to understand what they read. In general, Grade 4 students performed better than Grade 2 students on the ORF subtask.

Reading Comprehension Subtask:

In the reading comprehension subtask, zero scores indicate the percentage of students not able to correctly respond to a single reading comprehension question (Table 12). Across study arms, the difference in the percentage of Grade 2 students with zero scores in the reading comprehension subtask is statistically significant: 87.8% (Comparison), 93.1% (School Feeding Only), and 92.6% (Literacy & School Feeding), with $p < .001$. In general, this finding suggests that the majority of Grade 2 students in both intervention groups were not able to understand what they read. This aligns with their inability to read most of the words in the passage.

Table 12. Reading Comprehension Subtask Scores

	GRADE 2			GRADE 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Percent Zero Scores	87.8	93.1	92.6	52.2	57.6	70.9
Mean Percent Scores	5.1	2.0	2.2	26.8	23.2	14.2
p-values		<0.001*	<0.001*		0.189	<0.001*

The p-values shown represent the statistical significance of differences in mean percent scores relative to the Comparison group.

In Grade 4, 52.2–70.9% of students scored zero on the reading comprehension subtask. Grade 4 students in the Literacy & School Feeding schools (70.9%) had the highest percentage of zero scores in the reading comprehension subtask, compared to Grade 4 students in the Comparison schools and School Feeding Only schools. This finding was statistically significant in the Literacy & School Feeding schools, with a p-value of less than 0.001.

When students read too slowly, as shown by the low range of ORF rates across study arms among Grade 4 students (14–24 cwpm), students are primarily focusing their time and attention on trying to decode the words, and in the process, they compromise their understanding of the meaning that the words convey (Samuels & Flor, 2007).

Word Dictation Subtask:

In the word dictation subtask, zero scores indicate that students were not able to correctly write a single word. In Grade 2, the percentage of students who scored zero was 74.1–81.5% across study arms (Table 13), indicating that students struggled to apply their knowledge of the relationship between letter names and sounds in Portuguese to write words found in grade-level text. Grade 2 students in the Literacy & School Feeding intervention had the highest percentage of zero scores compared to the other two groups. This finding was statistically significant, with a p-value of 0.002 in the Literacy & School Feeding intervention. The findings align with research that shows a strong correlation between students' ability to read and write (Weiser & Mathes, 2011), given that across study arms, 68.2–74.7% of Grade 2 students could not read a single syllable (Table 10).

Table 13. Word Dictation Subtask Scores

	GRADE 2			GRADE 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Percent Zero Scores	74.7	74.1	81.5	38.1	25.2	52.1
Mean Percent Scores	13.4	13.0	8.8	41.7	55.1	29.8
p-values		0.828	0.002*		<0.001*	<0.001*

The p-values shown represent the statistical significance of differences in mean percent scores relative to the Comparison group.

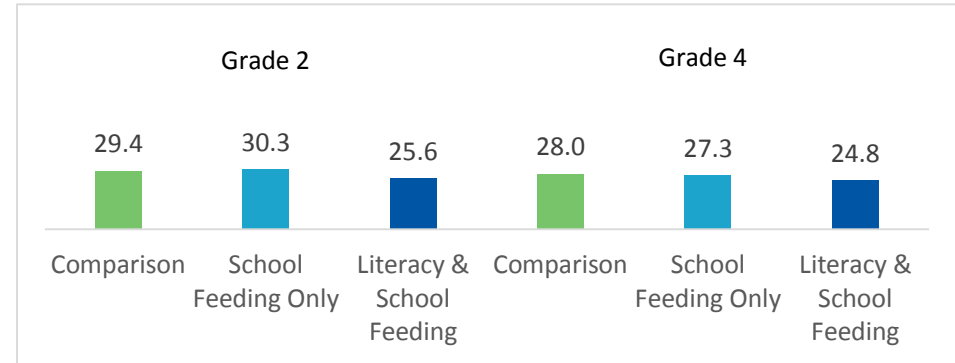
In Grade 4, the percentage of students with zero scores was 25.2–52.1%, with students in the Literacy & School Feeding intervention showing a higher percentage of zero scores. This suggests that more Grade 4 students in the Literacy & School Feeding intervention struggle with writing basic words than in the other two groups. The difference on the word dictation subtask is also statistically significant in both intervention groups ($p < 0.001$).

In the word dictation subtask, Grade 4 students performed better than Grade 2 students. In general, this finding is in line with better Grade 4 student performance than Grade 2 student performance on subtasks that measure foundational skills, such as letter identification, which are needed to develop the ability to write basic words.

3.1.2 Student Attendance

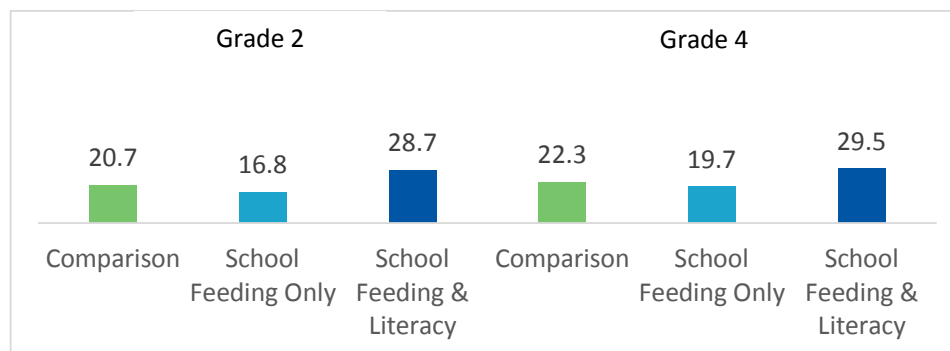
At baseline, no significant difference was detected in student attendance by study arm in either grade. The percentage of absent students was high across all groups with no significant differences across gender. Overall, 28% of Grade 2 students and 27% of Grade 4 students were absent during at least one day in the last week (Figure 4).

Figure 4. Percent of Students Absent At least One Day Last Week, by Grade and Study Arm



As an additional measure of student attendance, we compared class enrollment rosters with the number of students present in the classroom on the day of the survey (Figure 5). School Feeding & Literacy schools had higher absence rates than Comparison schools ($p < 0.001$). School Feeding Only schools had lower absentee rates than Comparison schools, but the difference was only significant in Grade 2. Student illness was cited as the primary reason for absences across gender. This is discussed further in Section 3.2.1.

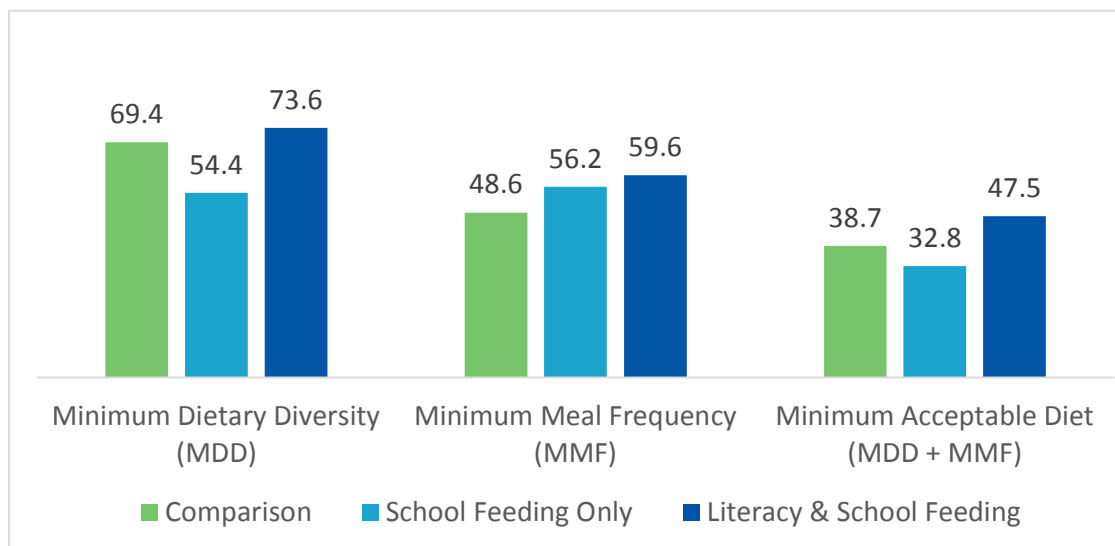
Figure 5. Average Percent of Students Absent in Classroom



3.1.3 Secondary Indicators

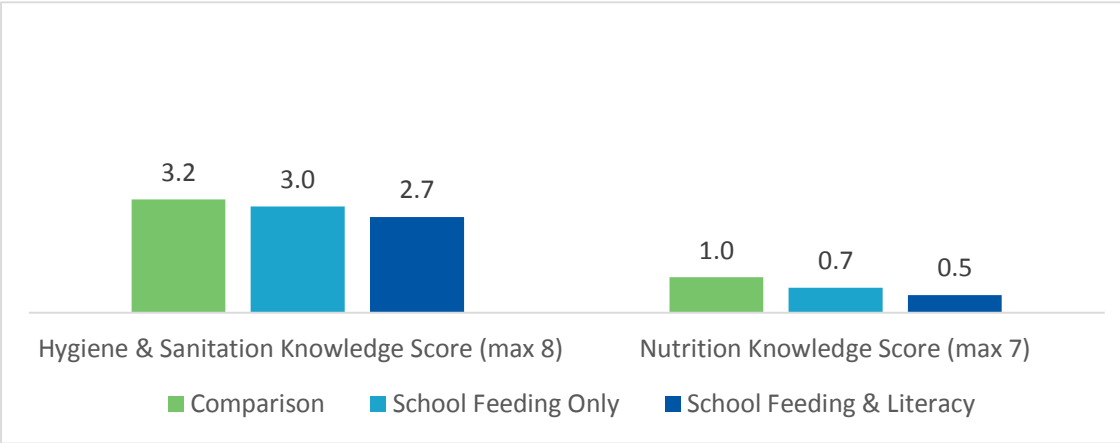
At baseline, we found several differences in secondary indicators by study arm. In general, students' diets were inadequate based on minimum meal frequency, minimum dietary diversity, and minimum acceptable diet (World Health Organization [WHO], 2010; Figure 6). Minimum meal frequency is defined as three or more meals per day. Minimum dietary diversity is defined as consumption of four or more of seven food groups (grains, roots, and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A-rich fruits and vegetables; and other fruits and vegetables). Minimum acceptable diet comprises individuals who have both minimum meal frequency and minimum dietary diversity. Less than half of the students surveyed had a minimum acceptable diet. Fewer students achieved minimum meal frequency than minimum dietary diversity. The percentage of students with minimum dietary diversity and minimum acceptable diet ranged from lowest in School Feeding Only schools to highest in Literacy & School Feeding schools, with Comparison schools falling in between (both $p < 0.001$). The percentage of students with minimum meal frequency was lowest in the Comparison arm and highest in the Literacy & School Feeding arm, with School Feeding Only arm falling in between ($p < 0.001$).

Figure 6. Percent of Students Achieving Nutrition Indicators, by Study Arm



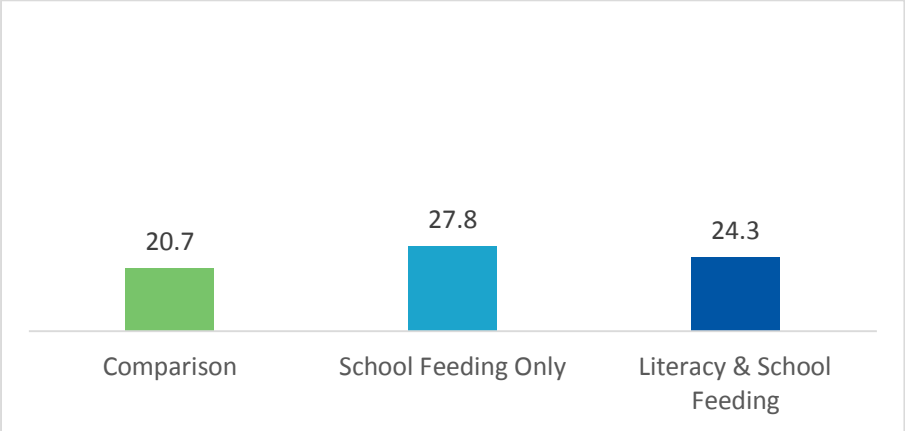
We asked students eight nutrition and seven hygiene and sanitation questions based on the curriculum provided by the program implementers. The nutrition questions focused on food groups, nutrients, and consumption of a balanced diet. The hygiene and sanitation questions asked about hand washing and prevention of diarrhea. We found that students' nutrition knowledge was very low and that their hygiene/sanitation knowledge was moderate (Figure 7). Students' knowledge differed significantly by study arm. Students in the Literacy & School Feeding schools had the lowest nutrition and hygiene/sanitation knowledge scores, whereas those in Comparison schools had the highest scores; School Feeding Only schools fell in between (both $p < 0.001$).

Figure 7. Student Nutrition and Hygiene and Sanitation Knowledge Scores



Teacher absenteeism was common. Across the study arms, 23% of teachers were absent at least once during the last week, based on self-report data (Figure 8). We found no significant differences in the percentage of teachers absent by study arm. However, the mean number of teachers absent differed significantly by study arm ($p < 0.001$), based on data reported by HTs. School Feeding Only schools had the fewest teachers absent, and Literacy & School Feeding schools had the most, with Comparison schools falling in between.

Figure 8. Percent of Teachers Absent At least Once Last Week



3.2 Baseline Descriptive Statistics

In this section, we provide descriptive results for all survey variables included in the theory of change for the evaluation by type of respondent: students, teachers, HTs, and cooks. The qualitative findings from parents are also presented and triangulated with the survey results.

3.2.1 Students

Student Demographic Characteristics

Students provided information on their own and their households' demographic characteristics. On average, students in Grade 2 were 8 years old, and students in Grade 4 were 10–11 years old (Table 14). Across study arms, approximately half of the students interviewed were female. A higher percentage of students in Comparison schools had piped water or a tap in their homes (approximately 32%) compared to those in School Feeding Only (approximately 18%) and Literacy & School Feeding (approximately 15%) schools. For students in School Feeding Only and Literacy & School Feeding schools, wells or boreholes were the most common household water source, followed by communal taps. Similar percentages of students in Comparison schools had access to water from wells or boreholes and piped water. The average number of household assets in students' homes was low to moderate, ranging from three to four items out of nine. On average, students in the Literacy & School Feeding study arm had the lowest number of household assets.

Table 14. Student Responses on Household Demographic Characteristics, by Grade and Study Arm

		GRADE 2			GRADE 4		
		Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
		n=1,386	n=666	n=1,368	n=1,349	n=616	n=1,323
		Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band
Student age		8.5 [±.2]	8.1 [±.2]	8.7 [±.2]	10.9 [±.2]	10.4 [±.2]	11.3 [±.2]
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Female students		50.3 (702)	50.0 (344)	49.5 (680)	51.2 (685)	50.4 (310)	50.3 (670)
Household water source	River, stream, or lake	12.7 (273)	15.5 (132)	20.0 (321)	12.7 (266)	19.3 (152)	17.5 (297)
	Well or borehole	29.9 (460)	40.3 (250)	41.0 (549)	28.6 (425)	35.8 (216)	43.6 (569)
	Communal tap	21.4 (311)	24.8 (158)	23.2 (297)	20.8 (287)	23.3 (146)	20.8 (260)
	Water pipe/tap in home	31.7 (268)	17.3 (73)	14.0 (130)	33.7 (300)	18.8 (64)	16.1 (145)
	Water truck or tank	2.1 (24)	1.9 (17)	1.1 (21)	2.4 (29)	2.7 (12)	0.7 (18)

		GRADE 2			GRADE 4		
		Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Household asset index	Other	2.2 (22)	0.2 (1)	0.7 (6)	1.8 (19)	0.1 (2)	1.3 (9)
	Radio	57.9 (748)	61.2 (398)	58.9 (780)	56.8 (731)	57 (369)	59.8 (800)
	Mobile phone	73.3 (928)	86.8 (575)	66.7 (930)	76.1 (962)	90.5 (544)	72.4 (960)
	Television	51.8 (511)	55.9 (304)	34.4 (415)	53.8 (542)	52.9 (290)	32.9 (410)
	Computer	20.7 (216)	24.6 (106)	12.5 (139)	18.7 (190)	12.7 (74)	10.2 (107)
	Refrigerator	41.7 (379)	35.6 (164)	22.0 (229)	39.1 (368)	31.5 (161)	21.4 (225)
	Bicycle	41.0 (593)	44.3 (304)	4.09 (648)	43.2 (615)	50.4 (315)	51.0 (710)
	Motorbike	18.0 (224)	16.2 (100)	19.1 (237)	17.8 (224)	13.9 (87)	20.5 (233)
	Car/truck	24.6 (248)	32.9 (185)	14.9 (184)	22.2 (227)	29.9 (157)	14.6 (177)
	Electricity	57.9 (590)	47.2 (251)	35.6 (415)	56.0 (599)	44.7 (224)	30.4 (353)
		Mean ± 95% CI Band	Mean ± 95% CI Band	Mean ± 95% CI Band	Mean ± 95% CI Band	Mean ± 95% CI Band	Mean ± 95% CI Band
Asset index (9 items)		3.8 [±.2]	4.0 [±.3]	3.1 [±.2]	3.8 [±.2]	3.8 [±.3]	3.1 [±.2]

Note: CI = confidence interval.

