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Assessment of Early Grade Reading in the Education Sector in Cambodia

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Assessment of Early Grade Reading in the Education Sector in Cambodia

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List of Abbreviations

ACR	All Children Reading
AF	Asia Foundation
ASEAN	Association of Southeast Asian Nations
CAS	Continuous Assessment System
CBI	core breakthrough indicators
CDCS	Country Development and Cooperation Strategy
CDPF	capacity development partnership fund
CFS	Child Friendly Schools
CSC	Community score cards
DCD	Department of Curriculum Department
DCLS	Differentiated classroom literacy structures
DFID	UK Department for International Development
DHS	Demographic and Health Survey
DOE	district office of education
DP	development partners
DTMT	district training and monitoring team
E2L	Easy 2 Learn
E4K	e-books for Khmer
ECE	early childhood education
EGMA	early grade math assessment
EGRA	early grade reading assessment
EGRA+	Early Grade Reading Assessment Plus, Liberia
EMIS	education management information system
ESCUP	Educational Support to Children in Underserved Populations
ESWG	Education Sector Working Group
ESP	Education Strategic Plan
EU	European Union
FLAT	functional literacy assessment test
GILO	Girls' Improved Learning Outcomes, Egypt
GPE	Global Partnership for Education
IIEP	International Institute for Education Planning
INSET	In-service education and training
JAPP	Joint accountability action plans
IRD	International Relief and Development
KAPE	Kampuchean Action for Primary Education
LEG	local education group
MoEYS	Ministry of Education, Youth and Sports
MPTC	Ministry of Posts and Telecommunications

NAEP	National Assessment of Educational Progress
NCDD	National Committee for Sub-national Democratic Development
NEP	NGO Education Partnership
NIE	National Institute for Education
NIPTICT	National Institute of Posts, Telecommunications and ICT
NGO	nongovernmental organization
NPSNDD	National Program for Sub-National Democratic Development
PB	program budget
PASEQ	Programme d'analyse des systèmes éducatifs de la Confemen
PISA	Programme for International Student Assessment
POE	provincial office of education
PRESET	Pre-service education and training
PRIMR	Primary Math and Reading Initiative, Kenya
PTTC	provincial teacher training college
QAD	Quality Assurance Department
QEMIS	Quality Education Management Information System
QLE	Quality Learning Environments
REACH	Reinforcing Education Access with Community Help
RISE	Research on Improvement Systems of Education
RtR	Room to Read
RWI	Reading and Writing Instruction
SCI	Save the Children International
SDPP	School Dropout Prevention Pilot
SES	socioeconomic status
SESSP	Second education sector support project
SfL	Schools for Life
SIDA	Swedish International Development Agency
SIG	school improvement grant
SIPAR	French NGO supporting Cambodia school libraries
SNC	Subnational Committee
SNDD	Subnational Democratic Development
SSC	school support committee
SSESP	second education sector support project
Swap	sector-wide program
TCO	Total Cost of Ownership
TEPS	teacher education professional standards
TEST	Technology for Education Systems Transformation project
TTC	Provincial teacher training college
TRAC	Total Reading Approach for Children
TTS	Thunthean Seksa

UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WEI	World Education, Inc.
WASH	water, sanitation, and health
WFP	World Food Program

Executive Summary

Cambodia, with its landscape of innovative leaders in the education sector, non-governmental organizations, and partners committed to improving learning, provides for a ripe foundation for improvements and efficiencies to be made in education. Cambodia's economy has also seen rapid growth and increased resources and funding being allocated to education.

Improvements in the education system have been made from the Paris Peace Accords in 1991 which had a significant impact in the enrollment rates and overall changes made to curriculum and instruction. Drop-out rates, inequity, and poor learning outcomes have persisted stemming in part from low levels of funding and a struggle to effectively distribute them efficiently. The introduction of the Early Grade Reading Assessment (EGRA) to Cambodia in 2010 made apparent the low levels of reading proficiency among primary students. Half of grade 1 boy and girl students could not recognize a single letter and two-thirds could not read a single familiar word. Almost half of grade 2 students similarly were unable to read any familiar words.

The 2015 Early Grade Reading Sector Assessment, authorized by USAID in April 2015, was designed to produce findings to help decision makers, in particular the Cambodian Ministry of Education, Youth and Sport (MoEYS) and USAID/Cambodia, plan effective reading-focused interventions and better understand current policies, practices, and impediments to early reading instructional practices in Khmer. The Early Grade Reading Sector Assessment worked to identify such gaps and provide a full diagnostic snapshot of the key accomplishments, challenges, and opportunities in Cambodia for a comprehensive and high quality early grade reading program. A team of four education experts from RTI International, one Senior Education Advisor from the USAID/Asia Bureau, and four staff members of a local NGO, Kampuchean Action for Primary Education (KAPE), carried out the assessment. The results of the assessment are presented in this report.

As the aim of this study is to identify and analyze the strengths, weaknesses, and key opportunities to improve children's reading outcomes within the contest of Cambodia's education systems, the following principles were established to guide the assessment:

Principle 1: Support the Ability of Cambodian Systems to Improve Reading at Scale

Principle 2: Support Improvements along the Entire Education Value Chain and Promote Greater Coherence in the Approach to Early Grade Reading

Principle 3: Measure Impact and Require Rigorous Evidence

The assessment involved an extensive document review and interviews conducted during a three-week period in-country during 2015. MoEYS officials, development partner staff, and implementation partners were interviewed as part of the study. Visits to 3 provinces, 4 districts, and 10 schools provided a glimpse into issues present in the education system at the

decentralized level. The team developed and followed a framework for data collection covering the information to be gathered relative to the current MoEYS policies, plans, and operations related to early grade reading, as well as the development partner portfolios of basic education projects, and various NGO implemented school-level interventions in support of improved early grade reading.

Though there are several important findings of this assessment and opportunities for growth, the key findings can be summarized as follows:

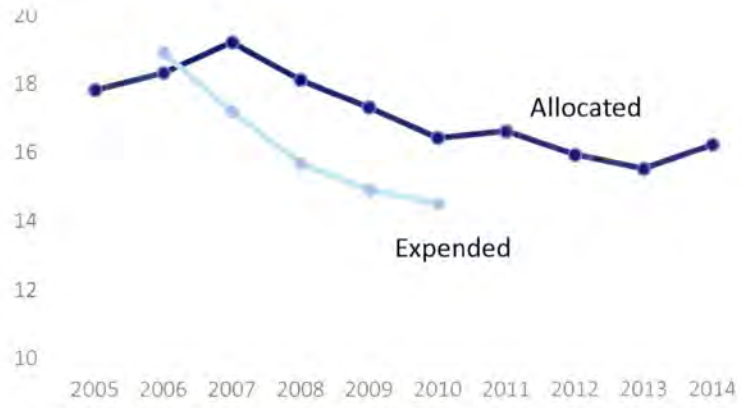
- MoEYS has placed a clear focus on improving early grade reading and math to improve learning outcomes in Khmer in grades 1-3 as outlined in the current education strategic plan. This focus stemmed from the EGRA conducted in 2010 in which the assessment team found concerns with the nature of the test, content of the instruments for subtests, as well as how the test was administered and results were analyzed. MoEYS responded to the results with revisions of textbooks and curriculum in Khmer for grades 1-3.
- A rich community of development partners and NGOs conveys clear alignment with the ministry's strategic plan with funding and technical support in many different areas. Organizations have made significant impacts to improving early grade reading outcomes through funding and budgetary support, implementation of the further early grade reading activities and assessments, development and revision of textbooks and materials, as well as investment in school feeding and nutrition.
- MoEYS has shown its reform-minded practice in addressing areas for growth in education and working closely with development partners and NGOs showing its openness to innovations and new approaches. The MoEYS will need to further focus on putting such ideas into practice and allocating significant attention to the review of the implementation of textbooks and curriculum to ensure resources are being used effectively and to determine areas for support for teachers and students.

The government of Cambodia has placed significant value on the improvement of education and early grade reading as evidenced by this assessment. The information included will provide USAID with a series of entry points where it can continue to align Cambodia's vision for growth with the wealth of partners and resources available to address the critical issues needed to move Cambodia's education forward.

1 Introduction

Cambodia is poised to significantly increase learning outcomes in primary schools. Reform-minded leaders in the education sector, a strong group of development partner collaborators and nongovernmental organizations committed to improving education all combine to create a favorable context for leveraging improvements in education. However, Cambodia is also a study in contrasts. The economy has experienced a decade of rapid growth, with increasing investment from and integration into the broader Southeast Asian region. Per capita gross domestic product has almost quadrupled in recent years with increasing investment in light manufacturing, particularly in the garment industry, accompanied by the emergence of an urban middle class. While the percent of national income allocated to education remains low both relative to other countries in the region and as a percent of national budget, the amount of money available has been increasing (in current dollar terms) —averaging over 10 percent growth per year from 2011–2013.[1] With increased allocations, the resources available for education stand to improve further. The Ministry of Education, Youth and Sports (MoEYS) has faced challenges in fully executing its budget as shown in Figure 1, but efforts have been launched to improve both allocations and expenditures in the sector, notably through enhanced resource flows directly to schools.

Figure 1. Percentage of National Recurrent Budget for Education



Source: World Bank GPE Project Appraisal Document, 2014

Cambodia benefits from a thriving nongovernmental organization (NGO) community that is particularly active in the education sector. Numerous NGOs are implementing promising innovations in education, some of which are resulting in improved learning outcomes. And MoEYS has sound working relationships with most NGOs, drawing lessons from their projects and activities and collaborating with NGOs on development of new initiatives and reforms in the sector, such as in the development of the new textbooks for teaching reading in Khmer in grades 1–3.

The system must make better use of resources and of its development and implementing partner contributions in order to dramatically improve the learning outcomes students are able to achieve. If Cambodia is going to see the fruits of its current growth spread more equitably and if

[1] Based on figures included in the World Bank's Project Appraisal Document for the current Global Partnership for Education grant (March 2014) and on the MoEYS presentation at the Annual Joint Technical Working Group retreat in January 2015.

the country is going to take full advantage of the opportunities that will be open to it through greater Association of Southeast Asian Nations (ASEAN) integration, it will have to use both partner contributions and resources more wisely.

The recent track record of success in the education sector has been mostly in expanding access to schooling. Primary enrollment rates have increased dramatically since the signing of the Paris Peace Accords in 1991. However, a high percentage of students still drop out before completing primary school and regional, urban-rural, and socioeconomic inequities mean that certain segments of the population have less access to schooling.[2] The government has made recent reforms dealing with curriculum and instruction, improving financial management and quality assurance, and funneling resources directly to schools through school improvement grants. However, high dropout, inequity in the system and poor learning outcomes persist, as they are in part due to the low levels of funding and inefficient use of available resources that result from a history of poor governance and management in the education sector.

The introduction of the early grade reading assessment (EGRA) to Cambodia in 2010 made stark the low levels of reading proficiency among primary students. Half of grade 1 boy and girl students could not recognize a single letter and two-thirds could not read a single familiar word. Almost half of grade 2 students similarly were unable to read any familiar words.

To its credit MoEYS responded to these poor results by revising the curriculum and textbooks for the first three years of primary school from a *whole-language* oriented approach to a more phonics-based approach to instruction based on the traditional *Chet Chhem* teaching method (as described in further detail in Annex C). In addition, many NGOs are actively supporting improvements in basic education, and in particular in the teaching of reading. MoEYS's current leadership, development, and implementation partners afford high priority to improving early grade reading, a turn of events that aligns nicely with the United States Agency for International Development's (USAID's) Education Strategy and the education component of USAID/Cambodia's Country Development and Cooperation Strategy (CDCS).

The USAID Education Strategy and Implementation Guidance (2011–2015) indicate that education resources should be targeted to achieve measurable and sustainable education outcomes. Therefore there is Agency-wide commitment to achieving the goal of "Improved reading skills for 100 million children in primary grades by 2015." The Cambodia CDCS embraces and will contribute to Goal 1 of the Education Strategy under its second development objective: to contribute to the improvement of the health and education status of vulnerable populations. Specifically, USAID/Cambodia is committed to working with MoEYS to achieve the intermediate result of improved literacy skills for Cambodian children. The tenets of USAID Forward place a premium on working in close collaboration with government, civil society counterparts, and other development partners. Working in this way in Cambodia will enable USAID not only to contribute to improved literacy. Because of MoEYS's demonstrated commitment to system-wide reforms that touch on instruction, system management and quality

[2] Data on inequities in access are presented under the subheading "Inequities in Education" beginning on page 20 of this report.

assurance, and improved financing and financial management, the Agency also has an opportunity to contribute to impacts at scale that have an increased likelihood of being sustained.

This sector assessment is shaped by USAID's strong commitment to working through government systems to achieve sustainable, measureable improvements in reading. Attention is therefore paid to how best to support an evidence-based, scalable, and sustainable reading improvement program. Furthermore, this assessment seeks to identify opportunities where programming can support, strengthen, and utilize existing national-, provincial-, district-, and school-level institutions and build upon the variety of promising early grade reading initiatives already underway in Cambodia. Therefore, the sector assessment team has applied the core principles articulated in Section 2 below in analyzing the existing situation and in considering options for supporting further improvements in the teaching and learning of reading in the early grades of primary school.

2 Core Principles Guiding this Assessment

The objective of this sector assessment activity is to identify strengths, weaknesses, and key leverage points to improve children's reading outcomes within the institutional context of Cambodia's education system. In the interest of helping put USAID/Cambodia in a position to contribute to improved reading for the largest number of Cambodian children, the first principle guiding this assessment concerns the need to intervene at an appreciable scale.

Principle 1: Support the Ability of Cambodian Systems to Improve Reading at Scale

USAID's Education Strategy clearly states that projects must demonstrate high marginal impact on policy reforms and systems strengthening. The Agency places great emphasis on extracting from any interventions the implications and lessons they provide for addressing the broader education sector challenges and constraints. It is therefore not enough to run a pilot program. The implementation of new initiatives in the sector should make use of and contribute to strengthening the Cambodian education system and help extend the public sector's capacity through improved relationships with its various development partners, including the nongovernmental and private sectors. Ideally, programs of support should engage the education sector at a level where critical features of system policy, governance, management, and operations come together to improve the effectiveness and efficiency of service provision.

For example, MoEYS has formed District Training and Monitoring Teams (DTMT) in an effort to better organize supervision and support for schools within districts. Many projects currently do engage DTMTs when delivering training or support to schools where the projects are funding activity. Working with DTMTs has revealed some of the constraints districts face—such as limited resources and lack of pedagogical and/or teacher support expertise (as discussed further in Annex E). However, because NGOs often do not work with all schools in a district, such efforts risk reinforcing the notion that only in conjunction with a project can the system fulfill its mandate (a syndrome that inflicts most education systems in the developing world). By working

district-wide, or better yet, at a province-wide level, external support can be used to confront the broader capacity, resourcing, management, and governance issues that currently limit the effectiveness of decentralized school support.

Fortunately, there is precedence in the sector for nongovernmental initiatives informing and helping shape MoEYS policy and strategies. For example, MoEYS invited NGOs that implement early grade reading programs to advise on the reforms to the curriculum for teaching Khmer in grades 1–3. However, too much of the NGO activity in the sector fails to engage the subsequent steps needed to build system capacity to turn policy into operational reality, thus leading to the second core principle guiding this assessment.[3]

Principle 2: Support Improvements along the Entire Education Value Chain and Promote Greater Coherence in the Approach to Early Grade Reading

The last several years have seen numerous innovations introduced to the education system: Room to Read's development of teachers' guides with detailed daily lessons; Kampuchean Action for Primary Education (KAPE)/World Education's development of a tablet-based set of games for remediating foundational literacy skills; CARE's introduction of frameworks for social accountability at the local level. Many of these have influenced policy and institutional changes in the sector, perhaps best illustrated by the adoption of the UNICEF-initiated Child Friendly Schools (CFS) framework on a national scale. However, insufficient attention is currently being directed to the rest of the value chain, namely the procedures, practices, and institutional capacity needed to create the conditions for these and other innovations to succeed system-wide.[4]

Confronting the question of how any innovation would be implemented broadly in the sector forces MoEYS and its partners to consider not only whether the innovation can contribute to improved outcomes (which is, by the way, a criterion that is not presently applied rigorously enough, as discussed later under Principle 3), but whether it can be implemented within the education system's resource and operational constraints. In other words, can it be cost-effectively applied on a large scale using existing institutions without compromising the features that make it effective in the first place? Such an approach would be consistent with the US President's Global Development Council, which, in its second report (2015) places emphasis on not only discovering, but also testing (evaluating) and taking to scale innovations that offer cost-effective ways to solve development challenges.

[3] While many projects provide training and other capacity building opportunities for district or province level education officers, they often rely wholly on NGO support for successful implementation, thus limiting the extent to which public sector capacity to manage school improvement is created.

[4] While the CFS framework is being applied in many, if not most, schools, since each school and its community completes a "self-assessment" to evaluate performance relative to the CFS indicators, there is no objective information available to assess what "meeting" those indicators means in different contexts. And, the fact that there are 177 different indicators included in the CFS framework raises serious doubt regarding how thoroughly any one of them can be "assessed" at the local level.

Cost-effectiveness and "implement-ability" should be non-negotiable criteria for determining what innovations are worth doing. Considering cost-effectiveness reveals that most input-intensive approaches are less than efficient at improving outcomes. High-cost inputs, unless they can deliver dramatic improvements in outcomes, will likely not prove cost-effective for large-scale implementation. In contrast, as explained later in this report, changes that contribute to productivity gains in how existing inputs are used may present the best value (in terms of improved outcomes) for effort propositions currently available in Cambodia. For example, helping teachers make more efficient and effective use of the available instructional time (through better lesson structure and teaching techniques) would extract considerably more value from the reforms to the grade 1–3 curricula already enacted country-wide.

The education sector at present is characterized by a multiplicity of projects, some that share common elements, some that take decidedly different approaches, and most that combine inputs in contrasting ways. With numerous development partners and over 100 NGOs active in the sector, and a tendency to say "yes" to most proposed interventions, a challenge faced by MoEYS is how to determine what constitutes a coherent approach that can be applied at scale. There is some evidence of the MoEYS drawing on NGO experience to develop national policies and strategies, which holds promise that a coherent national reading program could emerge. The team completing this assessment is not arguing for a "one-size-fits-all" solution. We are concerned, however, that without attention to the issues raised in these principles, development of the sector will continue to be constrained as resources and effort are diverted to various ideas without rigorous appreciation of which of them hold merit and meet the criteria argued for here—namely effectiveness, cost-effectiveness and scalability.

Principle 3: Measure Impact and Require Rigorous Evidence

In order to apply Principle 2 above, MoEYS and its varied partners could take a much more rigorous approach to measuring impact. The contributions of the various programs and innovations addressing early grade reading should produce evidence bases that, using consistently applied metrics, show how much additional impact they generate when compared to control settings. At present, only Room to Read has such evidence, using an objective measure of learning gains above what was being experienced in control schools. World Education has data showing a reduced need for remediation in schools where it piloted its innovations. The last several years have increased use of reliable measures of learning outcomes, such as EGRA. USAID's Education Data for Decision Making (EdData) Project has published numerous resources, references, and guidelines on how to develop and use EGRA. However, MoEYS's own measurement of the impact of the new Khmer curriculum and books, using the 2010 and 2012 national EGRA surveys, was compromised by, in the assessment team's opinion, improper administration and inappropriate analysis of the results. For example, certain subtests included in the EGRA may not have been properly timed and when analyzing the data, MoEYS chose to use a composite score that combines subtest results, something that has never been recommended by RTI or the panels of experts that have supported the development and revision of the assessment

as an appropriate method for reporting EGRA outcomes. Some NGO interventions followed the Ministry's lead on the approach to EGRA, and in so doing compromised their ability to provide sound measures of the impact of their programs. It will be important to revisit not only how assessment of early grade reading is being done in Cambodia (whether using EGRA or another tool), but also how monitoring and evaluation frameworks are being developed and rigorously implemented.

Additionally, Cambodia must sustain continued growth in reading proficiency over several years if the country is going to achieve levels consistent with neighboring countries and ASEAN partners. Evidence from programs that have been rigorously evaluated in other countries shows that even with significant improvements (with effect sizes on the order of from 0.15 to .49)[5] many students still fall below what would be considered an acceptable level of proficiency in reading fluency and comprehension. Measuring improvements over an extended period of time, and comparing the gains associated with different interventions (using different combinations of inputs and practices), will require high quality research designs, sustained investment and commitment to detailed monitoring and evaluation, and consistent, rigorous application of reading assessments. Applying the lessons-learned from program monitoring and evaluation and research will require strong feedback loops and nimble enough management to reflect on results along the way and make necessary adjustments and improvements to implementation. Therefore existing and proposed programs should be assessed also for the extent to which they reinforce the education system's capacity for this kind of monitoring, feedback, and continuous improvement.

The assessment team has tried to apply the three principles articulated here in reviewing the current activity in the education sector in Cambodia. The objective is to provide the means for USAID, the Royal Government of Cambodia, and other development and implementation partners supporting improved early grade reading outcomes to consider how the government's own, and its partners', resources and efforts can make maximum contributions to that end. The next two sections of this report summarize the findings of the assessment team and present our conclusions. More detailed accounts of the current context are provided in the annexes to the main body of the report.

The overall objective is to assess the current education sector context and identify the ways through which a USAID intervention would reinforce, extend, and improve government policies, practices, and institutions while also strengthening civil society and nongovernmental contributions to the education system.

[5] These figures are based on an assessment of the interquartile ranges of effect sizes achieved in various skill areas in a variety of programs that to date have produced rigorous evidence bases, namely Literacy Boost in some countries, Pratham in India, PRIMR in Kenya, GILO in Egypt, EGRA+ in Liberia, and Room to Read in a few countries. The results from studies of those programs are compiled, analyzed and presented in a paper by Crouch and DeStefano presented at the DFID-hosted Research on Improvement Systems of Education (RISE) Launch Event held June 18, 2015. A copy of the paper is available at the following web address: https://www.rise.ox.ac.uk/content/practical-approach-country-systems-research

3 Findings

Early Grade Reading in Cambodia

As mentioned above, MoEYS's current education strategic plan states clearly the intention to improve early grade reading (and math) and several of the policies, priorities, and strategies put forward by the ministry are intended to improve the capacity of the education system to increase learning outcomes in Khmer in grades 1 through 3. Annex B of this report provides a more thorough review of the past 15 years of reforms in the education sector and looks in detail at the present sector strategy, plans, and priorities. A summary of key recent developments is provided here.

As already mentioned in the introduction, attention to the importance of early grade reading stems from the implementation of the first national EGRA in 2010. After reviewing the available reports that present the results from the 2010 and 2012 national EGRAs, the assessment team is quite concerned regarding the nature of the test, the content of the instruments for many of the subtests, the way in which the test may have been administered, and, most troubling, how the test results have been analyzed and presented.[6] We therefore present only some of those results, and do so with extreme reservations about what they actually represent (Table 1).

Table 1. Percentage of Students Failing to Answer Any Items Correctly (zero scores)[7]

	Grade 1		Grade 2	
Subtest	**2010**	**2012**	**2010**	**2012**
Letter Knowledge	50%	25%	35%	17%
Initial Sound Identification	31%	25%	9%	13%
Familiar Word Reading	67%	43%	48%	33%

It would appear that the new curriculum had a significant impact on the lowest performing students, reducing by half the students in both grade 1 and 2 who could not recognize a single letter. The percentages of first and second graders who could not read a single familiar word was also reduced, but not by nearly as much as for the simpler task of identifying letters. Zero scores for initial sound identification decreased from 2010 to 2012 in grade 1, but oddly, increased in grade 2. We reiterate that these data are reported only to give a rough indication of what may be happening with basic reading skills in Cambodia following the implementation of the new curriculum. The nature of the available information does not allow the team to report with confidence any other national EGRA results.

[6] Two EGRA reports were reviewed in which the 2010 and 2012 results were compared. One, by A. Schwartz was only available in draft form and had data on several subtasks, but without clear explanation of how those subtasks were administered. The second report, by J. Seymour, contains no explanation of the subtasks and only reports a combined score (percent correct across all subtasks) that is completely invalid (as discussed in detail in Annex C).

[7] The assessment team chooses to show here only zero scores based on the draft version of the A. Schwartz report because the explanations received for how the test items were designed and administered raises numerous concerns regarding what the resulting data actually show. Zero scores offer a reasonable indication of the lowest end of the distribution of students' reading skills. Reductions in them are an indication of improvements in basic skill.

Following the 2010 national EGRA, the ministry devoted concentrated effort to a rapid revision of the textbooks for Khmer, beginning with grade 1 in 2011 and finishing up with grade 3 in 2013. The reform primarily was based on a return to the more traditional phonics-based approach (*Chet Chhem*) to teaching reading in Khmer (for a more detailed discussion of the curriculum and textbooks see page 14 and Annex C). MoEYS also mobilized a national effort to orient all teachers in each grade as the corresponding books were made available. The logistics of textbook distribution and implementation of training did not line up in ways that would have increased the effectiveness of the reformed curriculum. For example, for grade 1 in 2011, teachers received their two-day orientation in July 2011, but the new books did not arrive in schools until March 2012.[8] Nevertheless, there is uniform agreement that the approach to Khmer instruction in the new textbooks is one that teachers are more comfortable with, and school visits, teacher interviews, and discussions throughout this assessment confirmed a strong preference for the current approach to teaching reading. Encouragingly, the switch to the reformed curriculum has been universal, with all schools and all projects supporting MoEYS aligned to the use of the new textbooks. And the opportunity to make a productive contribution to improved learning outcomes is further enhanced by what is clearly reform-minded leadership at MoEYS.

More broadly speaking, the Ministry's current policy and strategic orientation and plans for each level of education are conveyed in the Education Strategic Plan (ESP) for 2014–2018. The current ESP articulates a focus on strengthening basic education quality and emphasizes building the reading and math skills of students in the early grades of primary education. The ESP identifies three policies that apply across all education sub-sectors, namely:

- Ensuring equitable access for all to education services,
- Enhancing the quality and relevance of learning, and
- Ensuring effective leadership and management of education staff at all levels

Core breakthrough indicators (CBI) are defined for each of these three policy areas. There are no indicators related to specific learning outcomes and none that specifically deal with student achievement in early grade reading. Only one indicator concerns assessment of learning—regarding the development and implementation of a national assessment to evaluate learning achievement in grades 3, 6, and 8 in both Khmer language and mathematics. The ESP does give priority to developing a framework and tools for assuring quality and building the capacity of schools and teachers to meet "service standards" that guarantee quality and relevance through a "responsive curriculum, adequate learning materials and advantage in teaching." The current ESP also emphasizes a shift to results-based management through an "evidence and outcome-based planning, budgeting and monitoring system at the national and sub-national levels." A strong commitment to decentralization is also evident in the current plan, and the intent is to pilot greater provincial-level authority regarding education budget decisions.

Table 2. Major Development Partners supporting Basic Education

[8] Based on informant interviews

Agency	Areas of Support	Funding (USD Millions)[9]
European Union	Budgetary support for ESP	12.5
USDA/WFP	School feeding and early grade reading	26.6
SIDA	School inspection/supervision; school improvement planning	11.3
UNICEF	ECE, CFS, WASH, multilingual education for indigenous minorities	5.9
UNESCO	Adult literacy	0.3
GPE	Expanded ECE, scholarships, EGRA/EGMA, district school support	38.5

For the primary education sub-sector, MoEYS is looking to build on the success it has had implementing the reforms to the Khmer language curriculum for grades 1–3 (and several informants stated the need to review and revise the curriculum following what many characterize as its hasty development). Additionally, MoEYS will continue to apply the CFS policy and framework in the implementation of school improvement grants (SIGs) and improved disbursement of school operating budgets (referred to as program budgets or PBs). The role of the district education office (DOE) is seen as key to effective education service delivery at the local level through the operation of DTMTs (which is discussed more fully in the section Quality Assurance and Decentralized Capacity for School Monitoring and Support).

A well-coordinated community of development partners is aligned with the ministry's strategic plan, contributing funding and technical support in several key areas (Table 2). Budgetary support from the European Union (EU) underwrites the operational costs associated with much of the ESP. The EU support is conditional on government-wide performance related to financial management and macroeconomic stability and on specific actions in the education sector. For the latter, there are input, process, and outcomes indicators related to access, quality, and management, but, unfortunately, none that relate specifically to learning outcomes. Another significant financial contribution comes from the Global Partnership for Education (GPE). The previous GPE grant[10] provided technical assistance to and funded the implementation of the 2010 EGRA and supported the curriculum/textbook development (among other things). The current grant contributes to the 2014–2018 ESP, funding expanded provision of early childhood education, scholarships for disadvantaged students, implementation of EGRA and the early grade math assessment (EGMA), training for teachers on inclusive education, training for principals on academic leadership and school management, constructing DOEs and helping them develop capacity to support schools, and putting in place a unified early childhood education (ECE) and primary education monitoring system, including developing a new student tracking system.

[9] Figures presented here were obtained from the World Bank's Cambodia office.
[10] A grant of $57.4 million supported the MoEYS 2008–2012 ESP.

The World Food Program (WFP) and International Relief and Development (IRD), using US Department of Agriculture (USDA) financing, are implementing school feeding programs intended to contribute to improved early grade reading in 600 and 150 schools respectively. The Swedish International Development Agency (SIDA) is helping reform the school inspection and supervision approach. UNICEF has long supported implementation of the CFS approach, and UNESCO is supporting community-based adult literacy. In addition to the above development partner contributions, the EU and SIDA have set up a capacity development partnership fund (CDPF) to invest in the development of critical MoEYS capacities (e.g., EMIS). The fund is managed by UNICEF.

While there is not a formal sector-wide program (Swap) in the education sector, coordination among development partners is assured through the operation of the Education Sector Working Group (ESWG), presently chaired by UNESCO and UNICEF and including representation from the NGO Education Partnership network (NEP). This group serves as the local education group (LEG), providing ample opportunity for alignment, coordination, and collaboration. It meets monthly on its own and jointly with MoEYS leadership each quarter and in an annual retreat, with the latter serving as a joint annual review opportunity.

The nongovernmental sector in Cambodia is robust, with over 2,600 registered NGOs in the country, of which 80% are local.[11] Approximately 100 NGOs working in education belong to NEP, which has served as a clearinghouse for the community since 2002. NEP focuses on working with member organizations to contribute to enhanced accountability and transparency in the provision of educational services, as evidenced by its participation in the Public Expenditure Tracking Survey and support for promoting use of community report cards to increase social accountability at the local level.

Several NGOs have been actively working to improve early grade reading for the past several years. The table summarizes the numbers of schools and districts they are working in, and a map showing more detail regarding the locations of different NGO programs is included in Annex G. Presented in Table 3 as well is a short summary of some of the existing NGO-initiated and supported early grade reading interventions.

Table 3. Some NGOs Working in Early Grade Reading[12]

NGO	Project	# Districts	# Schools
KAPE	E4K	TBD	10
	Easy to Learn	2	23
	READ	4	22
	Schools for Excellence	1	15
Room to Read	Reading & Writing Instruction	7	213
Save the Children	I'm Learning	5	na
World Education	TRAC	4	6
	TRAC +	13	170
	TEST	4	7
Asia Foundation	Khmer eLibrary	3	4

Room to Read has completed a four-year pilot program in Siem Reap that includes the introduction of lesson guide books for teachers and three successive years of teacher training emphasizing oral language

[11] Strangio, 2014, p 193

[12] These are the larger programs, based on data obtained through interviews with different NGO representatives.

development, the five components of reading, use of the structured sequence of lessons, techniques for increasing student practice in each skill area, and use of decodable stories and leveled books. This was extended to schools in Prey Veng in 2014, and in the 2015-16 school year the program will be used Kampong Thom and Kampong Cham. There program operates in schools where Room to Read has also supported the establishment of school libraries. Room to Read has also developed several decodable books and leveled readers that could be made more widely available. In the next year Room to Read plans to address issues of pacing in the grade 1 and 2 textbooks. The program will revise the pacing and sequencing used to teach grade 1 content, enabling more time for each individual letter adding connected text reading in every lesson. Room to Read is also planning to develop more titles designed for early readers and to better level existing titles to make it easier for students to read books aligned with their reading ability.

World Education Inc. (WEI) developed the Total Reading Approach for Children (TRAC) project under the All Children Reading: A Grand Challenge for Development competition funded by USAID, World Vision International and the Australian Government and piloted by World Vision in Siem Reap. TRAC piloted the introduction of benchmarks and standards for student performance in grades 1 and 2, coupled with the use of continuous assessment tools to evaluate student performance in relation to the benchmarks and standards at defined "intervals" throughout the year. A locally recruited literacy coach (either from the ranks of existing staff, such as a vice principal, or from the community) helps administer the continuous assessment and then supervises remedial "responses" for the students scoring in the lowest level of performance. These responses are built around extra time during which students can use games that are specifically recommended for the skill area in which they need remediation. During the second year of the two-year pilot, WEI introduced a tablet-based software application also designed to provide remedial exercises in the form of games. Currently, WEI is finalizing a digital version of the continuous assessment tools they have been using, which will be introduced in a subset of the schools WEI will be expanding the TRAC model into in the coming school year.