Student Absenteeism and Attendance

Approximately 25–30% of students across the study arms were absent from school on any day last week (Table 15). Illness was the main reason for students being absent, with 56–66% of students who were absent saying they missed school because they were ill. Other top reasons for missing school were other work at home (8–18%) and unavailability of a school uniform (7–10%).

Table 15. Student-reported Absenteeism, by Grade and Study Arm

		GRADE 2			GRADE 4		
		Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
		n=1,394	n=666	n=1,368	n=1,357	n=616	n=1,323
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Absent from school any day last week		29.3 (346)	30.3 (182)	25.6 (343)	28.0 (377)	27.3 (146)	24.8 (335)
Reason for being absent	Illness	59.2 (177)	66.4 (104)	55.8 (173)	58.3 (211)	57.5 (85)	57.5 (192)
	Had other work at home	7.6 (34)	13.9 (25)	11.7 (46)	11.2 (42)	11.6 (18)	17.8 (52)
	Had to care for family member	3.2 (10)	1.3 (4)	3.8 (11)	6.2 (17)	6.4 (4)	5.7 (19)
	No transportation	1.9 (7)	0.0 (0)	0.4 (4)	0.8 (3)	0.2 (1)	0.5 (1)

	GRADE 2			GRADE 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Bad weather	2.5 (8)	1 (3)	0.6 (1)	0.8 (3)	1.5 (4)	0.3 (3)
Had an emergency	2.9 (9)	2.5 (5)	1.8 (8)	1.9 (10)	1.1 (2)	0.9 (5)
Getting to school was too dangerous	0.3 (1)	0 (0)	1.3 (2)	.7 (2)	0.0 (0)	0.0 (1)
Woke up late	1.3 (6)	0 (0)	2.6 (5)	1.3 (1)	0.9 (2)	0.9 (2)
Could not find uniform or uniform was not ready	6.7 (28)	6.7 (4)	7.5 (25)	9.6 (35)	8.5 (9)	5.9 (20)
Treated poorly by teachers	0.7 (2)	0.7 (1)	0.3 (3)	0.5 (2)	0 (0)	0.9 (4)
Treated poorly by other students	1.4 (3)	0 (0)	2.0 (3)	1.2 (6)	0 (0)	0.2 (1)
Other	12.4 (38)	7.5 (15)	12.0 (47)	7.5 (34)	12.3 (8)	9.5 (31)

Note: CI = confidence interval.

We also asked teachers about the total number of students formally enrolled in the class. In general, enrollment for boys and girls was lower in School Feeding Only schools compared to Literacy & School Feeding and Comparison schools (Table 16). Across the study arms, the mean number of students present was lower than the mean number enrolled, and the mean number of girls enrolled was lower than the mean number of boys enrolled. Enrollment numbers were compared to the number of students present on the day of observation to generate the attendance rates discussed in Section 3.1.2. Sixteen to nineteen percent of teachers across the study arms did not have a student attendance register available. Most of those with student attendance registers completed them daily.

Table 16. Teacher-reported Student Attendance, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=331	n=163	n=312
	Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band
Number of boys enrolled in the class	27.2 [±.8]	14.0 [±1.3]	23.9 [±.0]
Number of boys present	18.3 [±1]	11.0 [±1.4]	14.9 [±1.3]
Number of girls enrolled in the class	25.1 [±.8]	13.7 [±1.5]	22.3 [±.9]
Number of girls present	17.7 [±1.2]	10.7 [±1.7]	14.3 [±1.2]
Number of students absent on a typical day	7.3 [±.5]	3.3 [±.4]	7.8 [±.5]
Number of students who are late on a typical day	7.3 [±.5]	4.6 [±.7]	6.2 [±.5]
	% (n)	% (n)	% (n)
Status of class attendance register			

Register was not available	19.1 (67)	16.2 (27)	15.6 (51)
Attendance records completed daily	65.4 (213)	69.7 (112)	70.2 (214)
Attendance records completed weekly	5.9 (21)	7.6 (12)	5.6 (20)
Attendance records completed biweekly	0.5 (3)	0.0 (0)	1.3 (2)
Attendance records completed monthly	7.4 (21)	1.1 (2)	3.2 (8)
Other	1.8 (6)	5.4 (10)	4.0 (16)

Note: CI = confidence interval.

Students' Reporting on Access to School Supplies and Learning Materials

The percentage of Grade 2 students who had a supplementary reader available on the day of the interview was 50–60% across study arms (Table 17). The percentage of Grade 2 students who had the Portuguese textbook available on the day of the interview was 79–82% across study arms. The percentage of Grade 2 students who had the exercise notebook available on the day of the interview was 83–85% across study arms. When asked if they read books daily in the classroom or school library, across study arms, the rate of affirmative responses among Grade 2 students was 42–58%

The percentage of Grade 4 students who had a supplementary reader available on the day of the interview was 48–53% across study arms. The percentage of Grade 4 students who had the Portuguese textbook available on the day of the interview was 71–82% across study arms. The percentage of Grade 4 students who had the exercise notebook available on the day of the interview was 92–94% across study arms. When asked if they read books daily in the classroom or school library, across study arms, the rate of affirmative responses among Grade 4 students was 52–62%.

Table 17. Students' Reporting on Access to School Supplies and Learning Materials, by Grade and Study Arm

	Grade 2			Grade 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
	n=1,394	n=666	n=1,368	n=1,357	n=616	n=1,323
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Student has supplementary reader available today	52.0 (655)	59.8 (405)	50.8 (690)	48.1 (603)	53.8 (341)	48.9 (658)
Student has Portuguese textbook available today	82.1 (1027)	84.0 (542)	79.2 (1016)	74.2 (1011)	82.8 (509)	71.7 (975)
Student has exercise notebook available today	84.4 (1169)	83.5 (538)	85.7 (1143)	94.9 (1265)	93.1 (581)	92.6 (1219)
Student reads books daily in the classroom or school library	42.7 (524)	58.3 (357)	47.5 (587)	52.8 (681)	62.4 (386)	55.4 (689)

Students' Reporting on Extracurricular Activities

The percentage of Grade 2 students who reported attending an afterschool learning club was 16–18% across the study arms (Table 18). Reading clubs, homework clubs, and math clubs were the most common afterschool learning activities reported by students across the study arms. When asked if they had received a certificate or award in school to celebrate progress in reading, 8% of Grade 2 students responded affirmatively.

The percentage of Grade 4 students who reported attending an afterschool learning club was 18–25% across the study arms. Reading clubs, homework clubs, and math clubs were the most common afterschool learning activities reported by students across the study arms. Among the Grade 4 students who reported attending an afterschool learning club, approximately 29–34% said they attended a reading club, 19–32% said they attended a homework club, and 17–32% said they attended a math club. When asked if they had received a certificate or award in school to celebrate progress in reading, 10–12% of Grade 4 students responded affirmatively.

Table 18. Students' Reporting on Extracurricular Activities, by Grade and Study Arm

	Grade 2			Grade 4		
	Comparison	School Feeding Only	Literacy +& School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
	n=1,394	n=666	n=1,368	n=1,357	n=616	n=1,323
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Attends afterschool learning club	17.2 (183)	16.2 (107)	18.6 (228)	20.3 (254)	18.7 (130)	25.2 (297)
Type of afterschool learning club student attends	Math club	19.0 (35)	21.5 (23)	18.4 (38)	17.5 (40)	32.1 (41)
	Science club	2.0 (2)	1.0 (1)	1.5 (2)	12.3 (21)	14.1 (16)
	Gardening club	0.9 (1)	1.3 (1)	0.0 (0)	1.3 (2)	0.4 (1)
	Reading club	23.3 (46)	35.7 (33)	35.9 (65)	29.4 (74)	33.7 (43)
	Homework club	35.4 (52)	15.8 (20)	9.7 (22)	32.7 (71)	27 (34)
	Other	1.6 (6)	10.3 (14)	13.4 (30)	5.1 (14)	13.3 (20)
Student received a certificate or award in school to celebrate progress in reading	8.4 (89)	8.8 (57)	8.7 (105)	10.6 (115)	16.2 (104)	12 (158)

Students' Perspectives on Instructional Support Received

The percentage of Grade 2 students who reported that the teacher uses Portuguese as the language of instruction was 83–88% across the study arms (Table 19). The percentage of students in each study arm who reported that the teacher uses another language of instruction (Macua or Changana) was 31–41%.

The percentage of Grade 4 students who reported that the teacher uses Portuguese as the language of instruction was 91–96% across the study arms. The percentage of students in each study arm who reported that the teacher uses another language of instruction (Macua or Changana) was 27–39%. Given the geographical spread of local languages, Table 19 also

shows that 0% of students in the School Feeding Only study arm reported that the teacher uses Macua to teach reading since students in this study arm are located in a region of Mozambique where Portuguese and other mother tongues are spoken.

When asked what the teacher does when the student is unable to answer a question, the most common responses among both Grade 2 and Grade 4 students across study arms were “Teacher hits the student” and “Teacher rephrases or explains a question.”

Table 19. Students’ Perspectives on Instructional Support Received, by Grade and Study Arm

		Grade 2			Grade 4		
		Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
		n=1,394	n=666	n=1,368	n=1,357	n=616	n=1,323
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Student-reported language teacher uses to teach reading in class	Portuguese	88.7 (1229)	87.3 (561)	83.9 (1148)	96.2 (1297)	96.6 (591)	91.2 (1222)
	Rhonga	0.1 (6)	0.7 (4)	0.5 (25)	0.2 (9)	0.3 (2)	0.5 (17)
	Changana	5.9 (101)	37.6 (309)	16.2 (266)	3.0 (60)	32.5 (227)	13.2 (196)
	Macua	31.7 (515)	0.0 (0)	41.5 (497)	27.5 (439)	0.0 (0)	39.1 (495)
	Other	3.3 (27)	0.1 (2)	0.3 (3)	0.6 (9)	0.0 (0)	0.8 (6)
According to student, what teacher does when child is unable to answer a question:	Teacher rephrases/ explains question	14.7 (207)	13.8 (72)	11.4 (210)	26.2 (327)	19.1 (105)	19 (272)
	Teacher provides example	14.0 (139)	7.5 (45)	5.9 (100)	14.7 (153)	8.6 (61)	8.0 (134)
	Teacher encourages child to try again	6.6 (84)	2.7 (16)	5.9 (91)	8.5 (104)	6.1 (37)	7.0 (100)
	Teacher asks another student	6.9 (95)	6.1 (31)	6.6 (87)	8 (92)	4.3 (20)	8.9 (101)
	Teacher asks again	7.5 (87)	5.0 (33)	6.3 (94)	8.4 (101)	9.4 (54)	8 (105)
	Teacher corrects student	8.1 (107)	10.3 (70)	7.2 (92)	11 (134)	18.4 (110)	11 (162)
	Teacher assigns a student helper	5.1 (69)	3.2 (10)	4.2 (52)	4.8 (54)	1.8 (11)	4.9 (59)
	Teacher hits the student	30.0 (441)	40.5 (294)	35.1 (505)	23.8 (379)	37.6 (250)	34.0 (474)
	Other	4.6 (54)	6.9 (35)	5.5 (74)	5.3 (68)	5.6 (33)	8.8 (94)

Students’ Home Literacy Practices

In general, similarities in Grade 2 students’ home literacy practices were found across the study arms (Table 20). Slightly more than half of Grade 2 students reported that someone at home helps with homework when needed. The percentage of Grade 2 students who said they bring home reading books from the classroom was 64–72% across the study arms. Among the Grade 2 students who reported that they bring home reading books from the

classroom, approximately 92–96% reported that the books are in Portuguese. When asked if they bring home books from the school library or book bank, the rate of affirmative responses was 12–14%. Among the Grade 2 students who reported that they bring home books from the school library or book bank, roughly 80–98% reported that the books are in Portuguese. Grade 2 students in all study arms reported that a language other than Portuguese is the most widely used at home.

When asked about how often they read at home, a higher percentage of Grade 2 students in the Comparison study arm (46%) and Literacy & School Feeding study arm (49%) responded “Never”, whereas half of Grade 2 students in the School Feeding Only study arm responded “Sometimes.” When asked about how often someone at home tells them a story, the percentage of Grade 2 students who responded “Never” was 46–49% across the study arms.

In general, similarities were found in Grade 4 students’ home literacy practices across the comparison and both intervention study arms. Slightly more than half of Grade 4 students reported that someone at home helps with homework when needed. The percentage of students who said they bring home reading books from the classroom was approximately 68–76% across the study arms. Among the students who said they bring home reading books from the classroom, across the study arms, roughly 96–98% also reported that the books are in Portuguese. When asked if they bring home books from the school library or book bank, the rate of affirmative responses across the study arms was 10–18%. Among the students who reported that they bring home books from the school library or book bank, approximately 95–100% reported that the books are in Portuguese. Grade 4 students reported that a language other than Portuguese is the most widely used at home.

Table 20. Students’ Home Literacy Practices, by Grade and Study Arm

		Grade 2			Grade 4		
		Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
		n= 1,394	n= 666	n=1,368	n=1,357	n=616	n=1,323
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Someone at home helps with homework when needed		62.0 (741)	58.6 (328)	52.4 (683)	61.2 (747)	59.5 (335)	57.7 (756)
Student brings home reading books from the classroom		64.9 (816)	65.2 (424)	72 (918)	68.4 (908)	74.8 (465)	76.8 (1000)
Language of classroom books brought home	Portuguese	96.4 (705)	96.6 (384)	92.5 (785)	98.1 (853)	98.7 (456)	96.2 (938)
	Rhonga	0.3 (3)	0.0 (0)	0.4 (6)	0.1 (3)	0.0 (0)	0.0 (0)
	Changana	0.6 (9)	3.1 (16)	2.1 (17)	0.1 (1)	1.2 (6)	0.0 (2)
	Other language	0.3 (3)	0.1 (1)	0.2 (2)	0.6 (4)	0.1 (1)	0.3 (2)
Brings home books from the school library/book bank		12.3 (137)	14.8 (91)	12.5 (128)	10.5 (111)	18.0 (88)	13.6 (135)

		Grade 2			Grade 4		
		Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
Language of school library/book bank books brought home	Portuguese	98.6 (129)	98.4 (85)	80.7 (104)	100 (110)	97.6 (84)	95.4 (126)
	Rhonga	0.8 (1)	0.0 (0)	0.3 (2)	0.0 (0)	0.0 (0)	0.4 (1)
	Changana	0.3 (1)	1.6 (3)	8.1 (7)	0.0 (0)	1.6 (2)	0.7 (3)
	Macua	0.3 (1)	0.0 (0)	9.2 (11)	0.0 (0)	0.0 (0)	3.5 (6)
	Other	0.0 (0)	0.0 (0)	1.7 (1)	0.0 (0)	0.7 (1)	0.0 (0)
Language child speaks at home	Portuguese	38.1 (357)	21.7 (81)	12.1 (146)	40.2 (365)	23.7 (83)	10.7 (123)
	Rhonga	0.7 (20)	1.2 (10)	0.9 (43)	0.9 (22)	0.6 (5)	1.1 (51)
	Changana	17.7 (321)	74.8 (552)	31.8 (477)	16.2 (304)	75.6 (522)	34.4 (471)
	Macua	43.1 (652)	0.0 (0)	54.8 (658)	42.0 (636)	0.0 (0)	53.1 (652)
	Other	0.5 (7)	2.2 (13)	-.5 (18)	0.7 (14)	0.1 (1)	0.7 (21)
Frequency student reads on his/her own at home	Never	46.3 (662)	38.4 (273)	49.8 (675)	31.9 (436)	26 (152)	29.7 (405)
	Sometimes	43.7 (547)	50.5 (283)	40.4 (519)	53.5 (676)	54.5 (339)	53.9 (705)
	Every day	9.9 (95)	11.0 (67)	9.8 (85)	14.6 (193)	19.5 (105)	16.5 (165)
Frequency someone tells the student a story at home	Never	49.3 (683)	46.4 (339)	48.1 (634)	44.3 (594)	42.2 (278)	43.6 (538)
	Sometimes	41.9 (547)	44.4 (265)	46.3 (599)	50.4 (644)	51.7 (289)	49.2 (662)
	Every day	8.8 (79)	9.2 (40)	5.6 (64)	5.3 (61)	6.2 (37)	7.3 (83)

When asked how often they read on their own at home, the percentage of Grade 4 students who responded “Sometimes” across the study arms was 53–54%. When asked how often someone at home tells them a story, the percentage of Grade 4 students who responded “Sometimes” ranged from 49% to 51%.

Students’ Reports on School Feeding and Hunger

Nearly all students in schools with School Feeding Only and Literacy & School Feeding reported that their school serves school meals, whereas approximately 7% of students in Comparison schools said that their school serves school meals (Table 21). Among the students reporting school meals, approximately three quarters of those in schools with School Feeding Only and Literacy & School Feeding interventions said their school served a meal yesterday or on the previous day they were in school. Porridge was the most common meal in schools with School Feeding Only or Literacy & School Feeding, whereas Comparison schools with a feeding program mainly served food other than porridge. Of the students who had school meals served at their schools, more than half—in some cases, more than two thirds—said they ate fewer meals at home when they received a school meal. Approximately 80–90% of students said they felt less hungry on days when they received a school meal.

We asked students if they felt hungry at the time of the interview, and affirmative responses ranged from 31% to 56% across study arms and grades. The percentage of students who

said their household had experienced hunger since the beginning of the school year was 8–21% across all study arms. Among those reporting household hunger, roughly 12–34% said it occurred every month.