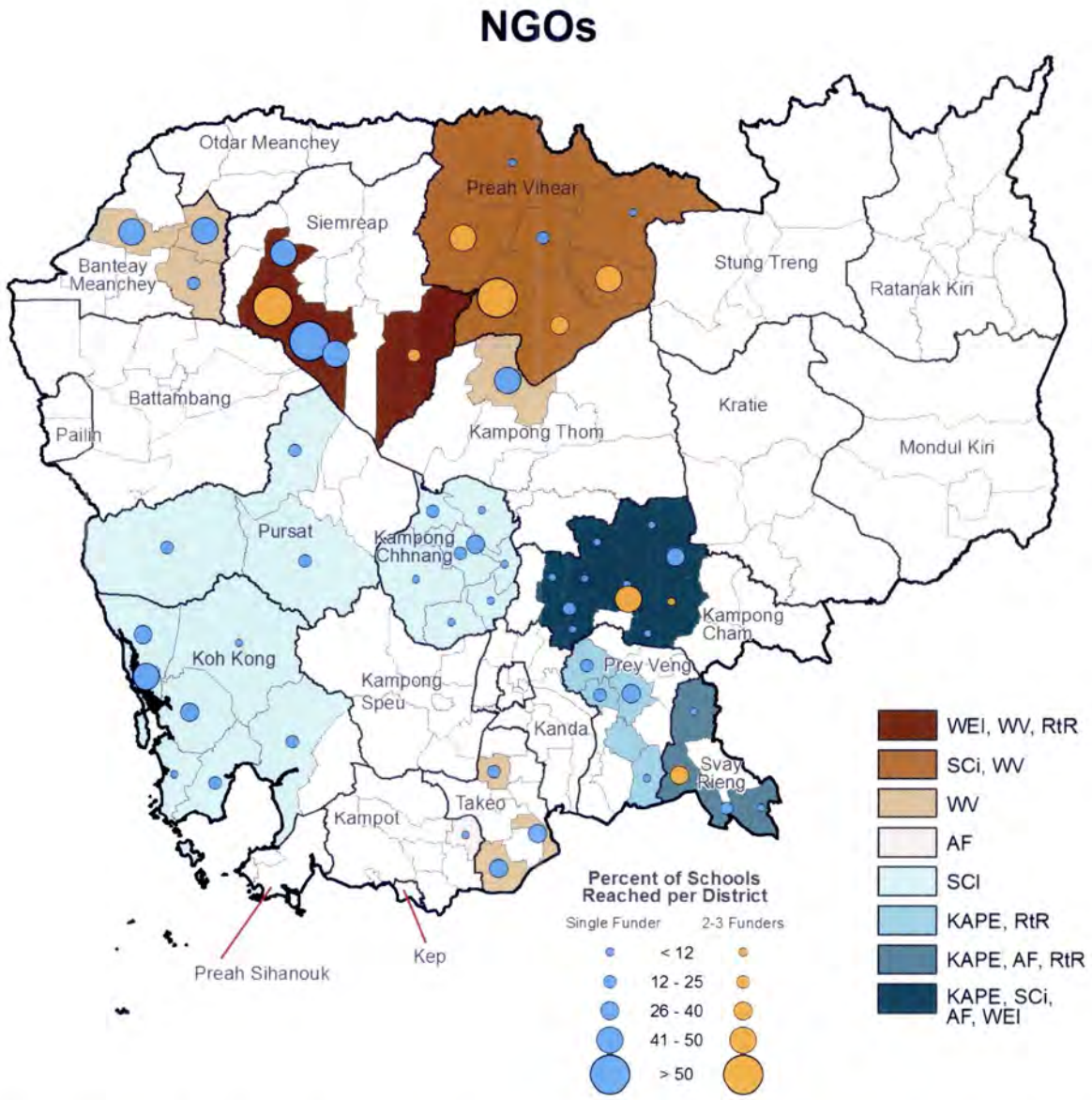
Kampuchean Action for Primary Education (KAPE) has worked in partnership with WEI to implement the TRAC project and has formed partnerships with several other NGOs to implement that approach in pockets of other schools. These include Child Fund Australia, an Italian NGO called We World, and the Asia Foundation. KAPE will also introduce electronic books (e-books for Khmer or E4K) in 10 schools on a pilot basis next school year. Existing books are being converted into sets of basal readers in electronic form with interactive features, including multi-modal presentations that build on children's oral language skills. The e-readers will also include digitized quizzes and test exercises to increase the efficiency and validity of teacher assessment.

Save the Children International (SCI) began the "I'm Learning!" project as a pilot in 2013 in 15 schools to test a new implementation framework known as Quality Learning Environments (QLE). QLE addresses four things: (i) emotional and pyschological well-being; (ii) physical well-being; (iii) improved learning outcomes (particularly in literacy and numeracy); and (iv) effective community and parental engagement. Additionally, SCI is developing low-cost, decodable stories to use in conjunction with its community-based early childhood program. Such books could also be useful in grade 1.

World Vision is implementing the expansion of the TRAC program (now called TRAC+) to 170 schools; 107 of the schools will receive the full package of support, including tablets for the remedial *mlearning* software and for administering the digital continuous assessment. The remaining 63 schools will receive the package of interventions minus the tablets. This offers an exceptional opportunity to isolate and evaluate the added value of the tablet-based components of the approach.

Figure 2 below shows the geographic spread of the main NGO programs supporting schools in Cambodia. Programs appear to be concentrated in certain districts, in select regions, and many of these districts have more than one program operating side-by-side. In some districts in Preah Vihear, Banteay Meanchey, and Kampong Cham the NGO programs are supporting more than half the public schools; in many others they support only a quarter or fewer of the schools.

Figure 2. Map of Some NGO-Supported Schools[13]



RtR – Room to Read; WEI – World Education Inc.; WV – World Vision; SCI – Save the Children International; AF – Asia Foundation; KAPE – Kampuchean Action for Primary Education

The combination of reform-minded leadership in MoEYS that affords high priority to improving early grade reading, along with a well-established network of development partners supporting MoEYS's strategic plan, and an NGO sector that is actively experimenting with ways to improve teaching and learning creates an opportunity for USAID to make a strategic investment in the sector that builds on these strengths.

[13] The map is not meant to be comprehensive. It includes the larger NGO programs and excludes some of the smaller scale interventions.

While the overall climate in the sector is one that has the potential to lend itself to some high-leverage, high-impact interventions, it would be naïve to claim that there are not significant concerns regarding whether the right components in the right combinations are being brought together in a way that can most effectively and efficiently contribute to improved reading. Likewise, the weak implementation capacity of the MoEYS's and Cambodia's issues related to governance and management in the public sector are drawbacks that any future intervention will have to overcome. These kinds of issues are discussed in the next section of this report and elaborated in more detail in Annex C.

Critical Issues Impacting Early Grade Reading

Like in many countries, children from disadvantaged backgrounds – from poor, isolated parts of the country – in particular face enormous learning challenges when entering school. Nutritional deficits, low levels of language development, and lack of access to stimulating early childhood development opportunities mean that many children may are likely entering school with a full range of developmental needs. And those needs have an impact on their ability to acquire literacy skills. This assessment was not able to evaluate these issues in Cambodia, but the team does acknowledge that attention to early childhood and pre-school education and to meeting the remedial needs of students during early primary grades are issues that likely also need to be addressed.

The Khmer Language

Cambodia enjoys the distinct advantage of a fairly homogenous population, with over 90 percent of all Cambodians native speakers of Khmer. However, some features of the language do pose particular challenges when teaching children to read.

Khmer is an alphabetic language that is part of the Khmer-Mon language family. Changes in the written form of the language have gone through several stages that closely follow the recent political upheavals in the country. However, the traditional system is once again currently the approach that holds sway in Cambodia. As a result of periodic changes to the language, Cambodian people are confused about the way to spell words, with parents who learned under one system sometimes giving the wrong guidance to their children who are now studying different spellings.

There are about 106 phonetic symbols in the Khmer Language, which, when combined with other peculiarities in the language, make it challenging to learn, especially for children. Consonants have inherent vowel sounds that change depending on whether they are in the voiced or unvoiced class. Their written form also varies depending on their position in a consonant blend. Khmer also has two groups of vowels—dependent and independent—the use of which varies depending on whether a vowel stands alone or with a consonant. Khmer words are not always written in a linear pattern. Consonants and vowels may take the form of symbols that occur above (superscripts) or below a letter (subscripts). Khmer also has three special symbols or diacritics that can change the associated vowel sound. As one can imagine, teaching young

children to understand this complicated system of different consonant classes, shifting vowel symbols and sounds, super- and subscripts, and diacritics is challenging. The approach currently being used requires students to memorize all the consonant-vowel combinations for each consonant in grade 1.

Reading Curriculum and Materials for Grades 1–3

MoEYS mobilized impressive efforts to respond to the 2010 EGRA results by developing completely new textbooks for Khmer for grades 1–3 (Table 4). And the Ministry did so by drawing on the experiences of the NGO partners working on improving the teaching of reading in those grades. The resulting books take a phonics-based approach to instruction that focuses on the teaching of grapheme-phoneme, or letter-sound correspondence. As mentioned, this is a return to a more traditional method of teaching students to read in Khmer. The original *Chet Chhem* method, as mentioned above, is based on students memorizing all classes of consonants, vowels, consonant vowel combinations, diacritics and subscripts in a particular order. The new textbooks use this approach to cover all the graphemes/phoneme combinations in grade 1, with a review in grade 2. The grade 3 book focuses on reading text and building vocabulary, comprehension, and grammar skills (details on the content of each grade's textbook are presented in Annex C).

Table 4. Some Information on New Textbooks[14]

	# Lessons	# texts for students to read
Gr 1	104	5
Gr 2	81	34
Gr 3	64	34

The teams working on developing the new books made the decision not to create separate teachers' guides. Instead, the front matter of each textbook contains a brief explanation of the five components of reading, instructions on how to teach each activity in the book, and for grades 2 and 3, teacher read-aloud stories. The rest of each textbook is divided into lessons that are aggregated into units. Each lesson has a title and a number as well as a specific amount of time that the lesson should take to complete. While the amount of time available for teaching Khmer is generous (520 minutes per week), at issue is whether the total amount of lessons available in the school year is adequate to cover the number of lesson hours indicated for each grade in the textbooks. According to the curriculum developers the aim of the textbooks is to cover all five of the components of reading: phonological awareness, alphabetic principle, fluency, vocabulary, and comprehension with some writing and grammar instruction included in grades 2 and 3. There is a considerable concentration on alphabetic principle in grade 1, while grade 2 and 3 mainly focus on fluency, vocabulary, and comprehension.

The main weakness of the grade 1 book is the lack of opportunities to practice and build students' ability to read connected text, vocabulary, or comprehension skills. These skills could begin to be developed through use of speaking and listening activities (such as teacher read-alouds) that build vocabulary and comprehension even before students are able to decode

[14] Based on assessment team analysis of textbook content.

connected text on their own. As stated above the main focus of the book is teaching alphabetic principle skills taking up 98 of the 104 lessons. This leaves little room for vocabulary or comprehension building. The grade 1 book also assumes that students can easily switch from reading one to three unrelated sentences to reading an entire story written with multiple paragraphs with no instruction on longer texts or comprehension skills prior to these lessons.

The grade 2 textbook consists of the grade 1 content and activities, and adds vocabulary, comprehension, and some writing skills. The book begins with 30 review lessons of the grade 1 content followed by 51 lessons that are a mix of speaking, listening, writing, and reading lessons. There are only 34 reading lessons, each made up of one text and related activities. Review lessons are virtually the same as grade 1 lessons with faster pacing. Challenges that exist in this textbook include over-emphasis on alphabetic principle in the beginning of the book and a lack of complexity to the skills and activities in the rest of the lessons. For instance the first 30 lessons in which grade 1 content is being reviewed do not contain any connected text reading or comprehension instruction. This, combined with other non-reading lessons, amounts to more than half of the school year during which students are neither reading connected texted nor building comprehension skills. When the students do get to read connected text in grade 2, only fiction stories are used and only literal comprehension is reinforced. Also the textbook does not address punctuation, making reading connected text less transparent. The grade 3 textbook also lacks sufficient focus on reading and comprehension skills. It has the same amount of reading lessons as the grade 2 book. Therefore students' opportunities to read connected text are nowhere near sufficient for them to have learned to read well enough to be able to read to learn in grade 4.

Supplementary materials for primary schools in Cambodia are generally produced and distributed by NGOs to project-supported schools (Table 5). Several MoEYS officials acknowledge the need for these materials but also cite a lack of funding and resources to develop, print, and distribute them. Three organizations in particular have developed leveled readers, and one has developed several learning games.

Table 5. Existing Supplementary Readers[15]

Organization	Type	# Titles	Grades
Room to Read	Leveled readers	193	1-2
	Decodable books	35	1-2
SIPAR	Leveled readers	120	Birth-8
KAPE	Decodable books	27	1

SIPAR has developed leveled books for children from birth to grade 8. This series includes everything from board books to short chapter books, several of which include comprehension questions at the end. The books for older students include Khmer stories as well as some from other countries. The text in the books gets progressively more complicated. The progression

[15] Leveled readers refer to books that increase in difficulty and that are specifically designed for a certain "level" of reading ability. Decodable books follow the scope and sequence of the textbook and use controlled text. Only words students have learned to read previously are used in the decodable readers. The figures here are based on information provided to the assessment team. Some materials may not have been identified/accounted for.

seems well paced. The illustrations are full color and range in styles. The print quality is quite good, likely causing the books to be higher cost.

Room to Read has also distributed libraries and developed decodable readers. Libraries contain both leveled readers and Khmer language versions of popular US children's books. Room to Read-supported classrooms also receive a series of simple, low cost decodable books. These books follow the sequence of the new Khmer textbooks and have short simple texts that students can read independently. The books are printed in black and white and have one sentence and one illustration on each page, making them cost little to reproduce.

KAPE has developed significant supplementary teaching and learning materials in the form of a toolkit and digital games to be used on tablets. The majority of these materials are simple games students can play that offer practice with specific skills and content in the textbooks. Most of these games are thoughtful and attractive for students. The games focus on only one skill or content area at a time, and many seem easy to use. Built into the digital games is also a set of decodable stories that the software reads aloud to students, followed by comprehension questions they have to answer. The challenges with KAPE's materials are the cost and the likelihood of them being implemented with the degree of support and supervision necessary to ensure students are learning from them and not simply playing.

Instruction and Classroom Practice

As mentioned earlier, one of the most significant positive features of the new approach to reading instruction is the time allotted specifically for Khmer in grades 1–3. Primary school in Cambodia runs in four-hour shifts, six days per week. Teachers are supposed to teach 13, 40-minute Khmer lessons each week, for a total of 520 minutes per week (more than a third of the total instructional time) allocated to teaching students to read in Khmer. This is much more time than is allotted to reading in many countries. However, whether that ample allocation of time is put to productive use is perhaps the single most important challenge to improving reading outcomes in Cambodia.

Based on an admittedly small, non-scientific sample of observations,[16] the assessment team saw lessons that had the teacher at the front of the classroom reading words or letters and students repeating and/or writing on slates. Activities sometimes included group work, and in at least one instance a teacher assigned more knowledgeable students to read with students who were struggling. Teachers were using the textbook and the activities prescribed in the front matter for instruction. All teachers had the textbook and some showed assessment team members their prepared lesson plans when asked. Teachers' instructional strategies focused on showing text such as letters or words, reading them for students, and having students repeat several times. In some classrooms, teachers had students write letters or words on slates, and in some instances making words or sentences in groups, or reciting or retelling a story, and sometimes answering

[16] The team conducted a relatively standardized approach to observing 12 lessons in four different provinces. The public schools visited included a mix of NGO-supported and non-supported schools and were all easily accessible from a main road.

questions. Teachers seemed to fairly consistently model what students should be learning or doing before asking students to practice. There were also many instances of teachers walking around the classroom to check student work and give feedback.

Although the team observed the above mentioned positive practices, some significant yet correctable challenges did exist. In general there was an overabundance of repetition as a strategy for reinforcing sound-symbol correspondence. Activities that could have focused on building vocabulary or developing comprehension were missing from most of the observations. In every instance students spent the majority of lesson time repeating, usually chanting chorally as a group. Such repetition, especially with so much emphasis on whole class response, quickly becomes unproductive primarily because chanted responses become disconnected from the text students are supposed to be reading. More generally, the team observed that teachers did not give students adequate opportunities to practice the different skills being taught. Teachers often called on only one student at a time to come to the front of the board and write or read, which, when done repeatedly (as was observed), leaves the rest of the class with nothing productive to do. This resulted in unengaged students drifting off task and at times disrupting class. Many classrooms shared these poor approaches to time and classroom management, which left many students either not fully or not at all engaged in the lesson.

Assessments

It is clear that MoEYS sees the importance of having sound assessment of student learning outcomes. In the past few years, leadership in the sector has committed to and developed a national reading and math assessment for grades 3, 6 and 8.[17] This national test will be multiple choice, with the reading component including a passage followed by several recall and comprehension questions. Disappointingly, the assessment team was told that the test is intended to be norm- rather than criterion-referenced.