Table 21. Student Responses on School Meals, Current Hunger, and Household Hunger, by Grade and Study Arm

		GRADE 2			GRADE 4		
		Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
		n=1,386	n=666	n=1,368	n=1,349	n=616	n=1,323
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
School serves school meals		6.9 (114)	98.5 (645)	96.7 (1317)	7.6 (111)	98.8 (605)	97.7 (1292)
School meal served yesterday ^a		58.9 (79)	79.7 (496)	74.6 (998)	66.9 (83)	74.8 (457)	71.0 (985)
Food served at school meal yesterday ^a	Porridge	28.5 (19)	99.4 (496)	96.9 (980)	38.6 (17)	98.9 (443)	97.1 (941)
	Porridge & other foods	2.2 (2)	0.2 (1)	1.4 (7)	4.0 (4)	0.4 (2)	1.0 (6)
	Other foods only	69.3 (56)	0.4 (2)	1.7 (28)	57.4 (62)	0.7 (2)	1.9 (28)
	Eats fewer meals at home when receives a school meal	54.1 (60)	69.6 (438)	46.0 (677)	63.0 (68)	69.2 (415)	52.7 (688)
	Feels less hungry on days when receives a school meal	89.0 (104)	90.9 (600)	83.1 (1107)	89.4 (102)	91.1 (556)	84.9 (1096)
	Feels hungry now ^b	55.9 (755)	40.3 (231)	51.9 (725)	46.1 (660)	30.8 (191)	39.9 (551)
	Household hunger	21 (273)	14.7 (94)	19 (243)	20.1 (243)	7.5 (48)	17.1 (216)
Household hunger frequency	Every month	28.7 (50)	15.3 (9)	16.5 (31)	26.7 (57)	12.2 (4)	33.5 (45)
	During the rainy season	20.3 (38)	12.2 (8)	15.4 (31)	13.2 (35)	15.2 (4)	14.4 (31)
	Other	50.9 (92)	72.6 (53)	68.1 (99)	60.0 (94)	72.6 (27)	52.0 (87)

^aThis is question was asked only if students reported that their school serves school meals.

^bWe used Bennett & Blissett (2014) to develop this question.

Student Nutrition Knowledge and Practices

Minimum dietary diversity, based on students' self-report, varied across study arms (Table 22). Higher percentages of Literacy & School Feeding (approximately 74%) and Comparison (approximately 69%) schools than School Feeding Only (approximately 54%) schools had achieved minimum dietary diversity on the previous day. The food groups consumed by the

fewest students were dairy products (18.5%) and eggs (23.5%), whereas grains, roots, and tubers were consumed by nearly all students (98.5%). Approximately 40–60% of students across the study arms and grades achieved minimum meal frequency on the previous day. Achievement of minimum acceptable diet was low: 31–50% across the study arms. On average, students had eaten four food groups and two to three meals on the previous day. Students’ knowledge of nutrition, based on topics covered in the curriculum, was low. On average, students correctly answered one out of eight nutrition knowledge questions.

Table 22. Student Nutrition Practices and Knowledge, by Grade and Study Arm

	GRADE 2			GRADE 4		
	Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
	n=1,386	n=666	n=1,368	n=1,349	n=616	n=1,323
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Minimum dietary diversity ^a	67.7 (905)	53.5 (356)	71.8 (899)	71.6 (930)	55.7 (348)	76.1 (937)
Minimum meal frequency ^b	42.8 (545)	55.3 (332)	57.4 (703)	56.9 (688)	57.5 (331)	62.4 (795)
Minimum acceptable diet ^c	34.1 (419)	30.5 (186)	46 (516)	45.2 (537)	36.0 (211)	49.6 (596)
	Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band
Dietary diversity	4.2 [±.1]	3.7 [±.2]	4.2 [±.1]	4.3 [±.1]	3.8 [±.2]	4.4 [±.1]
Meal frequency	2.4 [±.1]	2.6 [±.1]	2.7 [±.1]	2.6 [±.1]	2.7 [±.1]	2.8 [±.1]
Nutrition knowledge score (8 items)	0.7 [±.1]	0.4 [±.1]	0.4 [±.1]	1.3 [±.1]	1.0 [±.2]	0.7 [±.1]

Note: CI = confidence interval

^aMinimum dietary diversity is four or more of seven food groups (grains, roots, and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A-rich fruits and vegetables; and other fruits and vegetables).

^bMinimum meal frequency is three or more meals per day.

^cMinimum acceptable diet comprises individuals who have both minimum dietary diversity and minimum meal frequency.

Student Hygiene and Sanitation Knowledge and Practices

Among students in schools that provide school meals, less than half the students across all study arms said that they always wash their hands before eating their school meal (Table 23). Students’ knowledge of hygiene and sanitation was low to moderate, ranging from 2.5 to 3.5 items out of seven, on average. Grade 2 students had lower hygiene and sanitation knowledge than Grade 4 students.

Table 23. Student Hygiene and Sanitation Practices and Knowledge, by Grade and Study Arm

		GRADE 2			GRADE 4		
		Comparison	School Feeding Only	Literacy & School Feeding	Comparison	School Feeding Only	Literacy & School Feeding
		n=1,386	n=666	n=1,368	n=1,349	n=616	n=1,323
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Frequency of washing hands with soap or ash before school meal	Never	7.4 (7)	3.1 (28)	15.4 (158)	6.9 (5)	4.4 (27)	11.2 (126)
	Sometimes	44.6 (47)	54.8 (340)	49.1 (559)	45.8 (51)	47.0 (294)	45.4 (539)
	Always	48.1 (45)	42.1 (205)	35.5 (411)	47.3 (48)	48.6 (235)	43.4 (501)
		Mean ± 95% CI Band	Mean ± 95% CI Band	Mean ± 95% CI Band	Mean ± 95% CI Band	Mean ± 95% CI Band	Mean ± 95% CI Band
Hygiene and sanitation knowledge score (7 items)		2.9 [±.1]	2.6 [±.2]	2.5 [±.1]	3.5 [±.1]	3.5 [±.2]	3.1 [±.1]

Note: CI = confidence interval.

3.2.2 Teachers

Teacher Profile

Sixty percent of teachers interviewed in the Comparison study arm were female (Table 24), whereas less than half of teachers in the School Feeding Only and the Literacy & School Feeding study arms were female. The percentage of teachers who reported that they taught reading in Portuguese was 98–99% across study arms. The percentage of teachers who said they had attended and finished studies at a teacher training college (TTC) was 95–96% across the study arms. The percentage of teachers who reported they had received preservice training on the teaching of reading and writing to students in the primary grades was 58–61% across the study arms.

The percentage of teachers who reported attaining certification was 95–97% across groups. Less than 20% of teachers across the study arms attended an *Ajuda de Desenvolvimento de Povo para Povo* (Development Aid from People to People [ADPP])-supported TTC. The percentage of teachers who reported the certificate level as the highest level of academic education attained was 64–71% across the study arms.

Table 24. Teacher Profiles, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=331	n=163	n=312
		% (n)	% (n)	% (n)
Female teacher		60.4 (153)	36.8 (53)	47.8 (124)
Languages in which reading is taught	Portuguese	99.7 (300)	98.2 (144)	98.8 (288)
	Rhonga	9.1 (19)	2.4 (4)	3.6 (16)
	Changana	15.6 (47)	60.4 (93)	29.1 (74)
	Macua	28.2 (112)	0.0 (0)	39.9 (122)
	Other	0.0 (0)	0.0 (0)	1.6 (7)
Attendance of TTC	Did not attend TTC	1.8 (7)	1.8 (3)	1.4 (3)
	Still attends TTC	1.9 (3)	3 (3)	3.0 (6)
	Attended and finished TTC	96.3 (292)	95.3 (141)	95.5 (283)
	TTC teacher attended			
	IFP	77.5 (232)	87.9 (127)	78.5 (224)
	ADPP	13.3 (39)	9.7 (12)	16.3 (47)
	UP	9.2 (23)	2.4 (4)	5.3 (11)
Attainment of certification		97.4 (291)	97 (142)	95.7 (282)
Teacher is a currently trainees expected to graduate from a TTC—		7.7 (20)	4.7 (8)	6.1 (17)
TTC teacher is expected to graduate from	IFP	21.5 (5)	62.5 (5)	76.6 (14)
	ADPP	2.5 (1)	0.0 (0)	0.0 (0)
	UP	76.1 (12)	37.5 (3)	23.4 (5)
Highest level of academic education	Form 6 (Basic)	18.8 (78)	23.1 (37)	25.0 (76)
	Certificate	64.4 (192)	71.6 (105)	69.3 (199)
	Diploma	1.4 (2)	0.0 (0)	2.1 (6)
	Advanced diploma	15.4 (30)	5.3 (5)	3.4 (10)
	Other	0.0 (0)	0.0 (0)	0.2 (1)
During pre-service training, the teacher received specific training on how to teach reading and writing to students in the primary grades		61.4 (190)	60.9 (93)	58.9 (175)

Note: IFP = Instituto de Formação de Professores (Teacher Training Institute); TTC = teacher training college; UP = Universidade Pedagógica de Moçambique

Teacher Training

The percentage of teachers who reported that they attended an in-service training on how to teach reading in the primary grades varied across the three study arms (Table 25). Fifty-two percent of teachers in the Literacy & School Feeding arm, 38% of teachers in the School Feeding Only arm, and 26% of teachers in the Comparison arm reported that they attended an in-service training on how to teach reading in the primary grades. The percentages of teachers who attended a WV or PAI training were 70% in the Literacy & School Feeding arm,

63% in the School Feeding Only arm, and 10% in the Comparison arm. When asked if they received training on the fundamentals of reading instruction, the percentage of affirmative responses was 57–64% across study arms. The most common activities in which teachers participate during in-service training were analyzing the student exercise book, learning how to plan and prepare for a lesson, and learning how to assess students during the lesson.

Table 25. Teachers’ Reporting on Teacher Training, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=331	n=163	n=312
	% (n)	% (n)	% (n)
This year, the teacher attended any in-service training on how to teach reading in the primary grades	26.2 (87)	38.1 (54)	52.0 (157)
Teacher attended WV/PAI training	10.9 (29)	63.1 (90)	70.3 (212)
Teacher received training on the fundamentals of reading instruction	57.5 (174)	58.0 (91)	64.0 (190)
Types of activities teacher participates in during in-service training	Analysis of curriculum and syllabus	35.1 (109)	47.3 (68)
	Analysis of teacher guide	22.9 (71)	29 (42)
	Practice teaching lessons from the teacher guide	23.4 (63)	22.5 (33)
	Analysis of the student exercise book	35.9 (114)	61.5 (89)
	How to plan and prepare for a lesson	64.6 (208)	81.1 (121)
	Improvisation and use of teaching and learning aids	35.2 (126)	55.6 (80)
	How to assess students during the lesson	41.7 (147)	65.1 (100)
	How to use assessments to adjust instruction	23.1 (80)	40.8 (63)
	How to give students feedback	22.6 (67)	42.6 (66)
	How to use supplementary readers/decodable texts	25.2 (87)	29.6 (48)
	How to apply new strategies for reading instruction	26.8 (80)	33.7 (52)

Teacher Absenteeism

Across study arms, 21–28% of teachers were absent from school during the last week, and 13–17% of teachers were late to school during the last week (Table 26).

Table 26. Teacher-reported Absenteeism, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=331	n=163	n=312
	% (n)	% (n)	% (n)
Teacher absent from school any day last week	20.7 (57)	27.8 (43)	24.3 (73)
Teacher late to school any day last week	15.7 (46)	17.2 (26)	13.2 (46)

Note: CI = confidence interval.

Teacher Access to School Supplies and Learning Materials

The percentage of teachers who reported that they have access to a teacher guide was 51–58% across study arms (Table 27). A higher percentage of teachers in the School Feeding Only study arm (72%) reported that students have exercise books that can be used during reading instruction than in the Comparison (58%) and Literacy & School Feeding (65%) study arms. Higher percentages of teachers in the School Feeding Only arm (95%) and the Literacy & School Feeding arm (95%) reported having access to school supplies than in the Comparison arm (87%). Among the teachers who reported having access to school supplies, most reported access to supplies such as pens/pencils, notebooks, and chalk. Teachers across the study arms reported low access to school supplies such as paint, markers, and chart paper. The percentage of teachers across the study arms who reported access to supplementary readers was 72–88%.

Table 27. Teacher Access to Supplies and Learning Materials, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=331	n=163	n=312
	% (n)	% (n)	% (n)
Teacher has a teacher guide for reading instruction	51.8 (156)	51.5 (76)	58.2 (162)
Students have exercise books that can be used during reading instruction	58.2 (164)	72.0 (107)	65.7 (192)
Teacher has access to school supplies	87.6 (270)	95.2 (138)	95.7 (273)
Supplies the teacher can access			
Pens/pencils	91.9 (243)	93.1 (129)	88.3 (251)
Notebooks	88.7 (239)	88.7 (123)	83.8 (229)
Chalk	83.8 (225)	75.6 (104)	84.3 (234)
Cardboard	73.6 (196)	78.1 (106)	66.7 (188)
Paint	7.1 (26)	31.9 (48)	13.9 (43)
Markers	9.7 (31)	25.6 (38)	21.9 (66)
Chart paper	27.1 (80)	45.6 (67)	40.2 (118)
Other	12.5 (42)	10.0 (15)	16.5 (54)
Supplementary readers available for use in this classroom	72.7 (51)	88.7 (50)	78.0 (105)

Teacher Use of School Supplies and Learning Materials

The percentage of teachers who said they used the teacher guide for reading instruction varied across the study arms (Table 28). Fifty-two percent of teachers in the Comparison arm, 48% of teachers in the School Feeding Only arm, and 60% of teachers in the Literacy & School Feeding arm reported that they used the teacher guide for reading instruction. The percentage of teachers who reported that students use the exercise books during reading instruction was 75–86% across the study arms. The percentage of teachers who reported using school supplies during reading instruction was 91–97% across the study arms. Of the teachers who said that they used school supplies during reading instruction, most reported using supplies such as pens/pencils, notebooks, chalk, and cardboard. Teachers across the study arms reported low use of school supplies such as paint, markers, and chart paper. Among the teachers who reported using school supplies during reading instruction, most indicated that they used supplementary readers once a week.

Table 28. Teacher Use of School Supplies and Learning Materials, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
Count		n=331	n=163	n=312
Estimates		% (n)	% (n)	% (n)
Teacher uses the teacher guide for reading instruction		52.9 (163)	48.2 (74)	60.8 (168)
Student use the exercise books during reading instruction		75.3 (218)	86.9 (126)	83.2 (239)
Teacher uses school supplies during reading instruction		91.2 (283)	95.2 (138)	97.1 (280)
Teacher uses the following school supplies	Pens/pencils	69.9 (202)	68.1 (91)	74.2 (205)
	Notebooks	71.0 (202)	65.0 (87)	65.5 (185)
	Chalk	77.6 (219)	80.0 (111)	80.2 (229)
	Cardboard	79.9 (231)	83.1 (115)	70.7 (203)
	Paint	12.3 (35)	20.6 (31)	11.7 (36)
	Markers	10.1 (28)	15.0 (22)	17.0 (49)
	Chart paper	28.3 (78)	49.4 (72)	39.8 (113)
	Other	11.6 (40)	11.9 (19)	18.1 (61)
Frequency students use supplementary readers in this classroom	Never	2.2 (3)	4.8 (3)	6.6 (11)
	Once a week	72.7 (51)	88.7 (50)	78.0 (105)
	Every day	25.1 (21)	6.5 (4)	15.4 (26)

Extracurricular Activities

The percentage of teachers who reported that special events are held at the school to celebrate students' progress in reading was 33–49% across the study arms (Table 29). Sixty-two percent of teachers in the Comparison arm, 79% of teachers in the School feeding Only arm, and 48% of teachers in the Literacy & School Feeding arm reported that students received a certificate or award in school to celebrate their progress in reading. Nineteen

percent of teachers in the Comparison arm, 19% of teachers in the School Feeding Only arm, and 30% of the teachers in the Literacy & School Feeding arm reported that special events are held at the school to celebrate students' school attendance. Among those, lower percentages of teachers in Literacy & School Feeding (45%) and School Feeding Only (67%) groups reported that students in their class had received a certificate or award in school to celebrate improvement in attendance than in the Comparison arm (82%).

The percentage of teachers who reported the existence of an afterschool club in the school varied across the three study arms. Seventeen percent of teachers in Comparison schools, 40% of teachers in School Feeding Only schools, and 60% of teachers in Literacy & School Feeding schools reported that an afterschool club exists in the school. Among the teachers who reported an afterschool literacy club in the school, most teachers across the study arms said that half the students in their class attend an afterschool literacy club.

Table 29. Teachers' Reporting on Extracurricular Activities, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=331	n=163	n=312
		% (n)	% (n)	% (n)
Special events held at this school to celebrate students' progress in reading		33.9 (95)	48.5 (71)	49.3 (131)
Students in this class received a certificate or award in school to celebrate progress in reading		62.9 (65)	79.5 (56)	48.6 (71)
Special events held at this school to celebrate students' school attendance		19.3 (59)	19.1 (28)	30.5 (82)
Students in this class received a certificate or award in school to celebrate improvement in attendance		81.7 (43)	67.7 (19)	45.5 (40)
Afterschool literacy club in this school		17.4 (37)	40.7 (60)	60.5 (167)
Number of students who attend an afterschool literacy club in this class	None	3.3 (1)	5.5 (2)	3.1 (3)
	Half	61.2 (7)	60.0 (27)	73.0 (98)
	More than half	29.2 (4)	20 (10)	12.6 (19)
	All	6.3 (2)	14.5 (8)	11.2 (16)

Teacher Perspectives on Supervision and Support

The percentage of teachers who reported that the HT or assistant HT checked lesson plans was 97–98% across the study arms (Table 30). Among those teachers, higher percentages of teachers in the School Feeding Only and Literacy & School Feeding arms responded that the HT checks lesson plans once every week, whereas a higher percentage of teachers in the Comparison arm responded that the HT checks lesson plans daily. When asked whom they

consult when help is needed, in each study arm, most teachers reported that they discuss issues casually with other teachers.

When asked about the frequency with which classroom observations have been conducted by the assistant HT or HT since the beginning of the school year, in all study arms, most teachers responded that classroom observations occurred once per trimester. The percentage of teachers who reported that they received feedback from the HT or assistant HT was 92–96% across the study arms. In all study arms, higher percentages of teachers responded “Never” when asked about the frequency of reading coach visits conducted since the beginning of the school year.

Table 30. Teacher Perspectives on Supervision and Support, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=331	n=163	n=312
		% (n)	% (n)	% (n)
Does the HT or assistant HT check lesson plans		98.8 (294)	98.8 (144)	97.2 (278)
Frequency at which HT checks lesson plans	Once every 2–3 months	3.8 (11)	6.3 (6)	10.5 (25)
	Once every month	10.3 (29)	11.3 (17)	11.6 (36)
	Once every 2 weeks	14.0 (42)	15.7 (23)	12.4 (34)
	Once every week	30.3 (82)	39.0 (56)	39.7 (107)
	Daily	41.6 (126)	27.7 (40)	25.8 (73)
Person the teacher consults when help is needed	Never need help	0.6 (2)	0.6 (1)	0.4 (2)
	There is no one to ask for help.	1.2 (6)	0.6 (1)	0.0 (0)
	Discuss casually with other teachers	78.0 (226)	78.7 (112)	72.8 (211)
	Discuss at meetings with other teachers	37.6 (108)	34.3 (52)	33.8 (96)
	Reading coach	1.1 (4)	1.8 (2)	1.2 (4)
	Assistant HT	31.6 (97)	30.2 (45)	37.5 (114)
	HT	8.8 (36)	26.6 (41)	13.3 (48)
Since the beginning of the school year, frequency of classroom teaching observations by the assistant HT or HT	Never	16.1 (37)	13.7 (15)	6.2 (21)
	Once per trimester	50.4 (163)	44 (64)	56 (154)
	Monthly	20.7 (51)	25.6 (41)	28 (78)
	Weekly	12.8 (46)	16.7 (26)	9.8 (35)
Provision of feedback from HT or assistant HT		92.6 (236)	94.4 (123)	96.6 (254)
Since the beginning of the school year, frequency of reading coach visits	Never	82.9 (225)	72.0 (101)	61.1 (169)
	Once per trimester	11.3 (33)	14.0 (19)	15.9 (46)
	Monthly	5.1 (16)	7.0 (7)	12.6 (29)
	Weekly	0.8 (4)	7.0 (10)	10.4 (32)

Note: HT = head teacher.

Teacher Knowledge and Skills

When asked if they could name the core reading skills, no teacher in any study arm reported being able to do so (Table 31). However, the percentage of teachers who named letter knowledge as a core reading skill was 58–66% across study arms. Less than half of HTs across the study arms named phonemic awareness, fluency, or comprehension as core reading skills.

When asked about how they measure students' reading and writing progress, more than half of the teachers across the study arms reported using written tests and oral evaluations. When asked about how they check for student understanding during lessons, more than half of the teachers across the study arms reported asking questions of individual students.

When asked about the techniques used to teach a new vocabulary word, teachers across the study arms gave varied responses. More teachers in the Comparison arm (54%) reported providing a verbal explanation, whereas a higher percentage of teachers in the School Feeding Only arm (49%) reported using real objects. Finally, a higher percentage of teachers in the Literacy & School Feeding arm (55%) reported using pictures.

Table 31. Teacher Knowledge and Skills, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=331	n=163	n=312
		% (n)	% (n)	% (n)
Teacher can name the core reading skills		0.0 (0)	0.0 (0)	0.0 (0)
The reading skills the teacher can name	Letter knowledge	64.8 (195)	58.6 (89)	66.6 (195)
	Phonemic awareness	34.5 (98)	25.4 (38)	34.1 (112)
	Fluency	23.1 (65)	15.4 (23)	21.3 (72)
	Vocabulary	35.1 (114)	37.3 (57)	51.5 (146)
	Comprehension	43.1 (128)	37.3 (57)	35.3 (101)
Grade level at which the teacher expects children to read text in the target language fluently	Grade 1	7.1 (15)	5.9 (9)	4.5 (13)
	Grade 2	37.6 (102)	32.0 (45)	22.0 (57)
	Grade 3	25.1 (70)	27.2 (44)	42.4 (115)
	Grade 4 or higher	30.1 (111)	34.9 (49)	31.2 (94)
Grade level at which the teacher expects students to write a coherent and comprehensible short story correctly	Grade 1	4.3 (6)	3.6 (5)	2.5 (8)
	Grade 2	23.1 (62)	20.8 (31)	17.1 (45)
	Grade 3	28.4 (82)	29.2 (47)	35.2 (87)
	Grade 4 or higher	44.3 (144)	46.4 (63)	45.2 (142)
Ways the teacher measures students' reading and writing progress	Written tests	64.1 (198)	60.9 (93)	70.0 (199)
	Oral evaluations	66.7 (211)	66.9 (95)	62.1 (181)
	Observation	40.6 (122)	34.3 (51)	40.6 (126)
	Portfolios and other projects	4.1 (16)	5.9 (10)	4.4 (18)
	Homework	36.8 (111)	31.4 (45)	34.9 (95)

		Comparison	School Feeding Only	Literacy & School Feeding
	Classwork	31.1 (99)	30.2 (45)	32.4 (91)
	End-of-unit evaluation	6.0 (17)	5.3 (9)	5.5 (17)
	End-of-term evaluation	2.6 (11)	3.0 (4)	5.8 (16)
Ways the teacher checks for student understanding during the lesson	Ask questions of individual students	57.7 (187)	56.8 (81)	56 (174)
	Ask questions of whole class	46.4 (141)	40.8 (57)	38.9 (107)
	Ask questions of students in groups	25.3 (76)	25.4 (35)	25.6 (80)
	Give students a task and correct the written responses before the end of the lesson	32.6 (118)	43.8 (65)	36.3 (102)
	Give students a task and correct the written responses after the end of the lesson	21.2 (62)	35.5 (47)	25.6 (71)
	Other	7.7 (23)	7.1 (12)	8.8 (29)
Ways the teacher uses the results of students' oral and written assessments in instruction	Grade students	54.1 (171)	47.3 (74)	46.9 (135)
	Evaluate students' understanding of subject matter	59.8 (178)	56.8 (81)	53.5 (159)
	Plan teaching and learning activities	23.3 (76)	27.2 (37)	29.1 (82)
	Adapt teaching to better suit students' needs	21.3 (66)	36.7 (50)	21.4 (73)
	Arrange students in ability groups	4.7 (16)	3.6 (6)	7.0 (19)
	Other	12.0 (34)	3.6 (6)	5.1 (18)
Techniques teacher uses to teach a new vocabulary word	Pictures	40.6 (140)	43.2 (65)	55 (156)
	Realia	40.1 (131)	49.7 (72)	47.1 (141)
	Gestures	26.1 (77)	23.7 (38)	20.4 (75)
	Verbal explanation	54.9 (158)	49.1 (74)	51.9 (161)
	Other	15.7 (58)	13.6 (21)	12.9 (42)
Frequency of teacher switching between official language of instruction and a vernacular language during the teaching and learning process	Never	15.0 (29)	6.6 (8)	3.7 (8)
	Occasionally	58.3 (185)	63.5 (94)	67.8 (189)
	Often	21.1 (66)	22.2 (32)	18.8 (65)
	All of the time	5.6 (20)	7.8 (12)	9.7 (28)
Teacher's rating of students' reading skills in the target language of instruction	Weak	12.8 (47)	13.7 (18)	11.8 (39)
	Average	75.2 (223)	75.6 (112)	81.4 (231)
	Strong	8.9 (25)	9.5 (14)	6.8 (21)
	Not applicable—does not teach in the target language	3.1 (5)	1.2 (2)	0.0 (0)
Teacher's rating of students' writing skills in the target language of instruction:	Weak	11.9 (39)	12.4 (20)	9.2 (30)
	Average	71 (224)	72.8 (106)	73.5 (215)
	Not applicable—does not teach in the target language	13.9 (35)	13.6 (19)	17.1 (46)

The percentage of teachers across the study arms who reported that they occasionally switch between the official language of instruction and a local language was 58–67%. Across

the study arms, 75–81% of teachers rated their students’ reading skills as average. Similarly, the percentage of teachers across the study arms who rated their students’ writing skills as average was 71–73%. Interestingly, while students were generally not competent in basic reading skills, teachers think their students’ reading performance is average. When asked at what grade level the teacher expects children to read text in the target language fluently, teachers’ responses varied. A higher percentage of teachers in the Comparison arm (37%) reported that by Grade 2, students should be able to read text in the target language fluently, whereas relatively more teachers in the School Feeding Only arm (34%) reported that students should be capable of this skill by Grade 4. In contrast, a higher percentage of teachers in the Literacy & School Feeding arm (42%) reported that students should be able to read text in the target language fluently by Grade 3.

The percentage of teachers across the study arms who reported that students should be able to write a coherent and comprehensible short story correctly by Grade 4 or higher was 44–46% across study arms.

Teachers’ Perceptions of Student Attentiveness

Across the study arms, we asked teachers about their students’ attentiveness in general. In addition, we asked teachers in the School Feeding Only and Literacy & School Feeding schools about their students’ attentiveness in relation to the school meal. The percentage of teachers who reported that more than half of students are generally attentive in class was 62–66% across the study arms (Table 32). Teachers most often determined that students are attentive in class when students are seated facing and making eye contact with the teacher. In School Feeding Only and Literacy & School Feeding schools, less than 40% of the teachers said that the school meal makes their students more attentive, approximately 40% said the meal does not change student attentiveness, and approximately 20% said it makes their students less attentive.

Table 32. Teacher Perceptions of Student Attentiveness, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=331	n=163	n=312
		% (n)	% (n)	% (n)
Students are attentive in class		91.8 (282)	97.0 (143)	96.1 (278)
Approximate number of students who are generally attentive in this class	Less than half	7.7 (23)	4.3 (7)	9.1 (24)
	Half	20.4 (64)	5.5 (8)	12.0 (37)
	More than half	63.4 (170)	66.9 (93)	62.6 (173)
	All	8.5 (22)	23.3 (34)	16.3 (43)
Ways teacher gauges if students are attentive in class	Students are seated facing and making eye contact with the teacher.	55.8 (162)	59.8 (86)	47.9 (141)
	Students actively listen and act upon teacher directions.	38.1 (137)	41.4 (59)	37.4 (122)

		Comparison	School Feeding Only	Literacy & School Feeding
	Students are working independently, in pairs, or in small groups on the current learning activity.	14.8 (46)	14.8 (24)	13.1 (39)
	Students respond to questions posed by the teacher.	43.1 (139)	42.6 (67)	43.1 (132)
	Students ask the teacher or another student for help related to the current learning activity.	14.6 (49)	10.1 (15)	18.7 (53)
	Students ask the teacher questions related to the current learning activity.	16.8 (51)	13.6 (21)	13.0 (41)
	Students are reading.	2.6 (11)	8.3 (10)	6.3 (18)
	Students are writing.	4.7 (20)	4.1 (7)	4.2 (15)
	Students are listening to a story.	2.1 (8)	0.6 (1)	3.5 (11)
	Other	9.0 (27)	3.0 (5)	6.1 (19)
Student attentiveness in relation to the school meal	Students are more attentive after the school meal.	-	37.2 (55)	36.6 (108)
	Students are less attentive after the school meal.	-	21.3 (28)	22.7 (65)
	Students show the same attentiveness before and after lunch	-	41.5 (59)	40.7 (104)

School Conditions

We asked teachers about a variety of potential issues with the school's physical structure and relationships both between the school leadership and the community and among students. The most common issues identified with school conditions were the structure of the school buildings and lack of clean drinking water (Table 33). Issues with school structures affected approximately 60% of schools, across study arms. In terms of the lack of clean drinking water, School Feeding Only schools were most affected (41%), followed by Comparison schools (33%) and Literacy & School Feeding schools (26%). Other issues, such as issues related to latrines and relationships with parents, affected less than one third of the schools, with Comparison schools being the most affected, followed by School Feeding Only schools and Literacy & School Feeding schools.

Table 33. Teacher-reported School Conditions, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=329	n=163	n=312
	% (n)	% (n)	% (n)
Issues with structure of school buildings	60.0 (196)	62.1 (96)	63.3 (177)
Issues with the surrounding area	21.5 (73)	15.4 (25)	9.6 (32)
Lack of clean drinking water	32.9 (122)	41.4 (67)	25.7 (93)
Issues with latrines for boys	31.3 (105)	15.4 (25)	9.4 (30)
Issues with latrines for girls	26.8 (90)	14.2 (22)	10.0 (33)
Issues with latrines for teachers	29.4 (96)	19.5 (31)	12.5 (36)
Poor relationships with parents/community	16.6 (56)	10.7 (18)	11.2 (34)
Bullying at school	3.6 (10)	3.0 (4)	3.8 (10)
Other	19.9 (76)	24.3 (36)	29.7 (94)

Nutrition, Health, and Hygiene Teaching

The percentage of teachers trained to teach about nutrition varied widely across the three study arms (Table 34). Seventy-two percent of teachers in School Feeding Only schools, 52% of teachers in Literacy & School Feeding schools, and 12% of teachers in Comparison schools said they were trained to teach nutrition. The percentage of teachers who had lesson plans or other materials for teaching nutrition lessons was 27–36% across the study arms. Of the teachers who said they had nutrition lesson plans, across the study arms, 13–29% were unable to show any such lesson plans. Among the teachers who said they had lesson plans, 70% in the Literacy & School Feeding and 80% in the School Feeding Only schools had other materials, such as picture cards or posters for teaching nutrition. A higher percentage of teachers in School Feeding Only schools taught nutrition at least once per week (70%) compared to Literacy & School Feeding schools (58%) and Comparison schools (49%). A higher percentage of teachers in School Feeding Only schools (73%) rated their students' knowledge of nutrition as average compared to Literacy & School Feeding and Comparison schools (approximately 51%).

Overall, fewer teachers reported that they were trained to teach about hygiene and sanitation than about nutrition. A higher percentage of teachers in School Feeding Only schools (39%) said they were trained to teach about hygiene and sanitation than in Literacy & School Feeding (30%) or Comparison (23%) schools. The percentage of teachers who had lesson plans for teaching about hygiene and sanitation was low: 24–29% across the study arms. Of the teachers who said they had hygiene and sanitation lesson plans, across the study arms, 13–33% did not have lesson plans that they could show to the interviewer. Approximately three quarters of the teachers in the School Feeding Only and Literacy & School Feeding study arms had other materials, such as posters or picture cards, for teaching about hygiene and sanitation. In contrast, just 41% of teachers in Comparison

schools had these materials. Sixty-seven percent of teachers in the School Feeding Only group teach about hygiene and sanitation at least once per week compared to approximately 55% of teachers in the Literacy & School Feeding and Comparison study arms. A higher percentage of teachers in School Feeding Only schools (65%) rated their students' knowledge of hygiene and sanitation as average compared to those in the Literacy & School Feeding and Comparison schools (roughly 56%).