MoEYS conducted two national, sample-based EGRAs in 2010 and 2012, and there is a plan this year to develop and implement an EGMA as part of the GPE package of assistance. The Ministry also evinces continued interest in conducting another national EGRA, but at present has no firm plans, nor assistance lined up, to do so. In addition to these assessments, MoEYS has signed on to participate in the Programme for International Student Assessment (PISA) and is involved in the discussions regarding the development of a regional test for ASEAN countries. The Quality Assurance Department (QAD) reports that the Ministry is keenly interested in dissemination of assessment results and has asked that a report on 2015 outcomes be prepared and shared publicly.

As mentioned, when discussing the EGRA results, the assessment team has significant concerns regarding how EGRA has been developed and implemented in Cambodia, and how the results have been analyzed and reported in the country. The problems with the test are discussed in detail in Annex C. In sum, the team found that the test as constructed in Cambodia does not

[17] Development of the national assessment in grades 3, 6, and 8 was a condition of the EU-provided budgetary support.

follow the expert-developed norms and rules[18]. The comprehension passages are not narratives but are lists of related sentences; two of the test sections used in Cambodia are no longer recommended for use; and the letters and words were presented in order from easiest to hardest (also not standard practice). Furthermore, the analysis report relies on a composite score that tabulates the number of items correct out of the total possible across all the test sections, treating all items as if they had equal difficult and importance. This method has never been used elsewhere, is not at all recommended, and has never been validated as appropriate.[19] Before any additional uses of this assessment are undertaken, it will be important to help review the tool and its use and rebuild the necessary capacity for its proper administration. In fact, working with MoEYS and its partners to develop a simpler version of the test may be a useful strategy.

In addition to the government's efforts to introduce and use assessments in the education sector, all the NGO partners are using assessments as well. Several are using EGRA to evaluate their programs, but disappointingly are following the government's lead. This means they are also misusing the assessment in several important ways, such as accepting aforementioned composite scores for reporting results. In addition to EGRA, other assessments are being used such as the continuous curriculum based assessment introduced by WEI and KAPE based on the MoEYS-approved benchmarks developed by KAPE based on the content of the new textbooks, or the functional literacy assessment tool (FLAT) being used by World Vision, or another instrument developed by Child Fund and yet a different, grade 6 assessment being used by the WFP. At issue is the non-standard approach to measuring and reporting outcomes that makes it virtually impossible to understand, let alone compare, the kinds of outcomes being achieved through different interventions. Some organizations are testing students on curriculum mastery, some are setting very low standards for reading proficiency, and some are waiting until grade 6 to evaluate basic reading skills. Helping establish some basic requirements for how programs should be reporting results would be a vitally important way to assist MoEYS in better evaluating and comparing different approaches to improving reading outcomes.

Quality Assurance and Decentralized Capacity for School Monitoring and Support

Since 2009, MoEYS has re-emphasized and reoriented its approach to quality assurance. The transformation of the Inspectorate into a QAD is fully underway, with support from SIDA for training and development of quality assurance processes.

DTMTs are seen as critical components in the quality assurance and school support efforts of MoEYS. They have responsibility for two kinds of interactions with schools—those related to school management and administration and those related to teaching and learning. DTMTs are

[18] Norms and standards for implementation and analysis of EGRA developed by multiple early literacy experts and validated through dozens of implementations can be found in the EGRA Toolkit and The EGRA Guidance Notes. Both documents are available for download at www.eddataglobal.org.

[19] We should note that the consultant report for the 2014 EGRA mentions the fact that compiling a single score in this manner is not appropriate, but then goes on to present the data and to use these inappropriately calculated "scores" to draw conclusions about reading outcomes.

faced with severe constraints, most notably the limited amount of funding available for visiting schools. For example, provincial offices of education (POEs) report receiving annual allocations of only $3000 to cover visits to all schools under their jurisdictions.[20] In fact, at the national level, the QAD expects visits to be made to only half the schools in the country during the next five years. The other major constraint faced by DTMTs is their lack of expertise in pedagogy, especially in the area of teaching reading in the early grades. If QAD is to genuinely assure the quality of reading instruction in early grades, then technical expertise related to the teaching of reading will have to be developed among DTMT members (or they will have to be helped to form partnerships that can bring such expertise to bear).

While specific checklists exist to guide school visits, and the compilation of the reports that would be developed based on them is expected to be handled by the EMIS, the challenge of turning that kind of data into useful information is significant. For example, the current system places a lot of emphasis on CFS indicators, which, as discussed earlier, are numerous and relate to a broad range of issues. It will require herculean effort and razor-sharp data management and analytical skills to distill that kind of information into something that enables school support to be focused on the issues that most impact learning outcomes.

Helping MoEYS model how DTMTs can operate effectively, how they can focus their energy and efforts on factors that research indicates are most likely to contribute to improved quality, and how the data tools and reports that result from school visits can efficiently be made useful at the school, district, and system level should be much more explicitly addressed.

School-Level Management

There are numerous institutional arrangements and policies and practices in place intended to improve school governance and management. School support committees (SSC) bring together stakeholders and staff at the school-community level to conduct school self-assessments and develop school improvement plans. School self-assessments are governed by the CFS framework, and indicators and tools for evaluating all 177 of these are available for SSCs to use. Improvement plans are then developed, outlining how the community will support the school and how school resources will be used to address the indicators that need improvement. Often, communities focus on maintaining the school grounds and making improvements to infrastructure. Basic recurrent needs are often met through the program budget (an allocation from MoEYS to each school) and through SIGs. These two sources of funding combine to furnish each school with a few hundred dollars for the school year. To date, schools have not received their full allocations (often only getting one or two disbursements out of four during the year), largely because of the slow, bureaucratic processes MoEYS uses to distribute these funds. Decentralization reforms being pushed by the government seek to move to a direct allocation of funds to the local level, which may alleviate some of these constraints.

Whether school improvement planning and management of resources at the local level are currently supporting interventions that can improve early grade reading is entirely dependent on

[20] Based on team member interviews

the nature of local initiative. In most cases, this means that school communities are focusing on the things like infrastructure and visible improvements to the school environment. Some school communities are recognizing the need to do things like purchase books for their libraries or intervene to better preserve and replace as needed the MoEYS-provided textbooks. An opportunity may exist to take better advantage of the system of school improvement planning (notably, by simplifying it considerably) and focus efforts more directly on supports for improved teaching and learning in early grades.

Teachers and the Teaching Profession

Primary education teacher training requirements have changed significantly over the past few decades in Cambodia. There are still teachers who entered the profession when a lower standard of educational attainment was required prior to being trained as a teacher. The present requirement is 12 years of schooling (completion of upper secondary), followed by two years of pre-service training at a provincial teacher training college (PTTC). Table 6 below shows that some 38 percent of the teaching force nation-wide has less than that, with 3 percent still having only completed primary school. This is likely due to various issues such as the extreme teacher shortage or the number of older teachers who started teaching when the requirements were lower. There is considerable variation across the country in teacher qualifications owing primarily to the fact that the most qualified staff are also the least likely to accept or stay in positions in the more rural or remote parts of the country. Much of teacher deployment is still subject to informal influence and individually negotiated arrangements, meaning that less desirable postings either go vacant or are only filled through local hiring of less qualified personnel. In five provinces more than half the teachers have less than upper secondary education, while in three, less than a quarter do. At the district level, this kind of variation may be even more pronounced.

Table 6. Teachers' Levels of Education[21]

	Total	%
Primary	1,364	3%
Lower Secondary	15,768	35%
Upper Secondary	25,893	58%
Graduate	1,832	4%
Post-Graduate	38	0%
	44,895	

There are 18 PTTCs and the recruitment of trainees into those colleges and their placement as teachers upon graduation is all province-based. However, the output of the PTTCs of only a few thousand teachers per year is reported to be only enough to replace attrition and therefore insufficient to grow the teaching force to meet the present demand for teachers.

Currently, the Teacher Training Department reports a severe shortage (perhaps as large as 19,000) of qualified teachers. Demand for staff at the school level is reportedly only satisfied through having teachers work double shifts in many schools and by the hiring of contract and/or locally recruited teachers. MoEYS reports that 49 percent of schools nationwide are operating on double shift, and that there are roughly 1,443

[21] MoEYS Statistics 2013/14

contract teaches employed almost exclusively in rural areas (98 percent).[22] Deployment practices contribute to the shortages of teachers in certain provinces and districts as teachers prefer to teach in their home districts rather than in rural areas far from home. The map on page 24 in the section of this report on inequities in the education system shows how the pupil-to-teacher ratio varies significantly across provinces, with some provinces averaging more than 56 students per teacher. MoEYS recognizes that there are imbalances in teacher deployment, with some urban areas actually experiencing surpluses. Attempts to get teachers to more willingly accept postings to remote areas have thus far not been able to overcome the desire of most staff to work in larger towns and cities. Additionally, corrupt management of personnel makes it possible for teachers to seek the assignments they prefer through improper channels. MoEYS is once again working on increasing the indemnities paid to teachers who will work in remote areas.

Working against MoEYS's efforts to address the shortage of teachers is a policy decision to raise once again the pre-service requirements for primary school teachers. The ESP 2014–2018 envisages requiring a bachelor's degree (12 + 4) for all teachers by 2020. Such a move would greatly reduce the available pool of trained teachers, without necessarily improving the quality of the teaching force. And the upgrading of the PTTCs that would be required to convert them to degree-granting institutions would draw resources away from investments that could actually contribute to improved teaching and learning.

Aside from the trainings offered by some of the NGO-supported reading improvement interventions, teachers in Cambodia have not been adequately prepared to effectively teach reading in the early grades. The orientation that was conducted in conjunction with the introduction of the new textbooks was minimal at best and lacked any systematic follow up. Additional ongoing professional development is not adequately resourced, and MoEYS may be moving on to other areas of concern, such as mathematics, without having done enough to develop the skills of the teaching force for the teaching of reading. Furthermore, teacher motivation is low, with many teachers seeking second jobs to supplement their income (48 percent overall; 67 percent in rural areas).[23] Teachers increasingly are tutoring students outside of class; 97 percent report giving remedial classes (for a fee).[24] MoEYS has developed teacher standards, but many teachers are unaware of them, and the present evaluation and reward systems are disconnected from teacher competency and student outcomes. As observed by the assessment team and reported in a recent World Bank study, most instruction is very teacher-centric, and too much class time is unproductively used.

Governance and Accountability

Poor school governance limits the effectiveness of quality-improvement-focused projects in the education sector. While chronic underfunding hampers quality improvement in the sector, poor governance and lack of accountability mean that in some cases scarce resources that are available are not being managed well. However, MoEYS has sought to strengthen school governance

[22] MoEYS Statistics 2013/14
[23] Tandon and Fukao, 2015, p. 80.
[24] Ibid, p. 77.

through the establishment of broadly based stakeholder committees at school level that must sign off on the use of PB and SIG funds for school. Promoting transparency in this way helps to limit improper use of school funds. How well these policies and practices are curbing mismanagement at the local level still depends far too much on the integrity of individual school directors.

School directors are determining factors in both the management of schools and the quality of teaching and learning. The assessment was not able to examine information relating to how school directors currently are providing the necessary oversight and administration for their schools, as well as whether they are adequately supporting their teachers in the improvement of their pedagogy. However, the team recognizes that this may be an important area for future investment (and that models for working with school directors exist, such as a training program run by VSO International).

Of equal importance is the weakness of the regulatory framework that governs the behavior of public school teachers and the deeply rooted system of informal fees. Many research studies have noted the pervasiveness of informal school fees and how these undermine educational quality, thwart equal access, and damage the integrity of the basic education system.[25] Private tutoring, which is largely uncontrolled in the public schools, creates incentives for teachers to de-emphasize what they do during normal classroom hours in order to increase the likelihood that students will pay for access to "real" teaching after hours. The primary justification for informal fees used to the low salary levels of state teachers. Now that teacher salaries are increasing quickly, it will be important to see whether MoEYS can put in place tighter regulatory frameworks that demand higher performance from teachers based on higher pay, or whether teachers will simply take the higher salaries and continue to collect informal fees as well. Recent initiatives aimed at improving social accountability at the local level hold promise for exposing, discouraging, and reforming such practices.

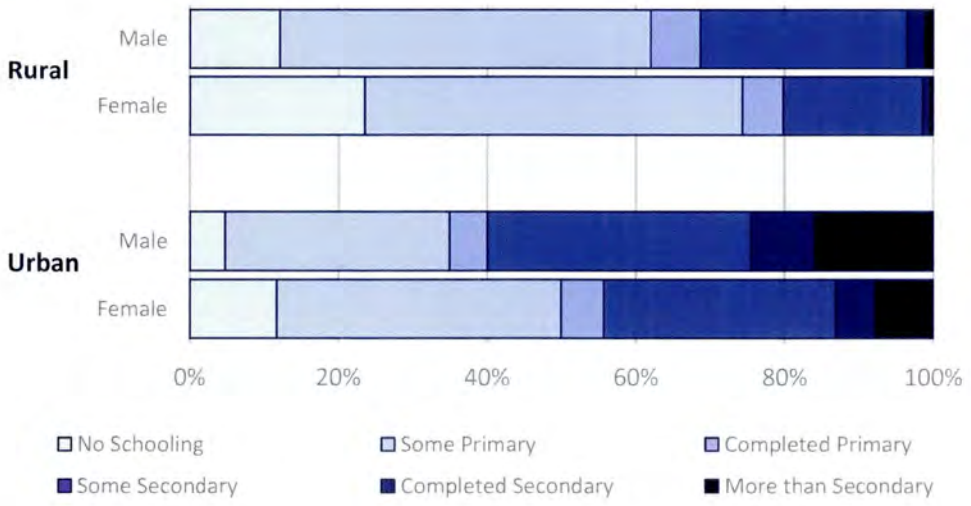
Inequities in Education[26]

While Cambodia has made great strides in improving access to education, the legacy of inequitable access is still evident in both the levels of education of the adult population and in the attendance rates of the current generation of school-age children. Figure 3 below shows the levels of education attained by the male and female populations in rural and urban households. A much higher percentage of both male and female household members in rural areas have no or only primary schooling: 74 percent of women and 62 percent of men. In urban areas, the majority (60 percent) of male household members and 44 percent of female members have more than just primary education.

[25] See for example, UNDP, 2015

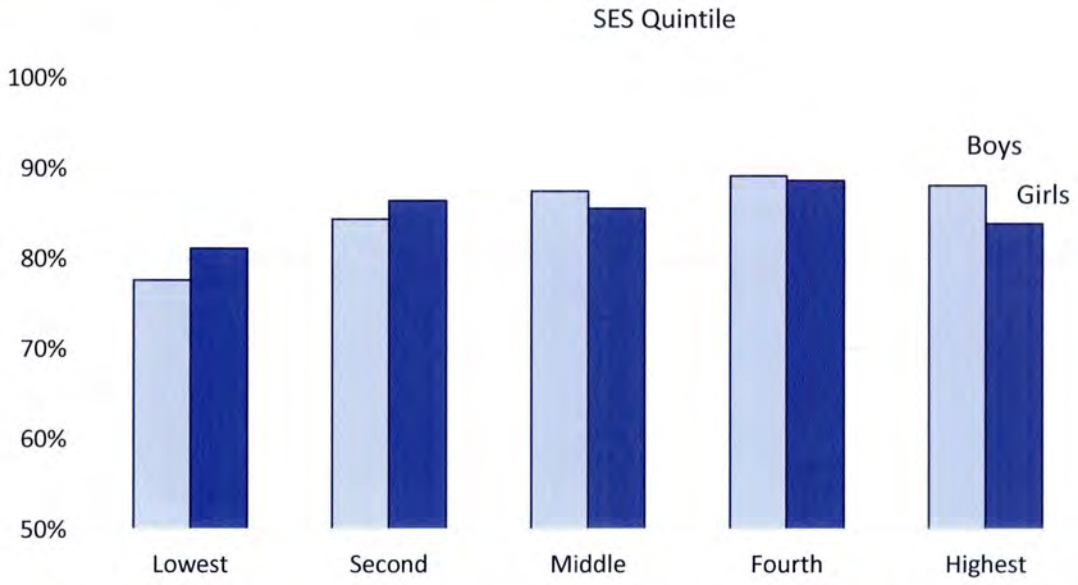
[26] Data presented in this section are drawn from the 2010 Demographic and Health Survey [DHS].

Figure 3. Household Education Levels



Regarding attendance in primary school of the current school-age population, inequities in access to schooling are based on geography and household wealth. Figure 4 shows the net attendance rates in primary school of boys and girls in each socioeconomic status (SES) quintile, ranked from the lowest or least wealthy to the highest or most wealthy households.

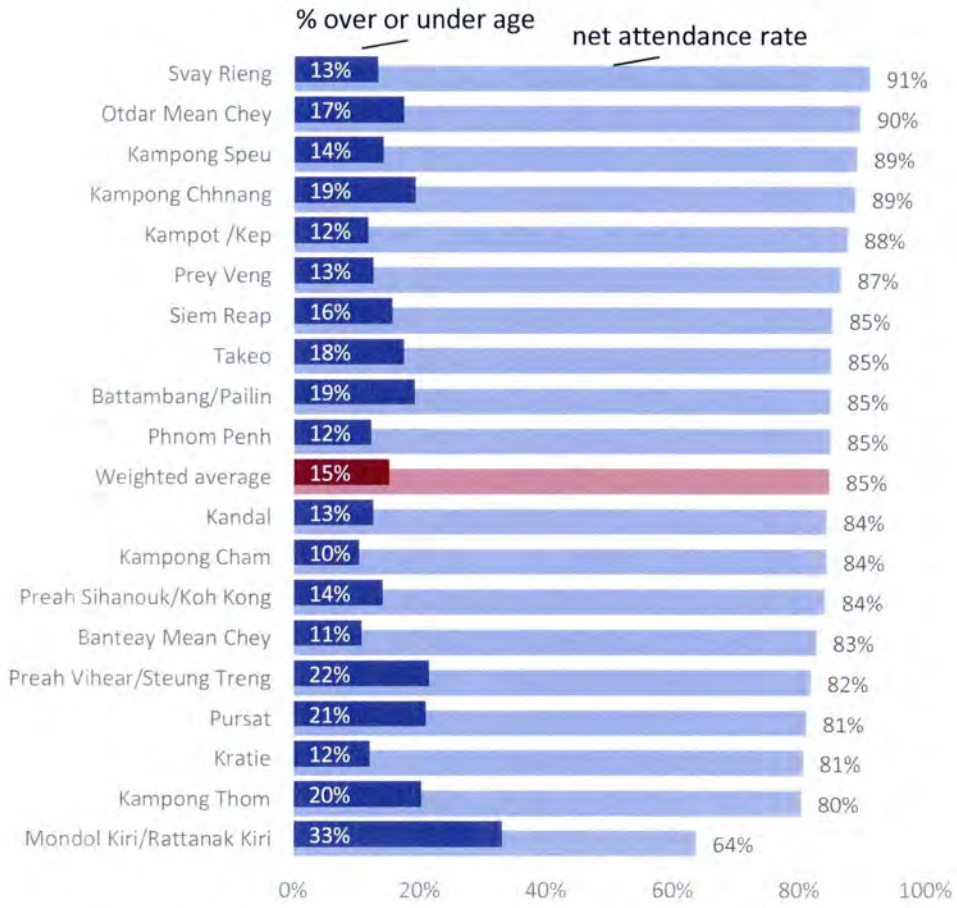
Figure 4. Net Attendance by SES Quintile



It is evident that children in lower SES quintiles enroll and attend school less frequently than those in the higher quintiles. Boys in the least wealthy quintile have a net attendance rate of only 78 percent, compared to boys and girls in the fourth SES quintile, who have rates of 89 percent.

In addition to inequities in access based on wealth, there is also considerable variation in the net primary attendance rate across provinces in Cambodia, as demonstrated in Figure 5.

Figure 5. Variations in Net Attendance across Provinces



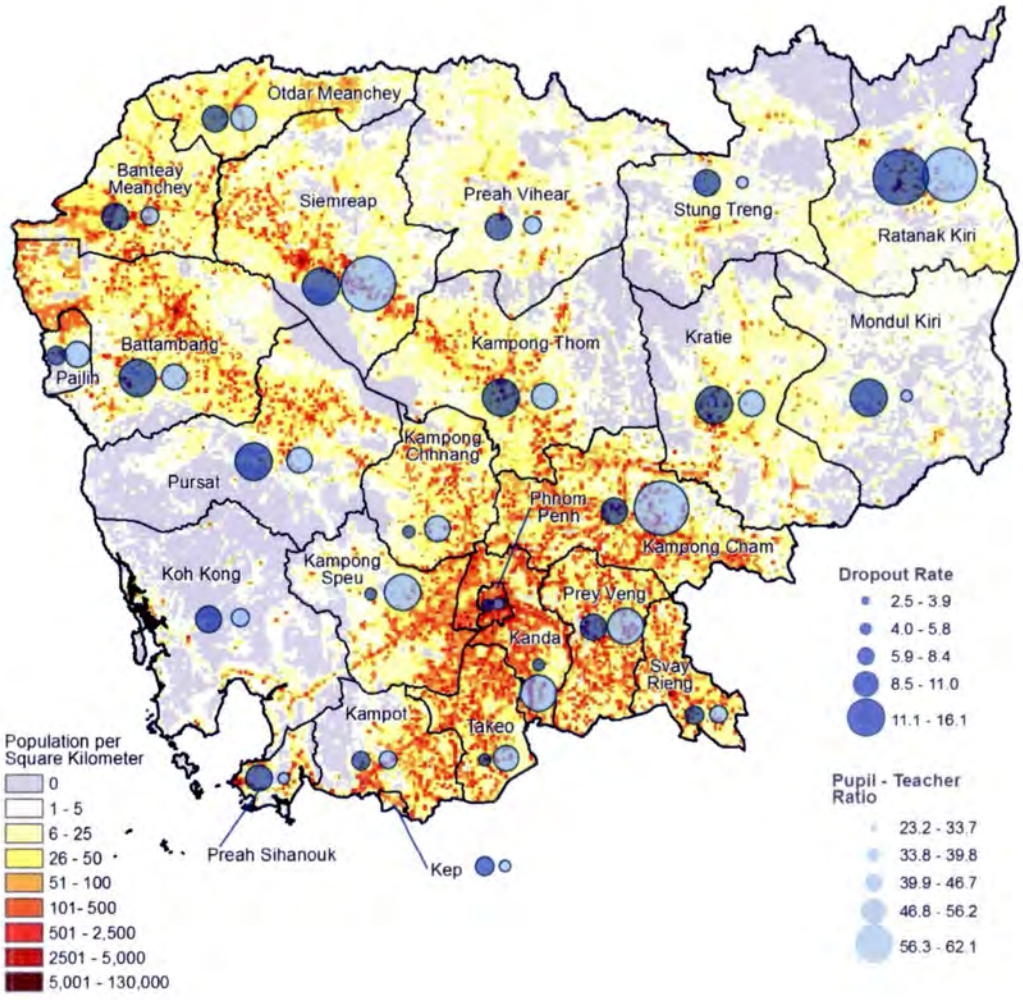
Attendance rates vary from a high of 91 percent in Svay Rieng to a low of only 64 percent in the two provinces of Mondolkiri and Rattanakkiri (combined in the DHS data). All the attendance rates based on the DHS household survey are below the net enrollment rates reported by MoEYS and based on the Ministry's own annual school census.

In addition to attendance rates, this chart shows the proportion of the enrolled students who are either above or below age (the darker bars). Every province has at least 10 percent of its school-age population either over- or under-age, while some provinces have very high rates of over- or under-age enrollment—such as Mondolkiri and Rattanakkiri (combined for 33 percent) and Preah Vihear and Steung Treng (also combined, at 22 percent). These four provinces are all located in the more sparsely populated, remote northeast corner of the country.

Lastly, inequities in basic service provision are also evident, with significant disparities in the pupil-teacher ratio across provinces. While data on learning outcome disaggregated by province are not available, a proxy indicator for school quality, the average dropout rate for the first three

grades of primary school, is. Figure 6 below overlays the pupil-teacher ratio and average dropout rates for grades 1–3 on a map that shows how population density is distributed across the country. It again is evident that more remote parts of the country, those where the population density is lowest, have the highest pupil-teacher ratios and highest dropout rates. Some of the low density areas are also where ethnic minorities are concentrated and the high dropout rates may have to do with students from those groups being unable to function in a monolingual, Khmer environment at school.

Figure 6. Population, Teacher Ratios, and Dropout Rates[27]



[27] Based on MoEYS data.

While Cambodia does reasonably well on measures of gender equity—the gender parity index for net attendance is .99 in urban areas and 1.01 in rural ones—there clearly is a need to do a better job addressing disparities in retention and quality between urban and remote parts of the country.

ICT4E: Promise/Practical Constraints

Technology development has made great strides in Cambodia in recent years. Mobile phone penetration is near universal and the costs of services and devices are decreasing. Social media are expanding. Facebook has an estimated 1.4 million users, 80 percent of whom are connecting to the network via mobile devices. MoEYS's Facebook page has over 400,000 followers. A wider range of ICT equipment is locally available, including modern devices such as thin clients and tablets, however these remain relatively expensive. IT support is available in the local market, but is of varying quality, especially as one moves outside of main urban centers. The market for software development is still emerging, but within this nascent environment, some applications for primary education have been developed.

A few, mostly donor-funded, technology innovations for early grade reading were developed and deployed in the country, with several just emerging. Technologies deployed are mostly Android apps optimized for tablets and smartphones. This is in light of the tremendous growth in mobile phone ownership in the country, reaching an estimated 96 percent of the population over 15 years of age,[28] with nearly a third of these owning a smartphone.

Notable, though still small-scale, technology initiatives focused on early grade reading include the following:

- *TRAC/Aan Khmer*, a game-based Khmer early grade reading support software aligned with the revised grade 1 Khmer language textbook and deployed on tablet devices as part of a comprehensive rapid response system for reading improvement. *Aan Khmer* was developed for Khmer under the TRAC initiative (2012–2014) funded by All Children Reading (jointly funded by AustralianAid, USAID, and World Vision). *Aan Khmer* is one of several components to TRAC.[29] It has been fully deployed and piloted in eight primary schools to date and also is used now in a small number of schools in other projects.
- *TEST*, continuous assessment software aligned with the new grades 1-2 Khmer language textbooks and continuous assessment approaches already piloted under TRAC. *TEST* is being developed with funding from the USAID/Cambodia Development Innovations initiative. Development started in June 2014 for completion in June 2015. To date, the software has been tested in former TRAC schools, but not yet been formally deployed.
- *TRAC+*, a scale up of the TRAC intervention package with tablets, from the original 8 primary schools to 107 new primary schools in Cambodia, funded by World Vision

[28] Phong, K., Sola, J. (2014). *Mobile phones in Cambodia*. Research funded by USAID/Cambodia and The Asia Foundation. (Open Institute)

[29] See Annex G for more details on the TRAC project.

Cambodia, and implemented from January 2015–2017. The actual deployment to schools will start in October 2015.

- *E4K* (2015–2016), an All Children Reading-funded initiative aimed at developing leveled e-books to complement the revised grade 2 and 3 Khmer language textbooks for students. The actual deployment of the software in TRAC, TRAC+, and other schools is scheduled to start in November 2015.

In addition, there are a number of self-standing apps for iOS and Android that have recently been developed by a range of actors and private software companies and made available on the respective stores. Self-standing in this context means that these apps are not deployed as part of a targeted early reading intervention, yet aim at promoting reading and early reading skills in Khmer.

A more detailed overview of the above early grade reading initiatives and other relevant developments in the technology sector for early grade reading are discussed in Annex H. The assessment team notes that the current climate may be overly focused on technology as a potential magic bullet. A more critical reflection on the ways technology can be a supportive input to the educational objectives pursued by MoEYS and its partners is needed, with less focus on technology as an end in itself.

That being said, some existing initiatives and applications such as those mentioned here could, with more appropriate customization, provide important resources for a range of target groups. For example, *Aan Khmer*, and a tool similar to the Khmer Library, could help overcome lack of access to grade-appropriate reading resources and texts outside of classrooms, and thus help promote greater community or parental engagement in reading. In the context of Cambodia, demand creation and advocacy, however, would be critical to stimulate such engagement. The near universal cell-phone access and early promising experiences with voice messaging under a MobileMamaAlliance effort in the country, point to ways that the education sector can use technology to encourage a culture of reading at home and in communities.

At the teacher level, the near universal access to cell phones and the projected high distribution rate of smartphones create an opportunity to provide instructional support resources directly to teachers, at scale. As outlined in more detail in Annex H, Cellcard, one of Cambodia's telecommunications providers, experimented with a student-facing app, combining an upper secondary textbook library, video lectures from professors, educational games and quizzes, a student forum, and the class calendar. There may be opportunity for a similar application targeted at teachers, integrating a range of resources including textbook supplements, model videos on common reading routines, or digital teacher forums for peer support. Furthermore, a re-design of the above-mentioned TEST app, facilitating teacher continuous reading assessment in classrooms, could enable more systematic monitoring of student outcomes. Additionally, mobile pedagogical support and quality monitoring tools could greatly enhance the work of DTMTs (and make up for some of their lack of expertise).

Key to the viability of any such initiatives is their systemic integration with other efforts to ensure that the technology component is not the end in itself. Furthermore, particularly with

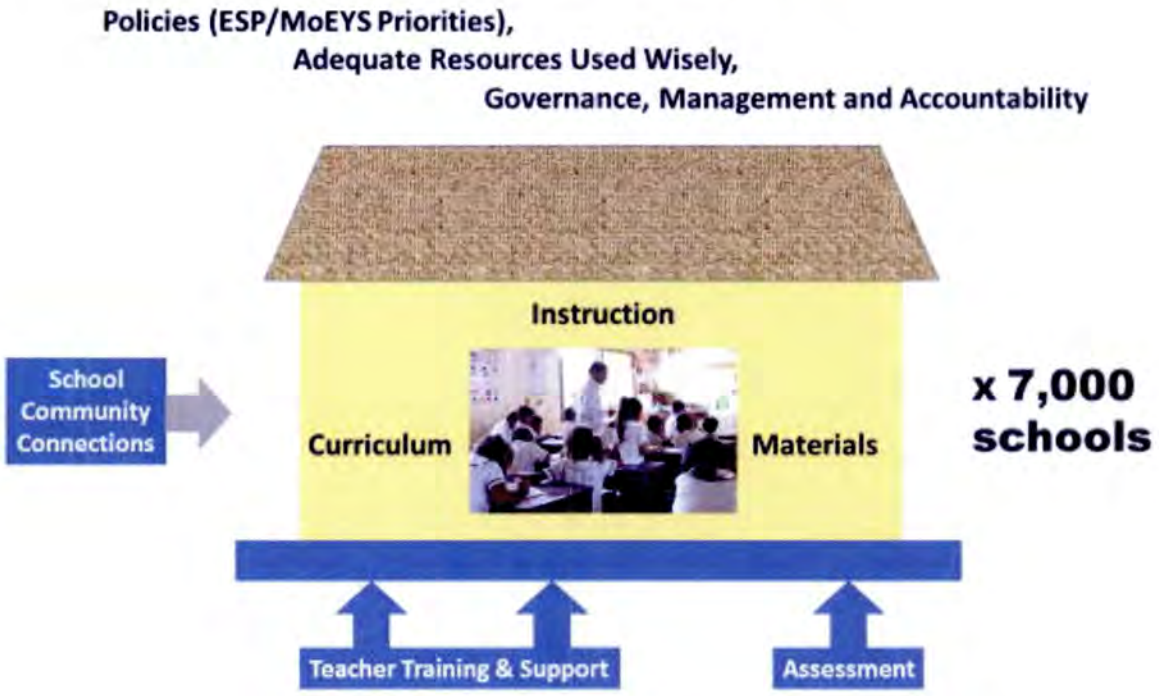
regard to technology, cost-effectiveness and "implement-ability" should indeed be, as outlined for Principle 2 above, non-negotiable criteria for determining which innovations would be worth pursuing. Leveraging existing devices that are already widely available and for which users themselves are already covering usage and maintenance costs would allow external assistance to focus on developing, evaluating, and promoting effective use of relevant content and tools rather than on purchasing, distributing, and maintaining devices.

4 Conclusions

The current context in Cambodia bodes well for developing an intervention that could make a marked contribution to improving early grade reading outcomes in the near- to medium-term. The current MoEYS leadership is reform-minded, has placed a priority on improving quality—particularly in the teaching and learning of reading and math in the early grades, and is open to innovations and new approaches. Numerous projects are supporting early grade reading, ranging from MoEYS's own efforts to the various NGO-led initiatives in the sector. MoEYS and these partners are working together in a spirit of collaboration, with the Ministry often willing to take lessons from the various projects. Progress in improving learning outcomes on a significant scale, however, is going to require more than just sharing ideas and an open invitation to NGOs to try out a growing variety of approaches. MoEYS is going to have to critically review the implementation of the new curriculum/textbooks to date and consider what additional inputs and supports will be needed to help teachers and students more fully benefit from them. And MoEYS and its development and implementation partners will need a more rigorous approach to determining which innovations represent viable options for improving teaching and learning at scale. A good starting point would be the criteria listed by Secretary of State and National Education for All (EFA) Coordinator Dr. Nath Bunroeun as his principles for evaluating partner projects, namely: 1) relevance to MoEYS programs and strategies, 2) efficiency, 3) effectiveness, 4) impact, and 5) sustainability. There is an opportunity for USAID to support such a rationalization of activity in the sector and to demonstrate through its programming how such principles can be applied.