Table 34. Teacher-reported Nutrition and Hygiene Teaching, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=329	n=163	n=312
	% (n)	% (n)	% (n)
Trained on teaching about nutrition	12.4 (35)	72.2 (105)	52.1 (153)
Has lesson plans or other materials for teaching nutrition lessons	26.6 (66)	32.1 (49)	36.4 (109)
Able to show			
All nutrition lesson plans	34.8 (23)	28.6 (13)	24.0 (24)
Some nutrition lesson plans	45.9 (27)	58.9 (31)	46.9 (51)
No nutrition lesson plans	19.3 (16)	12.5 (6)	29.1 (35)
Has other materials for teaching nutrition, such as picture cards or posters	35.8 (25)	80.4 (40)	69.9 (75)
Frequency of nutrition lessons			
Daily	4.1 (8)	12.8 (19)	9.8 (21)
A few times per week	32.3 (71)	27.4 (43)	25.1 (67)
Once per week	12.3 (34)	29.3 (40)	22.9 (64)
A few times per month	17.9 (46)	17.7 (21)	16.2 (44)
Once per month	5.3 (12)	2.4 (4)	4.9 (14)
Less than once per month	7.4 (22)	3.0 (5)	1.8 (8)
Rating of students' knowledge of nutrition			
Weak	38.3 (120)	18.4 (25)	41.3 (112)
Average	52.2 (137)	72.8 (100)	51.2 (146)
Strong	9.6 (23)	8.9 (13)	7.5 (22)
Trained on teaching about hygiene and sanitation	23.1 (56)	38.5 (57)	29.9 (96)
Has lesson plans or other materials for teaching hygiene and sanitation lessons	29.0 (72)	23.7 (35)	27.7 (88)
Able to show			
All hygiene and sanitation lesson plans	30.2 (24)	32.5 (10)	22.9 (22)
Some hygiene and sanitation lesson plans	37.0 (32)	55.0 (20)	56.2 (49)
No hygiene and sanitation less plans	32.8 (19)	12.5 (5)	20.9 (19)

	Comparison	School Feeding Only	Literacy & School Feeding
Has other materials for teaching hygiene and sanitation, such as picture cards or posters	40.8 (33)	72.5 (24)	77.6 (66)
Frequency of hygiene and sanitation lessons			
Daily	20.9 (49)	27.2 (36)	18.1 (49)
A few times per week	19.2 (53)	19.5 (31)	18.9 (56)
Once per week	15.4 (50)	20.7 (30)	17.4 (56)
A few times per month	21.1 (66)	19.5 (30)	18.4 (50)
Once per month	2.6 (9)	3.0 (5)	4.6 (14)
Less than once per month	1.4 (5)	1.2 (2)	1.9 (8)
Rating of students' knowledge of hygiene and sanitation			
Weak	22.0 (79)	15.0 (24)	28.6 (79)
Average	56.6 (169)	65.0 (89)	56.2 (164)
Strong	21.4 (43)	20.0 (26)	15.2 (37)

3.2.3 Head Teachers

School Profile

We asked our sample of Grade 2 and 4 teachers for information about their individual characteristics, and we also asked HTs to provide data on all teachers in their schools and school amenities. The average number of teachers per school varied across the study arms (Table 35).

Table 35. Number of Teachers and Classes per Grade, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=175	n=85	n=169
	Mean ± 95% CI	Mean ± 95% CI	Mean ± 95% CI
Total teachers	12.7 [±1.1]	6.7 [±1.0]	10.1 [±.7]
Male	6.1 [±.4]	4.4 [±.6]	5.8 [±.3]
Female	6.7 [±.8]	2.4 [±.5]	5.1 [±.6]
Number of teachers currently teaching Grade 2	2.3 [±.2]	1.2 [±.1]	1.9 [±.1]
Number of teachers currently teaching Grade 4	1.8 [±.1]	1.1 [±.0]	1.5 [±.2]
Number of Grade 2 classes (streams)	2.3 [±.2]	1.4 [±.2]	1.9 [±.1]
Number of Grade 4 classes (streams)	1.7 [±.1]	1.3 [±.2]	1.4 [±.1]

Note: CI = confidence interval.

School Feeding Only schools had the fewest teachers (approximately 7), whereas Comparison schools had the most (approximately 13). The numbers of male and female

teachers were evenly split in Literacy & School Feeding and Comparison schools, but there were fewer female than male teachers in School Feeding Only schools. Schools had slightly more Grade 2 than Grade 4 teachers, but the number of teachers for each grade was one–two across arms. The number of classes per grade (streams) mirrored the number of teachers.

We asked HTs to report about health-related amenities and activities at their schools, including school gardens, deworming, latrines, and tippy taps. The percentage of schools with gardens varied across the study arms (Table 36). More Comparison schools had gardens (50%) than Literacy & School Feeding (41%) or School Feeding Only (29%) schools. Comparison and Literacy & School Feeding schools tended to have gardens during the rainy season only (91% and 65%, respectively), whereas School Feeding Only schools more often had year-round gardens (76%). The majority of HTs in schools with gardens said they use the produce for school meals only when garden products are available.

Most schools coordinate with local health facilities to provide deworming medication to students. Higher percentages of School Feeding Only (89%) and Literacy & School Feeding (87%) schools ensured that students were dewormed than Comparison schools (75%). Similarly, more School Feeding Only (88%) and Literacy & School Feeding (87%) schools than Comparison schools (64%) facilitated the deworming of students during this school year.

Higher percentages of School Feeding Only (82%) and Literacy & School Feeding (87%) schools had improved latrines than Comparison schools (39%). Among schools with improved latrines, the average numbers of latrines were 3.1 in School Feeding Only, 4.3 in Literacy & School Feeding, and 4.6 in Comparison schools. Based on interviewers' observations, the percentage of schools with clean latrines was low overall but higher in the intervention study arms (44% in School Feeding Only and 42% in Literacy Plus School Feeding) than in the Comparison study arm (27%). Of the schools with improved latrines, the numbers of schools with tippy taps or hand-washing stations near the latrines were low (41% and 45% in intervention schools and 32% in Comparison schools), and few of these schools had ash or soap at all the tippy taps or hand-washing stations (9–28% across study arms).

Table 36. Head Teachers' Report of Health-related Amenities and Activities at Schools, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=175	n=85	n=169
		% (n)	% (n)	% (n)
School has a garden		50.0 (83)	29.4 (25)	41.4 (69)
Period garden operates	In rainy season only	91.4 (75)	24.0 (6)	65.4 (44)
	Year round	8.6 (8)	76.0 (19)	34.6 (25)
Use of garden to	Every day	0.0 (0)	0.0 (0)	1.4 (1)
	3–4 times per week	2.3 (2)	4.0 (1)	1.4 (1)

supply food for school meals ^a	1–2 times per week	0.0 (0)	8.0 (2)	5.7 (4)
	Never	22.1 (18)	8.0 (2)	13.1 (9)
	During the rainy season	20.9 (16)	8.0 (2)	16.2 (11)
	Only when school garden products are available	47.4 (37)	72.0 (18)	58.0 (39)
Students are given deworming medication		74.7 (130)	89.4 (76)	87.0 (144)
Students received deworming medication at least once during this school year		64.3 (113)	88.2 (75)	81.2 (137)
School has improved latrines		38.9 (71)	82.4 (70)	86.5 (146)
Cleanliness of latrines	All latrines are dirty with feces on the slabs	17.1 (12)	11.4 (8)	13 (19)
	Some latrines are dirty	56.1 (40)	44.3 (31)	45.4 (66)
	All latrines are clean with no feces on the slabs	26.9 (19)	44.3 (31)	41.5 (61)
	School has tippy taps or hand-washing stations near improved latrines ^b	32.4 (23)	41.3 (29)	45.2 (65)
	All tippy taps or hand-washing stations have ash or soap ^c	8.5 (2)	27.6 (8)	9.0 (6)

Note: HT = head teacher.

^aUse of garden to supply food for school meals includes schools with a school garden. Some schools without school feeding but with gardens provide students with food from the garden when it is available.

^bOf the schools with improved latrines.

^cOf the schools with improved latrines and tippy taps.

Head Teacher Training

In the Literacy & School Feeding arm, approximately 50% of the HTs attended WV or PAI training (Table 37). Among the HTs who reported attending WV or PAI training, 47% reported attending the training during this academic year. In the School Feeding Only arm, none of the HTs reported attending WV or PAI training this academic year.

HTs reported receiving training on the fundamentals of reading instruction (37–53%), school management (69–82%), and the importance of access to and use of school supplies and materials (25–38%) across the arms.

Table 37. HT Training, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=175	n=85	n=169
	% (n)	% (n)	% (n)
% of HTs who attended WV or PAI training	1.1 (2)	0.0 (0)	50.9 (83)
% of HTs who attended training this academic year	0.0 (0)	0.0 (0)	47.9 (78)
% of HTs who received training on the fundamentals of reading instruction	37.3 (63)	34.9 (29)	53.4 (89)
% of HTs who report receiving training on school management	68.1 (119)	82.1 (69)	69.3 (117)
% of HTs who report receiving training about the importance of access to and use of school supplies and materials	26.9 (47)	24.7 (21)	38.7 (65)

Note: HT = head teacher; PAI = Planet Aid Incorporated; WV = World Vision.

Head Teachers' Knowledge and Skills

The percentage of HTs who reported they could name the core reading skills was 76–93% across the study arms (Table 38). However, when asked to name the core reading skills, few HTs across the study arms could do so. HTs in the Literacy & School Feeding arm named more of the core reading skills than HTs in the School Feeding Only and Comparison arms.

Table 38. HTs' Knowledge and Skills, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=175	n=85	n=169
		% (n)	% (n)	% (n)
HTs able to name the core reading skills		93.7 (57)	76.9 (20)	90.7 (75)
Core reading skills named by HTs	Letter knowledge	5.9 (11)	4.7 (4)	21.4 (35)
	Phonemic awareness	10.2 (18)	8.2 (7)	30.9 (51)
	Fluency	5.9 (11)	9.4 (8)	21.8 (36)
	Vocabulary	15.1 (27)	17.6 (15)	30.9 (51)
	Comprehension	17.1 (30)	15.3 (13)	22.2 (37)
	Other	11 (19)	9.4 (8)	7.1 (12)
Ways HTs identify academic progress	Classroom observation	58.3 (102)	48.2 (41)	62.5 (105)
	Monitor student results on tests given by teachers	55.9 (98)	50.6 (43)	48.1 (82)
	Evaluate students orally myself	32.3 (55)	29.4 (25)	41.5 (69)
	Check students' assignments or homework	32.7 (56)	32.9 (28)	24.8 (42)
	Teachers provide progress reports	35.8 (64)	36.5 (31)	26.3 (45)
	End-of-term evaluations	37.9 (66)	28.2 (24)	32.6 (55)
	Feedback from parents	7.0 (12)	0.0 (0)	1.2 (2)
	Feedback from school counselors	5.3 (9)	3.5 (3)	0.0 (0)
	Feedback from school committees	1.1 (2)	1.2 (1)	0.6 (1)
	Other	14.8 (27)	16.5 (14)	12.4 (21)

Note: HT = head teacher.

Across the study arms, the most common approaches that HTs reported using to identify academic progress were conducting classroom observations and monitoring student results on tests given by teachers.

Head Teachers' Reporting on the Training of Teachers

The percentage of HTs who reported that teachers in their schools attended a literacy training this academic year was 7–14% across the study arms (Table 34). Of the HTs who reported that teachers attended a literacy training this academic year, 100% of HTs in the

School Feeding Only schools and 79% of the HTs in the Literacy & School Feeding schools reported that teachers in their school attended WV or PAI training. Of the 13% of HTs in the Comparison arm who reported that teachers in the school attended the literacy training this academic year, approximately 9% also reported that teachers in the school had attended WV or PAI training. Overall, the mean number of Grade 2 teachers who attended literacy training this academic year in the Comparison arm was greater than the mean numbers of Grade 2 teachers in the School Feeding Only and Literacy & School Feeding arm who attended training. The mean number of Grade 4 teachers who attended literacy training this academic year in the Comparison arm was greater than the mean numbers of Grade 4 teachers in the School Feeding Only and the Literacy & School Feeding arms who did so.

Table 39. HTs' Reporting on the Training of Teachers, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=175	n=85	n=169
	% (n)	% (n)	% (n)
HTs who report that teachers in the school attended literacy training this academic year	13.3 (22)	7.2 (6)	14.1 (23)
HTs who report the teachers in the school attended WV or PAI training (of the HTs who reported teachers attended literacy training)	9.1 (2)	100 (5)	79.2 (72)
	Mean [95% CI]	Mean [95% CI]	Mean [95% CI]
Mean number of female teachers in the school who attended literacy training this academic year	1.3 [±1.6]	0.4 [±.5]	3.6 [±3.6]
Mean number of male teachers in the school who attended literacy training this academic year	1.9 [±.8]	1.0 [±.6]	2.6 [±.6]
Mean number of Grade 2 teachers who attended literacy training this academic year	2.5 [±1.6]	0.7 [±.4]	1.4 [±.7]
Mean number of female Grade 2 teachers who attended literacy training this academic year	2.0 [±1.3]	0.0 [±0]	1.5 [±1.5]
Mean number of male Grade 2 teachers who attended literacy training this academic year	0.7 [±.5]	0.7 [±.4]	0.8 [±.2]
Mean number of Grade 4 teachers who attended literacy training this academic year	1.6 [±.9]	0.7 [±.4]	0.9 [±.4]
Mean number of female Grade 4 teachers who attended literacy training this academic year	1.1 [±.8]	0.2 [±.3]	0.1 [±.2]
Mean number of male Grade 4 teachers who attended literacy training this academic year	0.5 [±.3]	0.3 [±.4]	0.7 [±.1]

Note: CI = confidence interval; HT = head teacher; PAI = Planet Aid Incorporated; WV = World Vision.

Head Teachers' Reporting on the number of Teacher Training Sessions

When asked about the expected number of WV or PAI teacher training sessions, the mean numbers reported by HTs were higher in the School Feeding Only (2.9) and Literacy & School

Feeding (6.5) groups than in the Comparison (0) group (Table 39). When asked about the number of WV teacher training sessions held to date, the mean number reported by HTs in the Literacy & School Feeding study was 2.6. When asked about the number of PAI teacher training sessions held to date, the mean number reported by HTs in the School Feeding Only arm was 3, whereas that in the Literacy & School Feeding arm was 2.4.

Table 39. HTs' Reporting on the Number of Teacher Training Sessions, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=175	n=85	n=169
	Mean [95% CI band]	Mean [95% CI band]	Mean [95% CI band]
Expected number of WV or PAI teacher training sessions	0.0 [±0]	2.9 [±.6]	6.5 [±.4]
Number of WV teacher training sessions held to date	0.1 [±.1]	0.1 [±.1]	2.6 [±.2]
Number of PAI teacher training sessions held to date	0.0 [±.0]	3.0 [±.2]	2.4 [±.3]

Note: CI = confidence interval; HT = head teacher; PAI = Planet Aid Incorporated; WV = World Vision.

Head Teachers' Reporting on the Number of Reading Coaches

Higher percentages of HTs in the School Feeding Only (47%) and Literacy & School Feeding (59%) arms reported that reading coaches train teachers at the school than in the Comparison arm (24%) (Table 40). Among the HTs who reported that reading coaches train teachers at the school, the mean number of trainings provided by reading coaches this academic year ranged from approximately one to three across the study arms.

Table 40. HTs' Reporting on Reading Coaches, by Study Arm

	Comparison	School Feeding Only	Literacy & School Feeding
	n=175	n=85	n=169
	% (n)	% (n)	% (n)
% of HTs who report that reading coaches train teachers at this school	24.6 (43)	47 (39)	59.7 (97)
% of HTs who report that reading coaches supervise teachers at this school	48.5 (20)	59.5 (22)	82.0 (78)
	Mean [95% CI]	Mean [95% CI]	Mean [95% CI]
Mean number of trainings provided by reading coaches this academic year	2.0 [±.4]	1.9 [±.3]	3.2 [±.2]
Frequency at which reading coaches supervise teachers at this school	Never	45.1 (18)	42.9 (15)
	Once a year	15.3 (6)	11.4 (4)
	Once per term	21.5 (8)	8.6 (3)
	Once a month	12.8 (5)	11.4 (4)
	More than once a month	5.2 (2)	25.7 (9)

Note: CI = confidence interval; HT = head teacher.

Higher percentages of HTs in the Literacy & School Feeding (82%) and School Feeding Only (59%) arms reported that reading coaches supervise teachers at the school than in the Comparison arm (48%). Among the HTs who reported that reading coaches supervise teachers at the school, higher percentages of HTs in the Comparison (45%) and School Feeding Only (42%) arms reported the frequency of supervision visits as “Never”. In contrast, a higher percentage of HTs in the Literacy & School Feeding arm (30%) reported that reading coaches supervise teachers once a month.

Reporting on Access to School Supplies and Learning Materials

Higher percentages of HTs in the School Feeding (29%) and Literacy & School Feeding (52%) study arms reported that the school has a library/book bank than in the Comparison arm (17%) (Table 41). Among the HTs who reported that the school has a library/book bank, 100% also reported that the print material is available in Portuguese. In contrast, the percentage of HTs across the study arms who reported that the print material in the library/book bank is available in the mother tongue was 8–12%. Among the HTs in the Comparison arm, the most common types of print material reported as being available in the library/book bank were primers/student manuals and leveled books. Among the HTs in the School Feeding Only and Literacy & School Feeding arms, the most common types of print material reported as being available in the library/book bank were storybooks and primers/manuals.

Table 41. HTs’ Reporting on Access to School Supplies and Learning Materials, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=175	n=85	n=169
		% (n)	% (n)	% (n)
HTs who report that the school has a library/book bank		17.1 (30)	29.4 (25)	52.2 (86)
HTs who report specific types of print material available	Flipbooks	19.1 (6)	36.0 (9)	18.6 (16)
	Storybooks	61.8 (19)	84 (21)	84.1 (72)
	Primers/student manuals	70.2 (21)	84 (21)	57.9 (50)
	Fables	39.6 (12)	40 (10)	50.3 (43)
	Leveled books	63.6 (19)	52 (13)	53.5 (46)
	Supplementary readers	50.2 (15)	40 (10)	40.8 (35)
	Guidelines for parents	6.2 (2)	0.0 (0)	1.2 (1)
	Reading posters	29.8 (9)	28 (7)	20.8 (18)
	Other	2.3 (4)	8.2 (7)	4.3 (7)
HTs who report that the print material in the library/book bank is available in Portuguese		100.0 (30)	100.0 (24)	100.0 (86)
HTs who report that the print material in the library/book bank is available in the mother tongue		9.8 (3)	8.3 (2)	12.7 (11)

Note: HT = head teacher.

Reporting on Extracurricular Activities

A higher percentage of HTs in Literacy & School Feeding schools (33%) reported that the school has a literacy afterschool program than HTs in the Comparison (12%) and School Feeding Only (15%) schools (Table 42). Higher percentages of HTs in the School Feeding Only (72%) and Literacy & School Feeding (73%) arm reported that the school has other types of afterschool programs than HTs in the Comparison arm (14%).

Among the HTs in the School Feeding Only arm who reported that the school has other types of afterschool programs, the most common types were the Math Learning Club and the School Gardening Club. Among the HTs in the Literacy & School Feeding arm who reported that the school has other types of afterschool programs, the most common types were the Help with HW club, Math Learning Club, and Science Club. Among the HTs in the Comparison arm who reported that the school has other types of afterschool programs, the most common types were the Help with HW Club and the Math Learning Club.

Higher percentages of HTs in the School Feeding Only (55%) and Literacy & School Feeding (55%) arms reported that special events are held at the school to celebrate students' progress in reading than in the Comparison arm (38%). Higher percentages of HTs in the Literacy & School Feeding (48%) and School Feeding Only (35%) arms report that special events are held at the school to recognize effective reading instruction than in the Comparison arm (29%). Higher percentages of HTs in the Comparison (47%) and Literacy & School Feeding (55%) arms reported that special events are held at the school to recognize teacher attendance than in the School Feeding Only arm (27%).

Table 42. HTs' Reporting on Extracurricular activities, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=175	n=85	n=169
		% (n)	% (n)	% (n)
HTs who report that the school has a literacy afterschool program		12.9 (22)	15.3 (13)	33.5 (55)
HTs who report that their school has other types of afterschool programs		14.3 (25)	72.9 (62)	73.2 (124)
Other types of afterschool programs reported by HTs	Help with HW Club	5.7 (10)	8.2 (7)	23.3 (39)
	Math Learning Club	4.0 (7)	36.5 (31)	30.3 (52)
	Science Learning Club	2.4 (4)	10.6 (9)	23.3 (39)
	School Garden Learning Club	1.2 (2)	23.5 (20)	12.6 (22)
	Other	7.6 (14)	55.3 (47)	42.7 (73)
HTs who report that special events are held at the school to celebrate students' progress in reading		38.7 (68)	55.3 (47)	55.7 (93)
HTs who report that special events are held at the school to recognize effective reading instruction		29.0 (50)	35.3 (30)	48.0 (79)
HTs who report that special events are held at the school to recognize teacher attendance		47.1 (81)	27.1 (23)	55.9 (92)

Note: HT = head teacher.

Head Teachers' Reporting on Parental Involvement

The percentage of HTs who reported satisfaction with parental involvement in their children's work and in the school was less than half across all three study arms (Table 43).

When asked about the ways that parents show evidence of support for the school, the most common answers given by HTs across the study arms were volunteering time and resources. The percentage of HTs who reported that parents volunteer in the school feeding program was higher in the School Feeding Only arm (45%) than in the Literacy & School Feeding (28%) and Comparison arms (4%).

When asked about the frequency of parental involvement according to teachers, HTs in the Comparison (47%) and Literacy & School Feeding (43%) arms reported that parents were involved once a quarter. In contrast, HTs in the School Feeding Only arm (64%) reported that according to teachers, the frequency of parental involvement was more than once a month.

Table 43. HTs' Reporting on Parental Involvement, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=175	n=85	n=169
		% (n)	% (n)	% (n)
% of HTs who report satisfaction with parental involvement in their children's work		31.3 (56)	19.0 (16)	36.7 (62)
% of HTs who report satisfaction with parents' involvement in the school		30.2 (53)	19.0 (16)	35.0 (59)
Ways that parents show evidence of support for the school	None	19.1 (33)	7.1 (6)	9.9 (17)
	Visiting the school	18.9 (34)	16.5 (14)	19.2 (32)
	Actively seeking information about school matters	26.2 (45)	23.5 (20)	29.2 (49)
	Following up on academic progress	24 (42)	27.1 (23)	26.6 (45)
	Volunteering time	37.7 (66)	47.1 (40)	40.5 (68)
	Volunteering in school feeding	4.5 (8)	45.9 (39)	27.8 (48)
	Volunteering resources	38.7 (66)	40.0 (34)	33.4 (56)
	Participating in school meetings/committees	32.0 (57)	32.9 (28)	36.2 (61)
	Other	8.8 (15)	7.1 (6)	6.7 (11)
Frequency of parental involvement reported by teachers	Once a year	18.0 (24)	0.0 (0)	9.2 (13)
	Once a quarter	47.7 (63)	26.0 (20)	43.3 (62)
	Once a month	15.2 (20)	9.1 (7)	12.7 (18)
	More than once a month	19.1 (25)	64.9 (50)	34.9 (51)

Note: HT = head teacher.

Teacher Absenteeism

Across study arms, most schools (88–96%) had teacher attendance registers (Table 44). HTs reported that on average, one–two teachers were absent yesterday or the last day school was in session. The most common strategies HTs used to handle a teacher's absence were

allocating the class to another teacher or combining students together into one class. HTs themselves were frequently absent (22–30%) or late to school (10–19%).

Table 44. HTs' Reporting of Teacher and HT Absenteeism, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=175	n=85	n=169
		Mean ± 95% CI band	Mean ± 95% CI band	Mean ± 95% CI band
Number of teachers absent yesterday or last day school was in session		1.4 [±.2]	1.0 [±.3]	1.7 [±.2]
		% (n)	% (n)	% (n)
Teacher attendance register available		93.5 (164)	88.2 (75)	96.0 (162)
How class is handled if teacher is absent	Let class proceed without teacher	2.7 (5)	1.2 (1)	0.6 (1)
	Allocate class to another teacher	55.0 (95)	62.4 (53)	71.8 (119)
	Join all students in one class	26.9 (46)	15.3 (13)	15.0 (25)
	Dismiss students for the day	0.5 (1)	1.2 (1)	1.2 (2)
	Distribute students among other classes	6.6 (12)	11.8 (10)	7.5 (13)
	Other	8.3 (15)	8.2 (7)	4.0 (7)
HT absent from school any day last week		21.8 (38)	29.4 (25)	30.1 (51)
HT late to school any day last week		9.6 (16)	10.6 (9)	18.8 (31)

Note: CI = confidence interval; HT = head teacher.

Nutrition and Hygiene Training and Teaching

We asked HTs to report on teacher training on nutrition and hygiene/sanitation to collect information about all teachers in each school and triangulate the results with those obtained from Grade 2 and 4 teachers. HTs' reports of teachers trained on nutrition and hygiene/sanitation mirrored those of Grade 2 and 4 teachers (Table 45). In the School Feeding Only and Literacy & School Feeding schools, more teachers were trained on nutrition than hygiene/sanitation, whereas the reverse was true in Comparison schools. However, HTs' reports of the availability of teaching materials and the frequency of teaching nutrition and hygiene/sanitation did not align with those of teachers. HTs described less availability of teaching materials for nutrition and hygiene/sanitation than teachers. They also reported less frequent teaching of nutrition, although their estimates of the frequency of hygiene/sanitation teaching were relatively close to those of teachers in the School Feeding Only and Literacy & School Feeding arms.

Table 45. HTs' Reports of Teacher Training and Frequency of Teaching Nutrition and Hygiene Lessons, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=175	n=85	n=169
		Mean $\pm$ 95% CI band	Mean $\pm$ 95% CI band	Mean $\pm$ 95% CI band
Teachers trained on teaching nutrition		0.5 [$\pm$.4]	3.5 [$\pm$.4]	4.5 [$\pm$.6]
Teachers trained on teaching hygiene and sanitation		1.1 [$\pm$.4]	1.5 [$\pm$.4]	2.3 [$\pm$.5]
		% (n)	% (n)	% (n)
Teachers have materials for teaching nutrition		12.4 (22)	59.0 (49)	66.0 (109)
Frequency of teaching nutrition lessons to each class	Once per week	15.2 (22)	64.6 (51)	60.9 (91)
	Once every two weeks	6.1 (9)	7.6 (6)	8.5 (13)
	Once per month	7.7 (11)	12.7 (10)	14.3 (21)
	Once per term	38.6 (56)	8.9 (7)	6.1 (9)
	Never	32.4 (45)	6.3 (5)	10.2 (15)
		22.9 (39)	25.0 (21)	55.7 (90)
Teachers have materials for teaching hygiene and sanitation				
Frequency of teaching hygiene and sanitation lessons to each class	Once per week	35.0 (53)	70.0 (56)	66.9 (104)
	Once every two weeks	8.5 (13)	6.2 (5)	7.8 (12)
	Once per month	6.9 (10)	5.0 (4)	7.3 (11)
	Once per term	26.3 (39)	6.2 (5)	7.2 (11)
	Never	23.4 (34)	12.5 (10)	10.8 (17)

Note: CI = confidence interval; HT = head teacher.

School Feeding Program

HTs' reports of the presence of a school feeding program were similar to those of students. Nearly all School Feeding Only schools and all Literacy & School Feeding schools had a school feeding program, whereas only a few Comparison schools did (Table 46). In School Feeding Only schools, the program was supported exclusively by PAI/ADPP; in Literacy & School Feeding schools, the program was supported nearly equally by PAI/ADPP and WV; in Comparison schools, the program was supported by other organizations. Approximately 92% of School Feeding Only and Literacy & School Feeding schools served school meals daily, whereas all Comparison schools with a feeding program served meals daily. The main issue with school feeding programs was insufficient number of pots, utensils, or dishes, as mentioned by 21–40% of HTs across the study arms. Among the main “other” issues with school feeding programs, lack of water, lack of cooks/unavailability of cooks, lack of remuneration for cooks, lack of soap, and lack of firewood were mentioned most frequently.

Table 46. HTs' Reports of School Feeding Programs, by Study Arm

		Comparison	School Feeding Only	Literacy & School Feeding
		n=175	n=85	n=169
		% (n)	% (n)	% (n)
School has a school feeding program		5.4 (10)	98.8 (84)	100.0 (168)
Organization supporting school feeding ^a	PAI/ADPP	0.0 (0)	100.0 (84)	46.4 (81)
	WV	0.0 (0)	0.0 (0)	50.7 (82)
	Community support	0.0 (0)	0.0 (0)	0.6 (1)
	Other	100.0 (10)	0.0 (0)	4.1 (7)
Frequency of school meals ^a	Daily	100.0 (10)	92.8 (77)	92.2 (155)
	A few times per week	0.0 (0)	4.8 (4)	2.9 (5)
	Whenever food is available	0.0 (0)	2.4 (2)	4.9 (8)
Issues with school feeding program ^{a,b}	No issues	10.0 (1)	29.4 (25)	17.6 (30)
	Food is not always available.	10.0 (1)	2.4 (2)	4.1 (7)
	Kitchen/warehouse not constructed or in disrepair	30.0 (3)	1.2 (1)	4.2 (7)
	Not enough pots, utensils, or dishes	40.0 (4)	21.2 (18)	31.7 (53)
	Meals not prepared on time	0.0 (0)	7.1 (6)	6.0 (10)
	Other	70.0 (7)	51.8 (44)	68.7 (115)

Note: ADPP = *Ajuda de Desenvolvimento de Povo para Povo* (Development Aid from People to People); HT = head teacher; PAI = Planet Aid Incorporated; WV = World Vision.

^aOf schools with a school feeding program.

^bRespondents could select "no issues" or one or more other responses.

3.2.4 Warehouse Managers and Cooks

We originally planned to collect information about school feeding infrastructure and training from cooks, but during the pilot phase, we found that warehouse managers handle many of the logistical issues related to the school feeding program at each school. Therefore, we divided the questions between the manager and the head cook. We also determined that warehouse managers and cooks were not always present to answer questions.

School Feeding Infrastructure

More schools in School Feeding Only schools (92%) compared to Literacy & School Feeding schools (79%) had a school feeding log book where they tracked the quantities of food received and used (Table 47). In approximately 90% of schools with a log book, the log was filled out and up to date. Nearly all schools in both intervention arms had a kitchen and storeroom for the school feeding program. Furthermore, in both intervention arms, the percentages of schools in which the kitchen and storeroom were in very good condition were low (23% in School Feeding Only and 28% in Literacy & School Feeding schools).

We found some gaps in the availability of materials for school feeding programs. Half of the Literacy & School Feeding schools and more than one third of School Feeding Only schools had ever had a gap in their supply of corn-soy blend. Most schools had cooking pots and utensils, but 14% of Literacy & School Feeding and 8% of School Feeding Only schools did not. More School Feeding Only schools had sufficient numbers of cooking pots and utensils than Literacy & School Feeding schools. Approximately 80% of the schools had bowls and spoons for students, but only 50–60% had them in sufficient quantities. Clean water was available at 68% of Literacy & School Feeding and 60% of School Feeding Only schools. Many schools did not have soap for cleaning cooking materials and bowls. School Feeding Only schools more often had soap available to clean pots and bowls (61%) than Literacy & School Feeding schools (36%). A higher percentage of School Feeding Only than Literacy & School Feeding schools had a place for cooks and students to wash their hands and soap for hand washing. The availability of soap was the largest gap, especially in Literacy & School Feeding schools.

School meals are most often served between 9 and 10 a.m. in both intervention study arms, which puts the meal in the middle of the morning school session. Approximately half the cooks reported that school meals are always served on time.

Table 47. School Feeding Infrastructure, by Intervention Arm

		School Feeding Only	Literacy & School Feeding
		n=79	n=168
		% (n)	% (n)
School has a school feeding log book.		92.4 (73)	78.5 (125)
Log book is filled out and up to date.		89.0 (65)	89.0 (111)
School has a kitchen and storeroom for school feeding program.		98.7 (78)	98.2 (156)
Condition of the kitchen and storeroom	Not adequate (holes in roof or walls, no door, and/or no lock)	16.7 (13)	19.8 (32)
	Moderate (complete building but needs repairs)	60.3 (47)	52 (83)
	Very good (complete building with no repairs needed)	23.1 (18)	28.1 (44)
	School has ever had a gap in the supply of corn-soy blend.	36.7 (29)	50.3 (80)
	Cooking pots and utensils are available.	92.4 (73)	86.1 (137)
	Number of pots and cooking utensils is sufficient.	75.9 (60)	56.9 (91)
	School has bowls and spoons for students.	78.6 (55)	80.1 (114)
	Number of bowls and spoons is sufficient.	61.4 (43)	51.8 (74)
	School has clean water available.	60.0 (42)	67.7 (97)
	Soap is available to clean bowls, spoons, pots, and cooking utensils.	61.4 (43)	35.5 (52)
	School has a place for cooks to wash their hands.	74.3 (52)	58.7 (84)
	Soap is available for cooks to wash their hands.	60.0 (42)	28.5 (42)
	School has a place for children to wash their hands before eating.	72.9 (51)	65.2 (93)
	Soap is available for children to wash their hands before eating.	45.7 (32)	19.0 (28)

		School Feeding Only	Literacy & School Feeding
Time of day when meals are served	8 o'clock hour	0.0 (0)	1.9 (3)
	9 o'clock hour	60.8 (48)	56.7 (90)
	10 o'clock hour	10.1 (8)	14.1 (22)
	11 o'clock hour	12.7 (10)	12.7 (20)
	12 o'clock hour	13.9 (11)	10.9 (18)
	After noon	2.5 (2)	3.7 (6)
School meals are served on time	Never	5.1 (4)	3.9 (6)
	Sometimes	46.8 (37)	46.9 (74)
	Always	48.1 (38)	49.2 (79)

Cook Training and Knowledge

Less than half of the school cooks interviewed had received training (Table 48). Among those trained, the timing of the last training varied between the two intervention study arms, with 45% of School Feeding Only cooks and 27% of Literacy & School Feeding cooks receiving training less than 6 months ago. Cooks had low to moderate knowledge of food safety (three–four out of eight items correct) and hygiene (two–three out of five items correct).

Table 48. Cook Training and Knowledge, by Intervention Arm

		School feeding only	Literacy + School feeding
		n=70	n=144
		% (n)	% (n)
School cook training received		41.4 (29)	47.3 (67)
Timing of last school cook training	Less than 6 months ago	44.8 (13)	27.2 (19)
	6–11 months ago	17.2 (5)	17.9 (12)
	12 or more months ago	37.9 (11)	54.8 (37)
		Mean ± 95% CI Band	Mean ± 95% CI Band
Knowledge of food safety (8 items)		3.4 [±.3]	3.8 [±.2]
Knowledge of hygiene (5 items)		2.4 [±.2]	2.5 [±.2]

Note: CI = confidence interval.

Use of School Meals

Nearly 90% of cooks in both intervention study arms said that they usually eat the school meal when they are at the school cooking (Table 49). Fifty-three percent of School Feeding

Only schools and 40% of Literacy & School Feeding schools did not usually have leftovers from school meals. When there were leftovers, cooks most often gave more porridge to students or ate it themselves. On average, interviewers found two–three cooks present at each school, and cooks reported that they prepare three–four school meals per week.

Table 49. Use of School Meals and Cook Working Days, by Intervention Arm

		School Feeding Only	Literacy & School Feeding
		n=70	n=144
		% (n)	% (n)
Cooks usually eat the school meal		87.1 (61)	89.7 (128)
Use of leftover food at end of school meal ^a	Usually there are no leftovers	52.9 (37)	39.5 (57)
	Give more to students	27.1 (19)	37.3 (53)
	Give food to siblings/other children at school who are not students	7.1 (5)	4.9 (7)
	Give it to teachers	7.1 (5)	7.8 (11)
	Cooks eat it	15.7 (11)	16.1 (23)
	Cooks take it home	4.3 (3)	4.7 (7)
	Other	7.1 (5)	14.8 (21)
		Mean ± 95% CI Band	Mean ± 95% CI Band
Number of cooks present on day of survey		2.3 [±.3]	2.6 [±.2]
Number of days per week cooks prepare meals at school		3.6 [±.3]	3.7 [±.2]

Note: CI = confidence interval.