The team has identified several more specific ways that USAID can take advantage of the positive opportunities that are opening up in the primary education sector and help MoEYS and its partners overcome some of the obstacles holding back wide-scale improvements in learning outcomes. Our approach to summarizing the opportunities and options available to USAID/Cambodia is driven by what research indicates are the critical vectors for improving reading outcomes. Figure 7 below illustrates how these factors fit within an approach that supports capacity in Cambodia to effect wide-scale improvements.

Figure 7. In-School Factors Affecting Learning Outcomes



Depicted above are the in-school factors of curriculum (what to teach), materials (vehicles for transmitting content and affording students adequate practice), and instruction (how to teach) that determine whether students learn to read in early grades. These in-school factors must be reinforced through high quality teacher training, follow-up, and ongoing support, and progress must be monitored through rigorous assessment. School-community interactions that support improved instruction can also contribute to improved outcomes, but they must be more focused. If all these elements are to come together for all schools in Cambodia, then attention must be paid to the policy, resource, management, and governance environments in the sector (at the national, decentralized and local levels).

Applying this framework, the assessment team sees the following opportunities and recommends the listed options as possible ways a USAID program could take advantage of those opportunities in relation to curriculum, materials, instruction, teacher training and support, assessment, and school-community connections (Table 7).

Table 7. Opportunities and Options

Opportunities	Options
Related to Curriculum: • The return to a phonics-based approach to teaching reading is one that is almost universally supported and preferred by teachers.	Invest in helping MoEYS and its partners maintain attention to and momentum for supporting early grade reading by helping set up coordination mechanisms and a community of practice within the existing arrangements (such as the ETWG and NEP).
• The curriculum allocates plenty of time for reading instruction in early grades, however	Help MoEYS develop training approaches that stress efficient use of instructional time, better and varied teaching techniques, and more focus on the full range

Opportunities	Options
instructional time is not as productively exploited as it could be.	of reading skills development in grade 1. May want to consider the approach Room to Read is experimenting with that modifies how teachers introduce letters, moving students more quickly into reading decodable stories and developing comprehension and fluency skills.
• Benchmarks and standards that further explicate the curriculum have been developed by a project, and MoEYS has adopted them as of October 2014 with plans for printing and distributing in 2015-2016. .	Support revision of the benchmarks and standards to make them more generic (rather than including suggested project specific supplementary materials most schools cannot access as they are now) so that they can more appropriately be deployed on a wider scale. Assist MoEYS in considering not only how to distribute a document containing these benchmarks and standards, but also how to train teachers in their use in guiding lesson construction and ongoing assessment of student progress.
Related to Materials: • Existing textbook provides reasonable foundation for improving reading instruction, however the quality of the printing and long-term planning for replenishment have be addressed	Assist MoEYS and its partners in evaluating the usage and wear and tear on books, and use that information to plan for adequate ongoing replenishment of textbook stocks. Additionally, MoEYS can conduct more systematic monitoring and evaluation of the textbooks and plan for a review of the existing content and structure with an eye towards addressing some of the issues raised by this assessment (see Annex C).
• Numerous supplementary materials are available including: – Decodable stories – Leveled readers – Teacher lesson book – *Aan Khmer* app – E4K electronic versions of books – Khmer Library app (links to pdf versions of books) – TEST app – Draw Khmer alphabets (letter tracing) – Tiger, Monkey, and Rabbit (e-book)	Assist MoEYS and its partners in determining an optimum package of materials needed to support early grade reading, and provide assistance for rigorously evaluating the costs and tradeoffs associated with printed versus electronic versions of materials. Assist MoEYS and its partners in considering apps targeting teachers more directly, especially those that can take advantage of the growing penetration of mobile and smart phones as lower cost means to push resources to teachers and to facilitate communication and follow up. Assist in stimulating wider availability and access to the burgeoning market for e-based materials and apps for students and their families.
• MoEYS has policy regarding school libraries and with support from partners is trying to establish libraries in every school (at present, 36% of schools at all levels have libraries)	Support efforts to make libraries of leveled readers available in all schools, especially by pursuing better use of PB and SIG funds towards these ends, as well as mobilizing public-private partnerships that could mobilize resources for creating and stocking libraries.
Related to Instruction: • Teachers prefer and are more comfortable with the current approach to teaching reading, but they need much more guidance on how to put together and carry out lessons that make much more productive use of class time.	Help MoEYS put in place a systematic approach to teacher in-service professional development that focuses on teaching reading, including specific instructional techniques for engaging students in productive skills practice.
• Experience of TRAC project addressing remediation	Assist with rigorous evaluation of expanding implementation of TRAC Design to determine value added of a remediation-focused approach. Assist MoEYS in devising simple techniques for teachers to use to differentiate instruction and address remediation as a feature of daily practice.

Opportunities	Options
Related to Teacher Training and Support: • The education system has in place institutions, policies, and practices at the decentralized level that could be better exploited to support improvements in teaching. These include: – DTMTs – Cluster meetings—weekly within schools and monthly across schools	Help operationalize DTMT support to all schools in selected districts/provinces, including reinforcing the capacity of DTMTs and forging partnerships between DOEs and other actors (e.g., NGOs) at the district level that can lend expertise in pedagogical support. Help POE and DOE in selected areas operationalize and take greater advantage of the existing cluster system by introducing a clear focus on teaching reading in early grades, including techniques for improving classroom practice.
• High penetration of mobile phones and growing availability of smart phones (especially among teachers). MoEYS is using video for teacher training and includes video-based training and support as part of its ICT Master Plan.	Use technology-based approaches for teacher follow-up, remote teacher support, and teacher networks using teachers' existing mobile phones, and build off lessons learned in terms of trade-offs between text-based and voice-based approaches. Develop videos of good practice and introduce those into teacher support/teacher training activities, particularly at pre-services using existing ICT equipment.
Related to Assessment: • MoEYS has carried out two national EGRAs and is committed to continuing to evaluate early grade reading outcomes at the system level; however, it has committed serious errors in its use of EGRA to date.	Provide assistance to MoEYS to improve its use of EGRA, including improved adaptation of multiple equivalent versions of grade-appropriate Khmer instruments, training in test enumeration and in data analysis and reporting. Support MoEYS and NGO community in how to use and interpret EGRA results. Introduce electronic administration of EGRA.
• Some success introducing continuous assessment through the TRAC project and other related NGO interventions	Help MoEYS and the NGO community consider how continuous assessment can be simplified and incorporated into teacher practice.
Related to School-Community Connections: • Institutions in place for school-level community involvement in school improvement planning, but currently attention is spread across too many aspects of the school environment without sufficient attention to what communities can do to support teaching and learning of reading.	Can build on existing social accountability initiatives by investing in communications directed at parents/communities and intended to inform them about the teaching and learning of reading. Could support a social behavior change communications intervention intended to help address barriers in parents' knowledge, attitudes, and practices related to their children's acquisition of literacy.
• Success in mobilizing communities to participate in social accountability activities and to have greater say in evaluating and contributing to improvement of service provision in the education sector.	Can explore low-cost voice messaging options for communicating with families and for gathering and sharing information related to social accountability at the school level (e.g., concerning textbook availability, teacher attendance, use of school funds, etc.)
• Many community-based activities with potential overlap with efforts and links to improve early grade reading, for example community-based approaches to early childhood (SCI) and community-based adult literacy programs (UNESCO).	Explore ways to coordinate with community-based ECE and adult literacy (such as UNESCO's program) to create mutually reinforcing activities for parents and children related to language development and literacy.

For presentational purposes, the assessment team had to summarize a number of opportunities in the above table. Unfortunately doing so risks creating the impression that the team is advocating a variety of individual initiatives. We cannot overly emphasize that our intention is in fact the

opposite. A main concern the team has at this juncture is that the education sector in Cambodia is subject to the proliferation of disparate initiatives, approaches, and projects. We therefore return to the principles stated at the start of this report—namely that future consideration of activity in support of the education sector must:

- Contribute to impact at scale;
- Work to address the system issues necessary for school-level interventions to be scale-able and sustainable and promote greater coherence so that teaching and learning materials, instruction approaches, assessments, and school support activities are mutually reinforcing; and
- More rigorously provide evidence of impact and data on cost-effectiveness, and support MoEYS in requiring and promoting greater use of said information.

USAID can play an instrumental role by helping build MoEYS and NGO-sector capacity to apply these principles. For example, by working with MoEYS to promote a more uniformly applied approach to assessment of learning outcomes and to reinforce more rigorous standards for impact evaluation, USAID could help MoEYS determine the policy and operational guidelines it must put in place while simultaneously helping build capacity among implementing partners to work with the Ministry to institute such guidelines. Supporting the development of explicitly defined grade-based, measurable benchmarks for reading proficiency could also contribute significantly to reinforcing a more standardized approach to measuring project and program impact.

Additionally, resource and education poor, often more rural and more isolated communities are those least benefiting from recent improvements in the provision of education in Cambodia. USAID could help MoEYS explore, evaluate, and promulgate successful strategies for creating more and more appropriate educational opportunities for disadvantaged families and communities. Children at the low end of the socioeconomic spectrum are those who need more instructional opportunities and more time to develop and practice literacy skills. USAID could support the formulation, implementation, and evaluation of strategies for assuring cost-effective, scale-able approaches to supplemental instruction.

Finally, while the assessment team is encouraged by the opportunities present in the education sector in Cambodia, it is important to recall some of the important contextual and institutional constraints any future intervention will need to face. The government's limited allocation of resources to education is something that should continue to be addressed through ongoing policy dialogue. Helping generate better data on the costs associated with different interventions, and the cost-effectiveness tradeoffs between different options, approaches, and strategies, could help MoEYS see how to make better use of any additional resources the education sector does receive in the future. Well-timed, targeted policy support activities—that for example could help conduct cost-effectiveness analyses of existing interventions—could make a significant contribution on this front.

Another constraint is the limited implementation capacity within MoEYS, especially at the decentralized level. For example, going forward it is going to be crucial to determine how to

cost-effectively build capacity of district's to provide value-adding instructional support to teachers. Working with MoEYS's various NGO partners to develop models for public-private collaboration and partnership around school support services could be one avenue for addressing these capacity limitations. There is a need to more purposefully connect school support and quality assurance efforts (for example, those that SIDA is helping QAD put in place) and NGO-led school-level activities so that overall system capacity in this area is reinforced.

Lastly, USAID should take advantage of the high degree of collaboration and coordination already evident in the education sector and offer MoEYS assistance in harmonizing approaches to assessment, impact evaluation, and use of data to inform policy dialogue and deliberations.

5 Policy Dialogue Workshop

A draft of the present report was made available in July 2015 to a large cross-section of stakeholders representing the MoEYS, the NGO community and the development partners active in the education sector. They were all then invited to participate in a half-day workshop on August 3, 2015 during which a summary of the findings was presented. Workshop participants were given time to discuss the findings, provide their feedback and offer additional input to the assessment team's report. Those comments and inputs have been incorporated into this, the final report. Some highlights of what was discussed are summarized here.

One issue that arose during the workshop was the Khmer language. Many participants intervened to stress that while Khmer has some particular characteristics (as discussed in this report), with proper instruction children should learn to read in the first two years of primary school. Universally, stakeholders agreed that the new textbooks and the teaching methods around which they are organized are a vast improvement over what had been being used in the early grades, but were concerned that adequate attention be given to reviewing and refining the content of those books. The importance of supplementary materials was also raised, with an emphasis on making sure that schools have adequate additional reading materials and that the conditions be present to ensure teachers and students make productive use of such resources. Linked to this issue was concern for the development of reading culture – both in school and at home/in communities. Participants would like to see more effort mobilized to not only provide additional materials, but also to communicate the value of reading and to engage parents and the broader community in supporting children learning to read.

Two things were cited as missing from the assessment team's work, and the team acknowledges that in the limited amount of time available, it was not possible to cover them. First, participants raised concern for the developmental needs of children as they enter school and as they progress through the early grades. The lack of early childhood or pre-school education in most communities, as well as the impacts of poverty on children's development status when they enter school are issues that will be important to consider and address if Cambodia is to see marked improvement in language and literacy development in the early grades of primary school. Recognizing and meeting the remedial needs of children who are disadvantaged in when they enter school is also another important area of concern.

The second issue not adequately addressed in this sector assessment, is the important role played by school directors in determining school quality. School directors are a critical resource that can be more productively engaged to support improvements in teaching. To do so, they will also require training and support, so that they can a) understand what teachers are expected to do, b) provide support to their teachers as the labor to change their day-to-day instructional practice and c) monitor teacher behavior. Future efforts to support improved early grade reading in Cambodia should likely consider how to work with school directors.

Many participants agreed with the findings of the early grade reading sector assessment that adequate time and productive use of time for instruction are critical. Participants observed how professional standards for teachers need to be reinforced to ensure that teachers show up and manage the school day appropriately, and to set expectations for what good instruction needs to look like.

It was clear from the participation and the nature of the discussion and comments during the policy dialogue workshop that stakeholders across the board support having early grade reading as a priority for the MoEYS and its implementation and development partners. All stakeholders demonstrated that they are willing to support such a priority, and an atmosphere of collaboration, a willingness to learn from each other's experiences, and a desire to coordinate programming and resources makes it likely that they will be able to effectively work together to support interventions aimed at improving reading outcomes.

6 Annexes

Annex A: Statement of the Assessment of Early Grade Reading Objectives and Methodology

Sector Assessment Objectives

The findings will help decision makers, in particular the Cambodian Ministry of Education, Youth and Sport (MoEYS) and USAID/Cambodia, plan effective reading-focused interventions and better understand current policies, practices, and impediments to early reading instructional practices in Khmer. Upon completion, the Early Grade Reading Sector Assessment report will identify such gaps and provide a full diagnostic snapshot of the key accomplishments, challenges, and opportunities in Cambodia for a comprehensive and high quality early grade reading program. As customary in Ed-Data II Task Order activities, all relevant deliverables and products from this activity will be made publicly available on the EdData II website (https://www.eddataglobal.org/).

Sector Assessment Framework and Methodology

A team of four education experts from RTI International, one Senior Education Advisor from the USAID/Asia Bureau, and four staff members of a local NGO, Kampuchean Action for Primary Education (KAPE), carried out the assessment. An extensive document review was supplemented by interviews conducted during a three-week period in-country. A list of MoEYS officials, development partner staff, and implementation partners interviewed is included in Annex I to this report. Visits to 3 provinces, 4 districts, and 10 schools provided a glimpse into issues present in the education system at the decentralized level. The team developed and followed a framework for data collection covering the information to be gathered relative to the current MoEYS policies, plans, and operations related to early grade reading, as well as the development partner portfolios of basic education projects, and various NGO implemented school-level interventions in support of improved early grade reading.

Annex B: Overview of the Education Sector in Cambodia

The Ministry of Education Youth and Sports (MoEYS) has responsibility for the full scope of education in Cambodia from early childhood education through post-secondary and university. The central ministry is organized into General Departments for higher education, basic education, youth and sports, as well as Administration and Finance and the General Inspectorate. Basic education is further divided into early childhood, primary, lower secondary, and upper secondary; there are also offices with specific technical responsibilities for curriculum and teacher training. Annex D of this report discusses the responsibilities, attributes, and priority concerns of the departments with mandates that relate to the improvement of early grade reading. At the decentralized level, the administration of K-12 education is assured through 24 provincial and 185 district offices of education (decentralized administration is discussed in section 3, Quality Assurance and Decentralized Capacity for School Monitoring and Support). A brief overview of recent periods of reform in the education sector is provided here before a discussion of the Ministry's current plans and priorities.

Educational Reform Period (2000 to 2005)

Although Cambodia's education system received significant investment during the 1990s following the conclusion of the civil war, school efficiency indicators remained largely static for much of that decade. Empirical research carried out at the beginning of the 2000s attributed this lack of progress to a focus only on supply-side inputs such as textbooks, teacher training, and infrastructure. This research provided an empirical basis for a pro-poor education reform movement that introduced strategies to address demand-side constraints such as scholarships, school feeding programs, and the abolition of school fees. School operating budgets were introduced to make up for the lost revenue at the school level due to the elimination of fees. The new reforms led to dramatic increases in net enrollment rates, particularly among the poorest quintile of the population (Engel, 2010). However, net attendance rates among the poorest segment of the population still lag behind those of the higher socioeconomic quintiles (present inequities in the education system are discussed in more detail in section 3, Inequities in Education).