^aRespondents could select “usually there are no leftovers” or one or more other responses.

3.2.5 Parents

Overall, a total of 30 FGDs with parents were conducted. Fourteen and 16 FGDs were completed in rural and urban schools, respectively. Twenty-three of the schools where FGDs were held received the Literacy & School Feeding intervention, whereas seven received School Feeding Only (Table 50).

A total of 285 parents participated in the FGDs. We included mothers and fathers in the same groups because there were no sensitive questions, and we did not expect different responses based on the participants’ gender. The parents’ ages ranged from 17 to 74 years old, with half between 29 and 43 years old. Fifty-seven percent of the participants were female. On average, the participants had 3.4 children in total, and 47%, 34%, and 19% had a child in Grade 2, Grade 4, and both grades, respectively. Fifty-six percent reported speaking only a local language at home, 30% reported speaking both a local language and Portuguese, and 14% reported speaking Portuguese only.

Table 50. Number of FGDs and Parents by District and Province Involved in Qualitative Data Collection

		Literacy & School Feeding				School Feeding Only			
		# of FGDs	Mean # of Parents	% of Parents with Grade 2 Child	% of Parents with Grade 4 Child	# of FGDs	Mean # of Parents	% of Parents with Grade 2 Child	% of Parents with Grade 4 Child
Maputo	Magude	1	7.0	57%	43%	3	11.3	71%	53%
	Manhiça	4	7.3	79%	59%	2	8.0	75%	44%
	Matutuine*	3	7.7	-	-				
	Moamba*	3	6.7	33%	56%	2	11.5	61%	39%
Nampula	Muecate	6	10.5	75%	46%	-	-	-	-
	Nacarôa	6	11.8	51%	63%	-	-	-	-
	Total	23	9.3	63%	55%	7	10.4	68%	47%

Note: FGD = focus group discussion.

* Demographic information was missing for three FGDs in Matutuine and two in Moamba. Average and percent values are based on non-missing data only.

Parents' Perceptions and Expectations of Schools

"You must study in order to be someone"
—Parent, Namina Rio School, Muecate, Nampula

Parents value education for their children. They consistently stated that they expected their children to gain knowledge, including reading and writing; find employment after finishing school; support their family; and have an overall better quality of life. One parent stated, "I hope he continues to study to acquire knowledge and one day becomes a doctor, a teacher or a police officer. It's his future." Parents perceive that education not only improves future employment opportunities but also teaches children good behavior and helps them be respected by the community. As one parent stated, "Even in the hospital, people who are educated are treated differently." Parents' perceptions of teachers' performance in schools were mixed, with some parents being very pleased, while others expressed frustration that teachers were not more patient and persistent in helping each child succeed.

Most parents seemed very satisfied with the level of education their child received at school, citing the fact that children are gaining skills in reading and writing as proof that the school is working to provide an education. However, some parents expressed deep concerns about and extreme disappointment in their school because children were progressing through grade levels without advancement in their reading and writing skills. For example, one parent stated that her son was advanced to Grade 5 without the ability to read or write.

Three consistent problems regarding the quality of education were identified by parents: 1) teacher absenteeism, 2) inadequate education materials (particularly school books), and 3) the lack of a water source at the school. Without water, school meals cannot be prepared. Parents often stated that their children must wake up extremely early (e.g., 12:00 a.m.) to fetch water before school and that some schools require children bring water to attend

classes. Other requests made by parents related to adding grade levels in the schools to offer complete elementary and secondary education, incorporating English into the curriculum, providing security for the school to prevent thievery and vandalism, providing assistance with purchasing school uniforms, addressing the need for additional classrooms and latrines, and fulfilling the need for additional shelters (i.e., roofs) where children can read and study during the rainy season.

Parents' Perceptions of the Literacy Program

In both schools with and without a school literacy program, parents' perceptions of the overall literacy education in schools were mixed. While many parents indicated that they observed their children successfully reading and writing at home, parents in two of the School Feeding Only schools stated that the literacy education was not working because the children are advancing grade levels despite lacking the ability to read and write. A few parents stated that they could not assess their child's academic progress because they themselves were not literate.

Parents pointed to poor teaching quality and teacher absenteeism as problems leading to poor literacy program performance. The main suggestion for improvement was to increase the reading materials available to children. As one parent stated, "The books our children have are incomplete, and not everyone has them which makes it difficult to study because some children have to go to their friends' houses to study." Some parents also commented on a lack of trust in those running the program when supplies are not consistently available. Children were promised materials, including books, notebooks, and snacks, and when these materials did not arrive, children stopped attending school. However, other schools have reported receiving materials, including notebooks and pencils, and parents viewed these materials as appropriate and satisfactory for their child's education. In schools where parents were pleased with the literacy program, they greatly valued the program and requested that it continue for the sake of their children's educational success. Several parents proposed increasing the number of teachers implementing the school literacy program.

Parents' Perceptions of Reading and Writing Activities

Parents reported that nearly all the reading and writing activities that children engage in at home revolve around homework assigned by school teachers. Parents often mentioned that teachers should continue to assign homework as a means of ensuring that their children continue to engage in reading and writing activities. According to the parents, parental involvement in such activities at home mainly consists of encouraging their children to complete their homework. Many parents mentioned that children ask them questions about homework and that they try to answer such questions as best they can. However, the parents indicated that they were not always able to fully assist their children. Lack of fluency in Portuguese and illiteracy were consistently identified as the main barriers that prevent parents from engaging in reading and writing activities with their children at home. Some parents mentioned that older siblings in higher grade levels often help their younger

children with homework and practice writing and reading. Most of the children's reading and writing activities are conducted solely at home; however, sometimes, a lack of materials causes children to go to peers' homes to share books and complete their homework. Most parents noted that children engage in reading and writing activities daily, either once or twice a day.

Nearly all parents mentioned that school workbooks were the main source of reading materials. One parent stated, "The books that children get at school are important because without them they can hardly practice." Other, less frequently mentioned sources of reading material included non-school books purchased by parents, newspapers, television ads, phone text messages, and the bible. Some parents stated that their children have pencils and notebooks in which they can write and draw pictures; however, parents more frequently indicated a lack of writing materials as a problem. Thus, parents reported that many children use sticks and wire to write and draw pictures in the dirt.

Parents identified the following as factors that motivate their children to engage in reading and writing activities at home: assigned homework, access to adequate materials, parental guidance or supervision, support from older siblings, and peer support. Barriers included a lack of materials, a lack of electricity to provide light and allow children to read and write in the evening, a lack of time because of the need to complete household chores, insufficient teachers to provide additional support for low-achieving students, and the desire for children to play rather than complete homework. Parents also noted that children need to work on their farms to contribute to the family's income; however, other parents indicated that this competes with children's ability to succeed in school by decreasing the time available to complete homework.

Parents' Perceptions of the Language Used in School and at Home

Parents reported that local languages (i.e., Changana and Macua) are the most common languages used in the home setting, whereas Portuguese is used in schools. Very few parents indicated that they had the ability to read and write in Portuguese. Furthermore, they reported that the inability to read and write in Portuguese makes helping their children with homework challenging. When parents reported that they did engage in reading and writing activities at home with their children, they mainly described doing so in the local language rather than Portuguese. Some parents suggested that the sole use of Portuguese at school when children use Changana at home might hinder their ability to learn at school. One parent stated, "The child tends to mix up the languages, and I think this makes it difficult to understand the subjects at school." Many parents agreed that bilingual education is important and suggested using both Portuguese and the local language in school.

Parents' Perceptions of School Meals

"We are grateful for the soy meal, and we'd like the program to continue because even if the children can't eat at home, they have the soy meal at school."

-Parent, Maguaza School, Moamba District, Maputo

All parents expressed that they were pleased with the presence of the school feeding program. Indeed, the parents frequently mentioned that school meals help motivate their children to attend school more regularly and stay at school longer and prevent children from dropping out of school. As one parent stated, “The school meal is very important for children because it guarantees that at least they have something to eat, and it encourages them to go to school.” A few parents perceived their children to have gained weight as a result of the school meals. Others noted that their children appeared to be stronger and happier when a school feeding program was implemented. All parents requested that the school feeding program continue to improve their children’s overall well-being and success in school.

Parents identified the main problem with the school feeding program as the lack of a water source for cooking meals at the school. One parent noted that installing a water source near the school would also improve school attendance, the consistent provision of school meals, and the hygienic preparation of school meals. Many parents suggested providing more variety in the types of foods offered through the school feeding program. Suggested foods included beans, meat, rice, and pasta. One parent proposed adding peanuts to the school porridge to increase the calories consumed by the children. Several parents also recommended improving the flavor of the porridge by adding salt or sugar. Other suggestions for improving the school feeding program included increasing the number of cooks, ensuring that no gaps occur in the supply of school meals, and constructing more buildings with roofs where children can eat during the rainy season.

Changes in Diets at Home due to School Meals

Although a few parents stated that the amount of food consumed at home by their children did not change because of the school meals, most indicated that their school-going children ate much less food at home when they consumed school meals. As one parent stated, “with the school meals, children no longer complain about being hungry when they arrive home from school.” Some parents noted that children used to eat breakfast, typically bread and tea, prior to leaving for school. However, with school meals, they no longer do so and instead eat only at school. Others stated that their children either skip dinner entirely or eat very little for dinner because when school meals are served, they are not hungry in the evening.

Parents’ Perceptions of Health Teaching and Illness

Some parents said that their children never missed school because of illness, whereas others stated that fever, cough, nausea, malaria, and/or diarrhea had caused their children to miss some school. Parents explained that at school, children mainly learned about personal hygiene, including bathing, washing their face, and washing hands, and about washing dishes. Most parents reported that their children applied these messages in their behavior at home, although some parents indicated that their children did not bathe regularly. No parents discussed improved sanitation, such as increased or proper use of

latrines; instead, they only mentioned that their children learned to wash their hands after going to the bathroom.

Parent's Perceptions of School Gardens

Nine of the schools where FGDs were held had school gardens. Parents noted that school gardens were beneficial because they allow students to have a variety of foods; however, many barriers prevent gardens from being successful. At most schools, parents are responsible for managing the school garden, and at some schools, children are also involved in the farming practices. Parents frequently indicated that a lack of seeds and other tools is the most serious challenge to having a successful school garden.

4. SUMMARY

In this section, we return to our theory of change and describe the baseline findings related to the elements of the theory. We also triangulate results across types of participants and data collection methods, wherever possible. At baseline, we found several differences between groups in the key indicators for the primary and secondary evaluation questions and in the factors that may contribute to those key indicators.

Student literacy: Baseline EGRA scores varied across treatment arms. In general, performance on the EGRA was better among Grade 4 students than Grade 2 students, as expected. In almost all cases, and for both grades, as the difficulty of the subtasks increased, students' performance decreased. Students in McGovern-Dole intervention schools struggle more with listening comprehension than students in Comparison schools.

Students in School Feeding & Literacy schools can read fewer words per minute than in School Feeding Only and Comparison schools. Oral reading fluency (ORF rates across all groups were lower than the minimum rate necessary for students to read the entire passage. Percent zero scores were generally higher for the syllable sound task than for the ORF task, indicating that more students could read at least one word of a short passage than were able to read a syllable. This pattern was similar across all arms and in both grades. This finding suggests that students have not fully acquired the decoding skills necessary to read fluently and with comprehension but may have recognized or memorized familiar words that they frequently encounter in grade-level text.

Parents' perceptions of the literacy program were mixed because some observed that their children read and write well, whether others saw their children promoted to the next grade despite struggling with reading and writing.

Student attentiveness: Most teachers said that they can tell whether their students are attentive when they face the teacher and make eye contact or when they respond to questions posed by the teacher. Less than 40% of the teachers said that the school meal makes their students more attentive, approximately 40% said the meal does not change student attentiveness, and roughly 20% said it makes their students less attentive.

Access to and use of school supplies: Students' reported access to exercise notebooks is generally aligned with teachers' reported use of exercise notebooks during reading instruction. However, data from parent FGDs indicated that children do not have consistent access to school materials. Only slightly more than half of teachers said they had access to a teacher guide, and their reported use of the teacher guide was generally aligned with their reported access to the teacher guide. Although more teachers in intervention schools than in comparison schools reported having access to basic school supplies, most teachers across groups reported low access to materials such as markers and chart paper.

Literacy instructional materials: Students had lower access to supplementary readers than to Portuguese textbooks and exercise notebooks. This point was supported by the data from teachers, who reported using supplementary readers approximately once a week. More than 50% of schools in the Literacy & School Feeding intervention have a library/book bank

with print materials, such as storybooks and primers/manuals in Portuguese. Less than 50% of schools in the School Feeding Only intervention have a library/book bank. Most intervention schools have few print materials in the mother tongue available. This finding aligns with parent FGD data, which revealed that parents would like to see an increase in the quantity of reading materials available to their children.

Extracurricular activities: Less than 50% of the HTs in the intervention and comparison schools reported the presence of an afterschool literacy program. Among the teachers who reported the existence of a literacy club at the school, across intervention and comparison schools, most indicated that half the students in their class attend an afterschool literacy club. Consistent with the teacher data, the HT data showed that more than 50% of the schools in the School Feeding Only intervention celebrated students' progress in reading. Less than 50% of all sampled schools 1) hold special events at the school to celebrate students' school attendance or 2) hold special events at the school to recognize effective reading instruction. More than 50% of schools in the Literacy & School Feeding study arm hold special events at the school to recognize teacher attendance. In contrast, this trend is not observed on the same magnitude in the School Feeding Only study arm.

Skills and knowledge of teachers: Most teachers reported attending and finishing studies at a TTC. Additionally, most reported that they had attained certification. Slightly more than 50% of teachers received specific training on how to teach reading and writing to students in the primary grades as part of their preservice training. More than half of the teachers earned a certificate as their highest level of education. According to HTs, more than 50% of teachers in the Literacy & School Feeding intervention receive training from reading coaches, whereas less than half of teachers in the School Feeding Only intervention receive training from reading coaches. More than 50% of the teachers in both interventions are supervised by reading coaches. However, these data are not consistent with teacher data indicating that more than 50% of teachers reported that reading coaches had not visited since the beginning of the school year. In terms of teachers' perspectives on supervision and support, most teachers in intervention schools reported that HTs or assistant HTs check lesson plans once a week and conduct classroom observations once per trimester. Nearly all the teachers in both comparison and intervention schools receive feedback from HTs or assistant HTs. When they need help, teachers in both comparison and intervention schools most often have casual discussions with other teachers. More than 50% of the teachers in comparison and intervention schools could not name all the core reading skills. More than 50% of the teachers in the comparison and intervention schools use written tests and oral evaluations as the most common approaches to measure students' reading and writing progress. To check student understanding during lessons, more than 50% of teachers in both comparison and intervention schools question students individually. Data on teacher knowledge and skills contradict data on students' perspectives on the instructional support received. For example, when asked what the teacher does when a student is unable to answer a question, the most common response from students in both comparison and intervention schools was that the teacher hit the student.

Skills and knowledge of Head Teachers: This year, 50% of the HTs in the Literacy & School Feeding group attended a WV or PAI training. Fifty-three percent of the HTs in the Literacy & School Feeding group received training on the fundamentals of reading instruction, compared to 35% in School Feeding Only schools. More than 65% of the HTs in both the comparison and intervention schools received training on school management. Less than 40% of the HTs in comparison and intervention schools received training on access to and the use of school supplies and materials. Few HTs in comparison and intervention schools could name the core reading skills. Classroom observations and monitoring of student results on tests given by teachers were the most common approaches used to identify academic progress by HTs in both comparison and intervention schools.

Students' home literacy practices: Sixty to 75% of Grade 2 and 4 students bring reading books home from the classroom, and nearly all the books brought home are in Portuguese. However, 50% of Grade 2 students in the Literacy & School Feeding intervention said that they *never* read on their own at home, and 50% of Grade 2 students in the School Feeding Only intervention said they *sometimes* read on their own at home. More than 50% of Grade 4 students across groups said they sometimes read on their own at home. Across the study arms, less than a quarter of Grade 2 and 4 students bring books home from the school library or book bank.

Parental involvement: Less than 50% of the HTs across the study arms are satisfied with the level of parental participation in terms of parents' involvement with their children's work and in the school. Among the HTs who reported that some parents do participate, across the study arms, the most common forms of participation consisted of volunteering time and resources to the school. More parents in the School Feeding Only arm said they volunteered their time in the school feeding program than parents in the Literacy & School Feeding arm. Slightly more than 50% of Grade 2 and 4 students across groups reported that someone at home helps with homework when needed. This result is in line with parent FGD data, which show that parental involvement at home occurs mainly in the form of encouragement to complete assigned homework. In the FGDs, some parents reported that older siblings help their younger siblings with homework and with practicing reading and writing. Across groups, more than half of students in Grade 2 and 4 speak a language other than Portuguese at home. This finding is consistent with parent FGD data showing that parents are not fully fluent in Portuguese. When asked if someone reads them stories, the most common response among Grade 2 students was that no one at home tells them stories. In contrast, among Grade 4 students, the most common response was that someone at home sometimes tells them stories.