Figure B-1. Child Friendly Schools Dimensions

Dimension 1: Inclusive Education

Dimension 2: Effective Learning Environments

Dimension 3: Health, Protection, and Safety

Dimension 4: Gender Sensitivity

Dimension 5: Parental, Community, and Child Participation

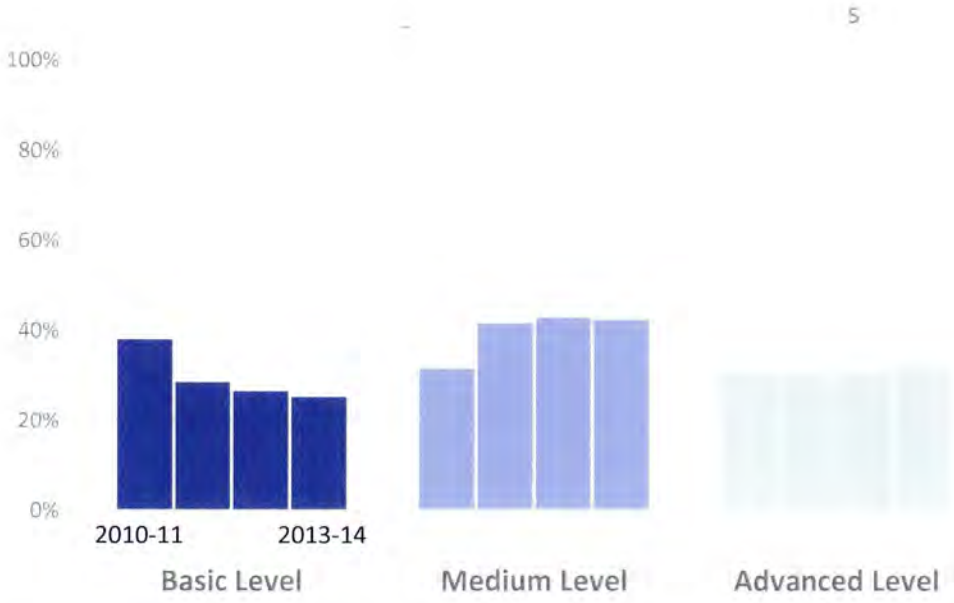
Dimension 6: Enabling Administrative Environments (Cambodia only)

Source: MoEYS, 2008

In time, this more balanced approach to educational investment coalesced around an integrated strategy known as Child Friendly Schools (CFS). MoEYS adopted a formal CFS Policy in 2008 that refocused investment on six key dimensions

of whole school development (Figure B-1). However the decision of MoEYS to roll out the CFS policy nationally without the use of any incremental phasing greatly diluted what had been achieved during the pilot phase (KAPE, 2007). Nevertheless, the CFS framework and indicators are widely referred to in the education sector and form the basis for school improvement planning and school supervision. Data on the extent to which all the dimensions of this whole-school model are adequately addressed at the school level where made available by UNICEF and summarized in Figure B-2, showing that from 2010–11 through 2013–14, percentages of schools scoring in the "medium" level increased and those scoring only "basic" decreased. How objectively any CFS indicator is evaluated at the school level is not apparent.

Figure B-2. Percent of Schools Achieving Different Levels According to Child Friendly School Indicators



A review of the school-self assessment instruments used as part of the national approach to CFS revealed a total of 177 indicators of the dimensions shown in the textbox on the previous page. Of these 177 characteristics of a child-friendly school, 17 (10 percent) have to do with specific aspects of teaching and learning (6 concern teacher preparation of lesson plans, 6 deal with presence and use of textbooks, 5 relate to instructional activities, 3 with teacher testing of students, and 1 with learning outcomes: pass/fail rates of students in class).

Post-Education Reform Period (2008 to 2011)

In spite of the significant progress made at the start of the new century, particularly with respect to access issues, by 2010 educational reforms had largely stalled. While primary net enrollment rates had nearly reached 100 percent (currently reported to be 96 percent), there are some concerns about the validity of the officially reported data. Household survey data, such as those provided by the Demographic and Health Survey (DHS), may in fact provide a more accurate

picture of the proportion of school-age children enrolling in and attending school. The 2012 DHS reports the total net attendance rate as 83 percent.

Although formal school fees were abolished in the prior reform period, a study in 2012 revealed that informal fees at both primary and secondary level posed a significant challenge. More than half of student respondents (53 percent) reported paying some kind of fee, and 67 percent of parents did so (Ang & Conochie, 2012).

Many of Cambodia's efforts to improve educational quality during the last decade have been impeded by a growing teacher shortage. Lack of adequate resources in the public sector constrains the number of teachers that can be added to the civil service payroll each year, limiting what MoEYS can do to address this problem. Additionally, the shortage has been exacerbated by recent policy decisions to increase entry requirements to Provincial Teacher Training Colleges (PTTCs) to completion of upper secondary (using a 12+2 model for teacher certification, with a 12+4 regime planned to take effect in 2018). Expansion of secondary schooling is also in part drawing teachers from the primary school ranks, further worsening the situation. The shortage in primary schools now numbers approximately 14,000 teachers or 32 percent of the total primary teaching force (EMIS, 2014). Double shifts in many schools and hiring of contract teachers are strategies being deployed to deal with this shortage. But it is important to note that misaligned teacher deployment means that the shortage of teachers is inequitably felt, with some urban or town districts even experiencing surpluses of teachers while rural districts suffer severe shortages. Redeployment of teachers from urban to rural areas has been tried, as has indemnities for teachers posted to remote areas, but with only limited success.

A World Bank supported national survey of early grade reading in 2010 found that 54 percent of children at grade 1 could not read at a basic standard (World Bank, 2010). According to the Executive Opinion Survey of 2013–14, Cambodia ranked 106 out of 148 countries on business perceptions of educational quality. Within the Southeast Asia Region, its primary education system ranked at the very bottom on this measure, with a score of 3.2 on a scale of 7 (World Economic Forum, 2014).

New Reform Period (2011 to Present)

Dissatisfaction with poor educational quality has led to several new initiatives at the start of the present decade. In response to the low levels of reading proficiency revealed by the 2010 early grade reading assessment (EGRA), the Ministry decided to replace the language curriculum for grades 1, 2, and 3 with an approach that was more consistent with traditional methodologies used for teaching Khmer. The Ministry was able to undertake these efforts through a consultative process that included many nongovernmental organizations (NGO) and development partners. Initiatives to enhance quality and improve management in the education sector were further advanced by the appointment in 2013 of a reform-minded minister with a strong mandate to bring about positive change in the educational system.

The Ministry's current policy orientations, strategic directions, and plans for each level of education are conveyed in the Education Strategy Plan (ESP) for 2014–2018. In the current ESP

the Royal Government articulates a focus on strengthening basic education quality and emphasizes building the reading and math skills of students in the early grades of primary education. The ESP identifies three policies that apply to the seven sub-sectors that are within MoEYS's purview (primary, general secondary, higher education, teacher training, non-formal education, youth development and sport), namely:

- Ensuring equitable access for all to education services
- Enhancing the quality and relevance of learning, and
- Ensuring effective leadership and management of education staff at all levels.

Core breakthrough indicators (CBI) are defined for each of these three policy areas. There are no indicators related to specific learning outcomes and none that specifically deal with student achievement in early grade reading. Only one indicator concerns assessment of learning. It stipulates that by 2017–18 MoEYS will develop and put in place a national assessment to evaluate learning achievement in grades 3, 6, and 8 in both Khmer language and mathematics. Grade repetition is also mentioned as an indicator however this is not a direct measure of student performance as students may repeat grades for many reasons, including age, too many absences, or learning disabilities.

The plan does give priority to developing a framework and tools for ensuring quality and building the capacity of schools and teachers to meet "service standards" that guarantee quality and relevance through a "responsive curriculum, adequate learning materials, and advantage in teaching." In addition, MoEYS intends to strengthen regular classroom and national assessments and examinations, and is committed to participating in the Programme for International Student Assessment (PISA).[30]

The ESP also emphasizes a shift to results-based management through "evidence and outcome-based planning, budgeting and monitoring system at the national and sub-national levels." This includes introducing a teacher performance management and appraisal program. MoEYS will also continue to pursue decentralization by "connecting with the National Program for Sub-National Democratic Development (NPSNDD) and contributing to process of installing unified and sub-national administrations (SNA) under the guidance of the National Committee for Democratic Development (NCDD)."

For the primary education sub-sector, MoEYS is looking to build on the success it has had implementing the previous ESP (2009–2013), notably the reforms to the Khmer language curriculum for grades 1–3 and the development and initial effort to distribute new textbooks and provide teachers a first orientation to the new materials. Additionally, MoEYS is looking to continue to apply the CFS policy and framework and to build on the school improvement grant (SIG) program initially piloted in 600 schools and being expanded to all schools during this plan cycle. Disbursement of school operating budgets (program budget or PB) will also be improved. The role of the district office of education (DOE) is seen as key to effective education service delivery at the local level through the operation DTMTs.

[30] PISA is a triennial assessment developed by the Organisation for Economic Cooperation and Development (ECD) that tests a sample of 15-year-old students in 60 countries in reading, mathematics, and science.

Among the 20 policy actions envisaged for the primary sub-sector, those that will impact the education system's ability to improve early grade reading include the following:

- Revising the regulations on the use of the school operational budget for primary education by 2014
- Revising curriculum in primary education in 2015
- Preparing a framework on school quality assurance by 2014
- Piloting the full day teaching and learning at primary education from 2014
- Revising teacher training system and program for primary education in 2016
- Disseminating and implementing teacher training quality assurance system in 2014

Strategies intended to realize the above-stated policy priorities for primary education include:

- Reinforcing school improvement planning and linking plans to the provision of school operating budgets through the SIG and PB.
- Updating the curriculum and developing standards for each subject as well as teaching and learning materials—publishing and distributing core textbooks for all subjects. Additionally, providing textbooks and teacher guides for teachers.
- Improving pre-service training by providing operational budget to PTTCs, investing in capacity development for PTTC staff, and ensuring that PTTCs train teachers in the use of the new curriculum and curriculum standards.
- Providing an induction program for newly hired teachers. MoEYS set a target of 2,000 to 2,500 new primary teachers per year (which falls far short of what is needed to overcome the current teacher shortage).
- Encouraging teaches to serve in disadvantaged areas through indemnities and provision of housing.
- Preparing the instruments and documentation for early grade reading and math assessments (EGRA and EGMA) and training DTMTs, school principals, teachers, and other stakeholders in the usage of these assessment tools.
- Developing national assessment for Khmer and math for grades 3 and 6 and for English in grade 6.
- Reinforcing ability of DTMTs to monitor low-performing schools, including encouraging the community to monitor and contribute to achieving CFS standards.
- Installing libraries and training librarians, school principals, and DTMTs in managing and monitoring the use of libraries and library materials.
- Strengthening the management capacity of school principals and disseminating guidelines on the establishment and functioning of school support committee, including strengthening the capacity of these committees in administrative management.

In addition to the policies and initiatives included in the current ESP, the minister of education has articulated his priorities in the form of an eight point reform plan summarized in Figure B-3. Of the eight priorities articulated by the minister, those that will impact how the system is able to improve early grade reading are discussed here.

Figure B-3. Minister of Education's Eight Point Reform Plan

1. Enhancing the quality and efficiency of education
2. Strengthening personnel management
3. Strengthening examinations
4. Reforming higher education
5. Developing technical and soft skill for youths
6. In-depth reforming of public financial management
7. Reforming physical education and sports
8. Creating an intellectual bank in education sector

Under the first priority, enhancing the quality and efficiency of education, MoEYS is preparing a framework of education quality assurance in cooperation with Sweden's education inspectorate that includes both internal and external inspection of school management and teaching and learning. New mechanisms and procedures for this kind of quality assurance are being developed.

The second priority, strengthening personnel management, includes improving the timeliness and reliability of teacher salaries through use of the banking system and increasing the base salary and functional allowances for teachers. The former salary for primary school teachers has been increased to 550,000 Riels. The latter now include pedagogical, regional, and health allowances. Additionally, the living support allowance for teachers in remote and difficult regions is being increased. Unfortunately, the minister is also stressing a training program that enables primary teachers to become secondary teachers, a move that is likely to increase the shortage of primary teachers. Five provinces are also piloting a new standard for pupil-teacher ratio in grades 1 through 3 (the standard reduced the ratio to 35-to-1, which requires more teachers to implement).

Reforms in public financial management (priority number 6) include increasing the budget for each line item in program budgets, delegating power to provinces to develop their own budget proposals and to implement program budgeting beginning in 2015. Improvements in procurement practices have already saved substantial resources, which were used to finance the salary increases mentioned above.

Lastly, the minister's final priority, creating an intellectual bank in the education sector, puts in place an education research board including leading academics who can help ensure more rigorous monitoring, evaluation, and research of education initiatives, innovations, and programs in Cambodia.

Annex C: Major Issues in the Education Sector

The Khmer Language

Khmer is an alphabetic language that is part of the Khmer-Mon language family. Changes in the written form of the language have gone through several stages that closely follow the recent political upheavals in the country. As a result, Khmer grammar/orthography has become somewhat of a politicized issue among Cambodian educators, which further compounds the more normal issues of cultural chauvinism usually associated with any given language.

Many traditional Khmer spellings use orthographic algorithms that require the use of a consonant blend when spelling certain nouns with two syllables. This system is based on a traditional grammar and orthography developed by a monk named Chuon Nath in the 19th century called "*payeang tamruach*" that involves a difficult set of counter-intuitive grammar rules. Political upheavals experienced in Cambodia between 1970 and 1993 led to shifts in the approach to Khmer orthography and grammar, but the traditional system, albeit somewhat hybridized) is once again currently the approach that holds sway in Cambodia.

As a result of the periodic changes to the language, Cambodians have various spellings for many Khmer words, leading parents who learned under one system to sometimes give the wrong guidance to their children, who are now studying more traditional spellings under the re-introduced (albeit hybridized) Chuon Nath system. Such uncertainty regarding correct spellings has significant implications for the teaching of reading today.

Quick Facts about the Khmer Language

- Consonants: 33
- Consonant Subscripts: 32
- Dependent Vowels: 23
- Independent Vowels: 15
- Diacritics:[31] 3
- 106 Total Phonetic and Orthographic Symbols

Every language has its own unique features that present a challenge to those learning to read it. Khmer is no different. Aside from the fact that there are about 106 phonetic symbols in the Khmer language, there are certain other peculiarities in the language that make it challenging to learn, especially for children.

Unlike many languages that form consonant blends by simply putting two consonants together, Khmer has a special set of symbols for the second and third letter sound in a blend. These special symbols are called "legs" and usually take the form of a subscript that goes beneath (though sometimes before) the initial consonant. Thus, children not only need to learn the 33 consonants

[31] Actually, there are more than three diacritics but others are more rarely used and only these three diacritics are taught at primary school level.

in the alphabet but also the alternative form that these consonants can take if they are used as the secondary or tertiary sound in a consonant blend.

In addition, Khmer classifies the consonants of its alphabet into voiced and unvoiced classes. One of the important differences between consonants in these two classes relates to their inherent vowel sounds.[32] Because they have inherent vowel sounds, some consonants can stand as words on their own without an associated vowel symbol. In addition, it should be noted that vowels change their sound depending on the class of the consonant with which it is used. Khmer also has two groups of vowels whose use will vary depending on the context. When a vowel stands independently by itself, the independent vowel symbol must be used. When vowels are used with a consonant, the dependent vowel symbol is used. When children learn the vowels, they must, therefore, remember two different sets of vowel symbols and sounds, as well as the special contexts in which they might be used.

Like many languages in Southeast Asia, Khmer words are not always written in a linear pattern. Consonants and vowels may take the form of symbols that occur above a letter (superscripts) or below a letter (subscripts). Khmer also has 3 special symbols or diacritics that can change the class of a consonant so that an alternative vowel sound associated with a different letter class can be used with that letter. Certain diacritics, however, can only be used with certain consonants, which can sometimes be confusing to children. Words are also not separated when written and punctuation is also sparse making Khmer even more complicated to learn to read.

As one can imagine, teaching young children to understand this complicated system of different consonant classes, shifting vowel symbols and sounds, super- and subscripts and diacritics is challenging. Under traditional teaching methods, Cambodian children were required to memorize all 759 consonant-vowel combinations for each consonant, regardless of whether these combinations had meaning or not (i.e., nonsense syllables). Whole language approaches to reading instruction that were introduced in the 1990s collided with the traditional approach and its advocates in MoEYS. The curriculum reforms introduced in 2011 and embodied in the books developed by the MoEYS revert to the more traditional method. Thus children are now asked to memorize all of the combinations before reading connected text. Some experts have suggested that it would be more efficient to teach the most simple and commonly used letters and letter combinations first so students can begin reading much earlier and teach more difficult and less frequent letters and combinations later in grades 2 and 3. [33]

Reading Curriculum and Materials for Grades 1–3

Textbooks: As stated earlier, when the 2010 nationally representative EGRA survey revealed a lack of foundational reading skills as high as grade 6, MoEYS responded by revising the Khmer textbooks for grades 1–3. To begin the process of textbook development, teachers were interviewed about the challenges their students encounter when learning to read. Teachers

[32] Unlike most Indo-European languages, all Khmer letters have an inherent vowel sound in addition to their own consonant sound.