Access to food/dietary intake and short-term hunger: More than 50% of the students said they eat fewer meals at home on days when they receive a school meal, indicating that school meals replace home meals for many students. Most students reported that they feel less hungry on days when they receive a school meal. These points were supported by the qualitative data obtained from parents, many of whom reported that their children skip meals at home on school days, in part because they are less hungry when they have a school meal.

Timing of the school meal: At most schools, meals are served at 9:30 a.m., which is in the middle of the morning session. This timing may have an impact on student attentiveness, if meals do indeed improve attentiveness, because the first half of the school day is over before the meal is served.

School feeding: Nearly all of the School Feeding Only and Literacy & School Feeding schools serve school meals; however, it appears that meals are not served daily in all schools. Instead, on average, schools serve meals three to four times per week. More than half of the intervention schools do not serve school meals on time. Parents appreciate the school feeding program because it encourages their children to go to school. They recommended enhancing or changing the foods included in school meals. A small number of Comparison schools had formal school feeding programs, but half of the Comparison schools also offered some type of school food during the rainy season when food from their school gardens was available. The presence of school feeding activities in some of the Comparison schools should be considered in the final evaluation analysis.

Access to requisite food preparation and storage tools and equipment: The conditions of the kitchen and storeroom were very good in only approximately one quarter of the intervention schools. Some schools had experienced a gap in the supply of corn-soy blend. Most schools had cooking pots and utensils available, but at least one quarter noted that the number of these utensils was not sufficient. Roughly 20% of schools lacked bowls and spoons for students. At least one third of the schools did not have clean water available. Soap for cooks and students to wash their hands was lacking, especially in Literacy & School Feeding schools.

Knowledge of safe food preparation and storage practices: Less than 50% of the school cooks had received training. Their knowledge of food safety and hygiene was low to moderate.

Knowledge of health and hygiene practices: Students had very low knowledge of nutrition and moderate knowledge of hygiene and sanitation. In intervention schools, one quarter to one half of the teachers were not trained on teaching about nutrition, and only approximately one third had nutrition lesson plans. Fewer teachers were trained to teach about hygiene and sanitation than about nutrition, and even fewer had lesson plans for hygiene and sanitation than for nutrition.

Health and dietary practices of students: We found that many students across study arms had inadequate diets, with inadequate meal frequency being more common than low dietary diversity. Less than half of the students reported that they always wash their hands with soap or ash before eating the school meal.

School infrastructure and access to water and sanitation services: Less than 50% of the intervention schools had a garden. Most intervention schools had improved latrines, but less than half of those with improved latrines had tippy taps or hand-washing stations. According to teachers, the most serious issues with the school environment were the dilapidated state of the school buildings and the lack of clean drinking water. Parents who participated in the FGDs also mentioned these as major problems. The lack of water impacts

the students in some intervention schools because they are required to get up early to fetch water to bring to school to make the porridge.

Access to preventive health interventions: Most intervention schools offered deworming to students.

Student attendance and health absences: Student attendance was difficult to capture accurately. We used student recall and compared class enrollment lists to the number of students present on the day of data collection. Across the study arms, more than one quarter of students were absent during the last week with no significant differences between the groups and no significant differences by gender. Students were most often absent because they were ill.

Community understanding of the benefits of education: Parents who participated in the FGDs understood that education and reading are important because their children need literacy skills to be gainfully employed later in life and to be able to support themselves and their family members. Parents mentioned insufficient quantities of books and workbooks for students in some schools, which led students to drop out.

Teacher attendance: Approximately one quarter of teachers and HTs were absent during the last week.

5. LIMITATIONS & RECOMMENDATIONS FOR IMPACT EVALUATION

In this section, we describe the limitations of the study and offer recommendations relevant to future data collection efforts (midline and endline) and impact evaluation analysis. Limitations and corresponding recommendations from a methodological perspective are included as a table in Annex C.

Limitations

- This is not a full factorial design because there were no schools receiving a “Literacy Only” intervention.
- The School Feeding Only study arm is only available in Maputo. As a result, the design is unbalanced, which will impact the distribution of degrees of freedom and the analytical approach taken during the midterm analysis and final impact evaluation.
- Intervention districts were matched with comparison districts manually based on the limited information available on these districts and current information on future donor activities.
- At baseline, we found that some comparison schools served school meals.
- Most intervention schools have participated in school feeding activities since 2012, so the school-level data here may not reflect a “true baseline.”
- Because this study was not a randomized controlled trial, intervention schools may be inherently different from comparison schools. The purposive selection of intervention schools for inclusion in the program could be related to their past poor performance, which could be one of the factors explaining why comparison schools seem to outperform intervention schools on some indicators.

Recommendations

- Difference-in-difference analysis should be used at midline and endline to account for the lack of a true baseline and the inherent differences between the three groups at baseline.
- Other donor and governmental interventions in target districts should be tracked over the course of the program so they can be accounted for or considered in subsequent parts of the evaluation.
- Matching at the school, teacher, and student levels should be considered in future analyses to control the variance. No matching below the district level was attempted in the baseline assessment.
- Based on findings from the baseline quantitative analysis, we recommend adding additional qualitative data collection from teachers and cooks/warehouse managers to facilitate a more comprehensive mixed methods approach at midline and endline. This would produce more information to explain and support the quantitative analysis findings. For example, to reduce changes to the questionnaire and shed light on data regarding access to and use of the teacher guide, mother tongue instruction, and materials such as those from the school library or book bank, we recommend that

qualitative in-depth interviews with teachers be conducted at midline. Furthermore, adding comparison schools to the qualitative interviews would help elucidate issues at these schools compared to intervention schools.

- Given that the literacy intervention will include mother tongue instruction and materials in some areas, we recommend designing an EGRA in the new target language of instruction, in addition to the Portuguese EGRA at midline. We also recommend keeping the question that asks about the percentage of teachers who report access to and use of mother tongue materials. Additionally, we recommend retaining the question on teachers' and HTs' knowledge of core reading skills at midline.
- We recommend the inclusion of a meta-analysis of the impacts in Maputo and Nampula to overcome the confounding factors and variance issues resulting from the differences in program implementation strategies across implementers, baseline levels, and contextual factors in the two provinces.

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7. ANNEX A. WITHIN-PROVINCE LITERACY ANALYSIS

Table 51 presents the Early Grade Reading Assessment (EGRA) results for Maputo Province by study arm. In Maputo Province, intervention arms include Comparison schools, School Feeding Only schools, and Literacy & School Feeding schools. The table provides the percent zero scores for all subtasks, mean scores for timed subtasks, and percent mean scores for untimed subtasks.

Table 51: Grade 2 and 4 EGRA Results for Maputo Province, by Study Arm

Maputo Province		Grade 2		Grade 4	
Subtask	Study Arm	Mean Scores	Percent Zero Scores	Mean Scores	Percent Zero Scores
Letter Identification (clpm)	Comparison	16.4	29.4%	45.5	3.5%
	School Feeding Only	11	49.4%	37.7	8.6%
	Literacy & School Feeding	11.7	42.3%	37	5.6%
Syllable Reading (csspm)	Comparison	9.9	57.3%	36.6	14%
	School Feeding Only	6	69.7%	29.4	22.1%
	Literacy & School Feeding	5.9	66.8%	28.2	21.2%
ORF	Comparison	7.6	26.9%	35.6	10.7%
	School Feeding Only	3.6	56.5%	24.4	24.1%
	Literacy & School Feeding	3.9	49.9%	24.5	20.7%
		Percent Mean Scores	Percent Zero Scores	Percent Mean Scores	Percent Zero Scores
Reading Comprehension	Comparison	8.7%	80.3%	43.7%	31.7%
	School Feeding Only	2%	93.1%	23.2%	57.6%
	Literacy & School Feeding	3.7%	87.9%	26.7%	50%
Listening Comprehension	Comparison	49.2%	12.7%	63.9%	4.4%
	School Feeding Only	21.2%	50.8%	39%	25.6%
	Literacy & School Feeding	24.6%	44.9%	44.1%	20.3%
Word Dictation	Comparison	22.4%	61.4%	65.4%	19.1%
	School Feeding Only	13%	74.1%	55.1%	25.2%
	Literacy & School Feeding	15.6%	71.1%	55%	27.1%

Note: clpm = correct letters per minute; csspm = correct syllable sounds per minute; EGRA = Early Grade Reading Assessment; ORF = oral reading fluency.

Sample sizes for Grade 2: Comparison, n=704; School Feeding Only, n=666; Literacy & School Feeding, n=661

Sample sizes for Grade 4: Comparison, n=681; School Feeding Only, n=616; Literacy & School Feeding, n=638

Table 52 presents the EGRA results for students in Nampula Province in Grades 2 and 4 by study arm. The study arms in Nampula include Comparison schools and schools that will receive the Literacy & School Feeding intervention. The table provides the percent zero scores for all subtasks, mean scores for timed subtasks, and percent mean scores for untimed subtasks.

Table 52: Grade 2 and 4 EGRA Results for Nampula Province, by Study Arm

Nampula Province		Grade 2		Grade 4	
Subtask	Study Arm	Mean Scores	Percent Zero Scores	Mean Scores	Percent Zero Scores
Letter Identification (clpm)	Comparison	5.4	39.6%	18.6	17.8%
	Literacy & School Feeding	6.4	43.4%	14.8	20.2%
Syllable Reading (csspm)	Comparison	2.3	81.6%	12.4	47.7%
	Literacy & School Feeding	2.7	80.2%	8.1	56.3%
ORF	Comparison	1.8	52.6%	9.4	37.1%
	Literacy & School Feeding	2.2	53.5%	6.3	42.6%
		Percent Mean Scores	Percent Zero Scores	Percent Mean Scores	Percent Zero Scores
Reading Comprehension	Comparison	.7%	96.9%	7.6%	75.7%
	Literacy & School Feeding	1.2%	96%	4.5%	87.1%
Listening Comprehension	Comparison	13.1%	59.6%	23.3%	40.3%
	Literacy & School Feeding	8.3%	75.2%	16.6%	59.4%
Word Dictation	Comparison	2.4%	91%	14.7%	59.9%
	Literacy & School Feeding	4%	88.8%	10.4%	71.4%
Nampula Province		Grade 2		Grade 4	
Subtask	Study Arm	Mean Scores	Percent Zero Scores	Mean Scores	Percent Zero Scores
Letter Identification (clpm)	Comparison	5.4	39.6%	18.6	17.8%
	Literacy & School Feeding	6.4	43.4%	14.8	20.2%
Syllable Reading (csspm)	Comparison	2.3	81.6%	12.4	47.7%
	Literacy & School Feeding	2.7	80.2%	8.1	56.3%
ORF	Comparison	1.8	52.6%	9.4	37.1%
	Literacy & School Feeding	2.2	53.5%	6.3	42.6%
		Percent Mean Scores	Percent Zero Scores	Percent Mean Scores	Percent Zero Scores
Reading Comprehension	Comparison	.7%	96.9%	7.6%	75.7%
	Literacy & School Feeding	1.2%	96%	4.5%	87.1%
Listening Comprehension	Comparison	13.1%	59.6%	23.3%	40.3%
	Literacy & School Feeding	8.3%	75.2%	16.6%	59.4%
Word Dictation	Comparison	2.4%	91%	14.7%	59.9%
	Literacy & School Feeding	4%	88.8%	10.4%	71.4%

Note: clpm = correct letters per minute; csspm = correct syllable sounds per minute; EGRA = Early Grade Reading Assessment; ORF = oral reading fluency.

Sample sizes for Grade 2: Comparison, n=690; Literacy & School Feeding, n=707

Sample sizes for Grade 4: Comparison, n=676; Literacy & School Feeding, n=685

8. ANNEX B. PRECISION ESTIMATES

Table 53 shows the weighted oral reading fluency (ORF) mean estimate and the confidence in the mean estimates by province and study arm. All mean estimates for Grade 2 fall well within the ± 2.5 wpm 95% confidence interval (CI) band. All groups fall under ± 1.0 wpm, except for the Maputo Comparison group, which has a band of ± 1.3 wpm. Table 54 provides the same information for the Grade 4 students. The mean ORF for Grade 4 students in Nampula stayed within the expected 95% confidence bands: ± 1.5 wpm for the intervention group and ± 1.7 wpm for the Comparison group. However, the mean ORF for Grade 4 students in Maputo exceeded the expected precision. The precision values in the Comparison group and the School Feeding Only group were similar: ± 2.8 and ± 3.2 wpm, respectively. The Literacy & School Feeding group had a precision of ± 4.0 wpm because of the combined high inter-class correlation (ICC) and standard deviation (SD), which were not expected. Overall, the estimates were sufficiently precise.

Table 53. Grade 2 Reading Fluency Means and Precision Estimates of the Mean ORF

Provinces	Study Arm	n	Range (wpm)	Mean (wpm)	95% CI Band (wpm)	SD (wpm)	ICC	DEFF
Maputo	Literacy & School Feeding	661	[0,46]	3.9	± 0.9	7.6	0.134	2.8
	School Feeding Only	666	[0,55]	3.6	± 0.7	8	-0.018	0.7
	Comparison	703	[0,89]	7.6	± 1.3	13.4	0.183	3
Nampula	Literacy & School Feeding	707	[0,69]	2.2	± 0.9	5.6	0.427	7.4
	Comparison	690	[0,64]	1.8	± 0.7	6.2	0.108	2.7

Note: CI = confidence interval; DEFF = Design effect; ICC = inter-class correlation; SD = standard deviation; wpm = words per minute.

Table 54. Grade 4 Reading Fluency Means and Precision Estimates of the Mean ORF

Provinces	Study Arm	n	Range (wpm)	Mean (wpm)	95% CI Band (wpm)	SD (wpm)	ICC	DEFF
Maputo	Literacy & School Feeding	638	[0,112]	24.5	± 4.0	22.1	0.252	4.5
	School Feeding Only	616	[0,115]	24.4	± 3.2	24.1	-0.005	0.9
	Comparison	680	[0,122]	35.6	± 2.8	26.9	0.06	2.3
Nampula	Literacy & School Feeding	685	[0,92]	6.3	± 1.5	12.2	0.115	2.6
	Comparison	676	[0,89]	9.4	± 1.7	14.7	0.109	2.5

Note: CI = confidence interval; DEFF = Design effect; ICC = inter-class correlation; SD = standard deviation; wpm = words per minute.

9. ANNEX C. IMPACT EVALUATION RECOMMENDATIONS (TABLE)

Source	Limitation	Consequences	Recommendations
Exogenous Factors & Program Design	Different conditions, environment, and access to resources between Maputo and Nampula	High variance expected which might mask some of the significant differences	Meta-analysis for midterm and final impact evaluation
Exogenous Factors & Implementer Strategy	Different implementation activities by Planet Aid and World Vision	Implementer and province variances are confounded resulting in increased variance which might mask some of the significance differences	Meta-analysis for midterm and final impact evaluation analysis
Implementer Strategy	Program phased out for developing curriculum	Different levels of exposures for students across different cohorts in midline and endline	Special care in the analysis on the exposure of each cohort relative to implementer activities and inclusion of indicators for intensity of the treatment
Implementer Strategy	No schools receiving a “Literacy Only” intervention	The quasi-experimental design is not a full factorial design	Special care in midterm and final impact evaluation analysis
Implementer Strategy	School Feeding Only study arm is only available in Maputo	Unbalanced design, which will impact the distribution of degrees of freedom	Special care to account for this difference during the midterm and final impact evaluation analysis
Exogenous Factor & Implementer Strategy	Intervention changes in response to endogenous and exogenous factors (e.g., schools with Literacy Only in Maputo because of other school feeding programs overlapping)	Implications on sampling and data collection efforts	Keep track of activities by implementers over time and update school lists and relevant activities to account for these changes in sampling and analysis

Exogenous Factor	Limited information on current and future activities on literacy and nutrition at the district and individual school level	Manual matching of intervention and comparison districts	Need additional model based matching effort (e.g., propensity score matching) and continue collecting information about relevant school level activities
Exogenous Factors	Some comparison schools serve school meals or have overlapping activities	Confounding factors due to contamination of the comparison schools	Continue tracking other donor and governmental institution activities throughout the intervention period to account for them in the impact evaluation analysis
Exogenous Factors	Wide range of differences across schools within districts with limited information available during sampling	Large variance which could impact the ability to detect significant differences	Conduct matching at school, teacher, and student level prior to impact evaluation analysis
Program Design	Intervention schools participated in nutrition activities since 2012	Not a true baseline across all indicators	Use of difference-in-difference approach for midterm and final impact evaluation analysis relative to 2017
Program Design	Not a randomized control trial and purposive selection of districts and school for inclusion in the program because of past poor performance	Comparison schools might be better and different relative to intervention schools because of inherent selection bias	Use propensity score matching and difference-in-difference approach for midterm and final impact evaluation
Baseline Results	Unexpected trends in quantitative findings	Need to explain reasons for the observed trends	Use a mixed methods approach by adding more qualitative data collection from teachers, cooks, and warehouse managers in midline and endline data collection Include comparison schools in qualitative

			data collection and analysis Avoid too many changes to quantitative instruments for consistency and comparability
Program Design and Implementer Strategy	Integration of mother tongue literacy program	No measurements at baseline of mother tongue reading assessment	Develop Early Grade Reading Assessment (EGRA) in mother tongue based on curriculum developed once available for midline and endline Assume zero scores at baseline