[33] Abadzi, H. (2011). Early grade reading acquisition (EGRA) in Cambodia: Rationale and school observation (presentation)

generally reported that the whole language methodology on which the textbooks at the time were based was not working for students. These findings, along with a predilection to favor the "old way" of teaching reading in Khmer, meant that the new curriculum and textbooks would return to a phonics-based approach to teaching reading.

The Primary Education Department (PED) led a large cross-departmental working group that developed the textbooks. The group included 30 people, drawing from the staffs of PED, the Teacher Training and Curriculum Development Departments (TTD and DCD), as well as teachers and PTTC lecturers. The working group was split into a subgroup of 10 people more knowledgeable and experienced in curriculum, who drafted the textbook content, another subgroup of 20 people who reviewed the content and gave feedback throughout the process. It is worth noting, according to one of the main curriculum writers in the working group, that there were no early grade literacy instruction or linguistic experts in the working group. The group did have access to experts through phone calls and meetings where questions could be asked to help make decisions as needed. Some of the specialists from the DCD who sat on the working group had been trained previously by UNICEF on how to write competencies for curriculum, but there is no evidence of reading instruction or curriculum writing expertise having been on the working group. The director of curriculum also confirmed there are no reading instruction specialists in his department.

A textbook for one grade, beginning with grade 1, was developed each year over 3 years. In each year, the work included drafting, reviewing, and revising the content, then piloting books in five provinces, followed by further revisions, review, and final revisions. Each pilot of the textbook included a pre- and a post-test, quarterly assessments,[34] observations, and interviews with teachers. Three NGOs supported the implementation of the pilot, each in a different province and each with a different implementation process. According to the informants consulted for this assessment, quarterly revisions were made to the content and format of the books. One of the main revisions was the addition of the front matter to tell the teachers how to teach the lessons. According to the curriculum writer and the DCD it was decided to put this information at the front of the textbook rather than make a separate teachers' guide because they did not want teachers to have to use two books and they wanted all the teacher information to also be accessible to students and parents (more on this section below).

The development process was funded by the two successive Global Partnership for Education (GPE) grants. There was a small gap in funding when the ministry began to develop the grade 2 textbook, but once funding was resumed the process continued smoothly. MoEYS enlisted the Publishing and Distribution House (a semi-autonomous printing and distribution company that used to be fully state owned and operated) to oversee the production and distribution of each set of books.

The reported level of satisfaction with the new books and the return to the traditional approach to teaching reading is consistently high. Informants across all levels of the system agreed that the

[34] Since all this is occurring in a single year—including drafting of the content, it's not sure what is meant by "quarterly" as reported to the assessment team by PED.

traditional approach allows students to learn letter-sound correspondence and to use that knowledge to decode rather than memorize words. One interviewee did express concern that the books do not explicitly enough address all five components of reading.

The new textbooks take a phonics-based approach to instruction that focuses on the teaching of grapheme-phoneme, or letter-sound correspondence. This approach too is a return to a more traditional method of teaching students to read in Khmer. The original method called Chet Cham is based on students memorizing all classes of consonants, vowels, consonant vowel combinations, diacritics, and subscripts in a particular order. The new textbooks use this approach to cover all the graphemes/phoneme combinations in grade 1, with a review in grade 2. The grade 3 book focuses on reading text and building vocabulary, comprehension, and grammar skills.

The beginning of each textbook contains a section aimed at teachers and serves as a kind of teachers' guide. It includes a brief explanation of the five components of reading, instructions on how to teach each activity in the book, and for grades 2 and 3, teacher read-aloud stories. This front matter was added to the books after the first pilot showed teachers struggling to know what activities would make best use of the content and instructional time in the textbook. When asked, curriculum writers and the directors of PED and DCD explained that the working group decided against a separate teachers' guide due to budget constraints and an interest in having all the information regarding teaching of Khmer available to all stakeholders. They reasoned that having the instructions to the teacher in the front of the book would allow parents to know how their children should be taught and give them guidance on how to work with children at home. It is unclear whether or not parents are actually able to take advantage of this information, but highly unlikely that those with little or no education could.

The rest of the textbook contains the content to be taught. The content is divided into lessons that are aggregated together in units. At the end of each unit there is a review lesson. These reviews are more frequent in grade 1 and 2 but generally cover a month's worth of content. Each lesson has a title and a number as well as a specific amount of time that the lesson should take to complete. Table C-1 below shows some basic details on each book.

Table C-1. Summary of Grade 1–3 Materials

	Number of Lessons	Length of Each Lesson	Number of Reading Texts	Total Number of Hours[35]
Grade 1	104	2-16 hours	5	494
Grade 2	81	8 hours	34	494
Grade 3	64	10 hours	34	494

One major issue is the time allotted in the books compared to the actual time available for teaching. According to each of the books there is about 494 hours of content to be taught for each grade. However the official curriculum requires 13 40-minute lessons per week, which equals 52 hours per month. Assuming a 10-month school year this would mean approximately

[35] In this context, hours refer to lessons in the school day and, as such, represent really only a 40-minute teaching period, not an actual 60-minute hour.

494 hours for 38 weeks of Khmer lessons in the school year. This includes all 26 holidays and the 2-week April break. However there is also another 10 days lost for the fourth Thursday of the month planning days and at least 2 weeks for testing at the end of each semester. Thus while MoEYS officially has a 38-week school year, in reality there seems to be a maximum of 34 weeks for instruction time assuming no days missed due to teacher absence or weather or any other delays. If a teacher begins on the first day and teaches each lesson as it is expected in the textbook with no absences, delays, or stopping to reteach when students need it, the teacher would be four weeks short of the end of the book. According to several sources, delays are quite common, especially at the beginning of each semester and during the rainy season. Thus the lessons as they are suggested in the textbook could not be covered in one school year.

Content: According to the curriculum developers the aim of the textbooks is to cover all five of the components of reading: phonological awareness, alphabetic principle, fluency, vocabulary, and comprehension, with some writing and grammar instruction included in grades 2 and 3. Table C-2 below shows that the components of reading are covered to varying degrees. There is a considerable concentration on alphabetic principle in grade 1, while grade 2 and 3 mainly focus on fluency, vocabulary and comprehension. Phonological awareness activities are extremely limited. It is unclear if this is due to a lack of focus on phonological awareness or a lack of understanding of this component and the skills it encompasses. Curriculum developers the team spoke with seemed to feel all the components were covered, even if they were not explicitly explained. Table C-2 shows the distribution of activities across grades and components.

Table C-2. Instructional Activities by Grade and Reading Component in New Khmer Textbooks

Component	Grade 1	Grade 2	Grade 3
Phonological Awareness	Consonant song Vowel song Show object for target sound Say words that contain target sound	N/A	N/A
Alphabetic Principle	Read from flash cards Read from the board Find vowel on the page Read in the textbook Fill in mission consonant	Read from flash cards Read from the board Find vowel on the page Read in the textbook	Rhyming words
Fluency	Letter reading Syllable reading Word reading Sentence reading	Fluent isolated word reading Story reading: 1. Silent reading 2. Teacher reads 3. Teacher and students read 4. Students read 5. Silent read	Story reading: 1. Silent reading 2. Teacher reads 3. Teacher and students read 4. Students read 5. Silent read

Component	Grade 1	Grade 2	Grade 3
Vocabulary	Write the word of the picture Fill in missing consonant for the picture	Identify difficult words in the story Read words from the story Definition of words Synonyms Antonyms Speaking lessons on specific topics	Identify difficult words in the story Read words from the story Definition of words Synonyms Antonyms
Comprehension	Literal comprehension questions (final 5 lessons)	Picture walk Literal comprehension questions Teacher read-alouds (3)	Teacher read-alouds (6) Picture walk Literal questions Literal multiple choice Story sequence Story structure True/False Cause and effect
Writing	Drawing lines Dictation of words Write consonant and vowels in the air Write consonants, vowels, syllables, words, phrases, sentences on a slate Write consonants, vowels, syllables, words, phrases, sentences at home	Dictation 1. copying 2. preparatory 3. dictation Handwriting	Writing paragraph based on response to questions Dictation
Grammar	N/A	Find the nouns in a sentence	Nouns Full stop Adjective Verbs Question mark Diacritics

As seen in Table C-2, the grade 1 textbook includes at least some activities for all five of components of reading. The lessons in this book are organized to teach all the graphemes, diacritics, and subscripts in the traditional order of the Chet Chem method. The book teaches all consonants, all vowels, and then voice and unvoiced consonants, followed by all consonant and vowel combinations, diacritics, and subscripts. Each lesson introduces one or two new graphemes followed by syllables, words, phrases, and sentences that include the target new graphemes. Numbers of phrases and sentences varies from one to three per lesson. Sight words are also included in each lesson using a picture above the word to help students increase their vocabulary and ability to read sentences with words they have not yet learned to decode. The final five lessons are made up of a story with vocabulary and comprehension activities related to the story.

The front matter lists a variety of activities teachers are expected to do to help students to recognize, memorize, and use the new grapheme such as reading from flash cards, finding the words in their textbook or writing letters in the air. The instructions to the teacher also ask

teachers to model most tasks before asking students to practice. This is a useful practice to ensure students have a clear understanding of the skill and task. According to the instructions student practice should be whole class, small groups, and individually. This, if implemented correctly, allows students many opportunities to practice new skills and teachers the opportunity to see all students respond in some way. The lesson structure successfully moves from letter to sentence level giving students a chance to practice reading some small amounts of connected text in each lesson.

The main weakness of the grade 1 book is the lack of opportunities to build connected text reading, vocabulary, or comprehension skills. As stated above the main focus of the book is teaching alphabetic principle skills, taking up 98 of the 104 lessons. This leaves little room for vocabulary or comprehension building. Having sufficient opportunities to read has been shown to make a significant difference to beginning readers' fluency, vocabulary development and comprehension skills.[36] Positive correlations between the amount of reading a student does and the student's reading achievement have been shown in multiple studies (Cunningham & Stanovich, 1998; Wu & Samuel, 2004). Cunningham and Stanovich have also shown that exposure to book language increases vocabulary and general knowledge. Finally, Kuhn & Schwanenflugel (2009) showed that simply providing increased opportunities to read was successful in promoting growth on standardized achievement measures one year later.

The grade 1 book also assumes that students can easily switch from reading one to three unrelated sentences to reading an entire story written in multiple paragraphs with no instruction on longer texts or comprehension skills prior to these lessons. In most grade 1 reading curriculums it would be expected that teachers regularly read aloud to students to model good reading and build vocabulary and comprehension strategies. Students should also be reading appropriately leveled texts with words they have learned to decode building on the complexity of the text as they learn more words. These activities are completely lacking. There are five stories at the end of the grade 1 book where students begin to do some of this work but as noted above there is more content in the book than available time in the school year so it is unlikely students will get to these lessons. Essentially students must wait an entire school year before learning comprehension skills.

The grade 2 textbook consists of the grade 1 content and activities and adds vocabulary, comprehension, and some writing skills. The book begins with 30 review lessons covering grade 1 content followed by 51 speaking, listening, writing, and reading lessons. Thirty-four of the lessons are focused on students reading connected text; each lesson is made up of one text and some related activities. Review lessons are virtually the same as grade 1 lessons with faster pacing. The front matter explains that the story reading lessons should include a series of readings of the text along with activities throughout to support students' comprehension. The activities for each of these lessons includes:

- Discussion of the picture related to the text

[36] Cunningham, A. E., & Stanovich, K. E. (1998). The impact of print exposure on word recognition. Garan, E. M., & DeVoogd, G. (2008). The benefits of sustained silent reading: Scientific research and common sense converge. *The Reading Teacher*, *62*(4), 336-344. Guthrie, J. T., Schafer, W. D., & Huang, C. W. (2001). Benefits of opportunity to read and balanced instruction on the NAEP. *The Journal of Educational Research*, *94*(3), 145-162. Guthrie, J. T., Wigfield, A., Barbosa, P., Perencevich, K. C., Taboada, A., Davis, M. H. & Tonks, S. (2004). Increasing reading comprehension and engagement through concept-oriented reading instruction. *Journal of Educational Psychology*, *96*(3), 403.

- Silent reading by the students while they attempt to find any difficult words in the story
- Teacher reviews difficult words and the vocabulary words listed in the textbook
- Subsequent readings: the teacher reads aloud, the teacher reads with students, and students read on their own aloud
- Students read silently again
- Comprehension questions that are mainly literal questions
- Various dictation and grammar and fill in the blank exercises.

Each of these reading lessons is supposed to take approximately 8 hours of instructional time.

Challenges that exist in this textbook entail over emphasis of alphabetic principle in the beginning of the book and a lack of complexity to the skills and activities in the rest of the lessons. For instance the first 30 lessons where grade 1 content is being reviewed do not contain any connected text reading or comprehension instruction. This amounts to less than half of the lessons in one school year where students are focused on reading connected text and building comprehension skills. When the students do get to read connected text there are only fiction stories and the comprehension is only literal. There is also no conversation about punctuation in this book, making reading connected text less transparent. The lessons do a good job of having teachers talk about the story before reading but the lessons ask students to read on their own before the teacher models or talks about vocabulary that might support comprehension. This sequence of activities is asking a lot of students with limited exposure to connected text reading. It might be more helpful for students if teachers read first, followed by a reading with students, and then students reading on their own. This would be a more efficient use of time and be more supportive for students. Finally the writing activities in the textbook are all dictation or copying activities. There are no activities where students are being taught to write their own original sentences or paragraphs.

The grade 3 textbook consists of 64 lessons that focus on speaking, listening, reading, and writing. Thirty-four of the lessons are based on reading some kind of text with follow-up activities similar to the grade 2 lessons. The main difference from grade 2 is the addition of comprehension strategies such as story structure, cause and effect, or true-false. There are also multiple genres of text such as narratives, poems, and plays. Grade 3 adds limited opportunities for students to create original writing, teaching students to write a paragraph by responding to questions and putting the responses together. Some simple grammar is also introduced such as parts of speech and punctuation.

Challenges with this book include the lack of review of grade 2 skills and a lack of continued word study. While Khmer has very simple grammar it does have multisyllabic words that could be studied to make it easier for students to read harder words. Each reading lesson is supposed to be spread out over approximately 10 hours, or almost an entire week of Khmer instruction. This ends up meaning that students are likely to only read one text per week during these lessons. While multiple readings of the same text is a useful strategy to build fluency, it is also important

for students to read a variety of texts to expand their vocabulary and comprehension skills. With only 34 reading lessons in the entire book, spending one week reading one text is far from enough variety for students to be prepared for grade 4 level subject matter such as science or social studies. There are six teacher read-aloud lessons in this book, which actually would be better suited for and make much more of an impact in grade 1. While students of all ages tend to enjoy teacher read-alouds, with limited instructional time these read-alouds could be appreciably more useful as a strategy to build grade 1 students' essential comprehension skills and vocabularies before they are asked to read stories on their own.

Recommendations

Students need more opportunities to read connected text early. Learning to be a fluent reader requires hours and hours of practice reading texts. The longer students wait to begin reading connected text the longer it will take to become fluent readers. Students should be given opportunities to read short decodable texts starting in grade 1 as soon as they have learned enough grapheme sounds to be able to put words together. If texts are constructed carefully using the sounds and graphemes students have learned, text reading would not be difficult and would allow for practice even if the stories are very simple.

Students need more reading material. In general there is nowhere close to enough text for students to read in the textbooks and there are no supplementary readers produced or required by the government. This limits students' ability to get enough practice on a variety of texts. For many students it is unlikely that they have enough appropriately leveled reading materials available to them at home, so having access to supplementary texts at school is essential. These limited opportunities to read and build comprehension skills are not sufficient for students to be ready to "read to learn" in grade 4. Students need targeted, leveled text that they can practice reading independently as well as texts that are slightly above their level that can be read with an adult or more knowledgeable student.

Students need more time on comprehension skills, especially higher level skills. Because students do not read any text until the end of grade 1 and the middle of grade 2 there is also no comprehension instruction until this time. There is no reason to wait to learn these skills until students are able to read complex stories independently. If students can build these skills before they read independently, comprehending while they read will be significantly easier. The textbooks should include regular teacher read-alouds two or three times a week in grade 1 and perhaps once a week or more in grade 2. Many comprehension activities could accompany these read-alouds and be done orally to prepare students for comprehending text they would read on their own more easily.

Review of the amount of content in each book compared to the amount of available instructional time. There seems to be a discrepancy between the available instructional time and the amount of time needed to complete the content in each textbook. It seems unlikely that a teacher following the guidelines for time set in the textbook would be able to finish all the lessons in one school year.

Review lesson length suggestions. The times set aside for each lesson may overestimate the amount of time it takes to cover lesson content. Connected text reading lessons in particular do not need to be spread across 8 to 10 hours. The lesson content could likely be covered in 1 to 2 hours with good time management and more efficient classroom practices.

Supplementary Materials

Supplementary materials for primary schools in Cambodia are generally produced and distributed by NGOs to project schools. While several MoEYS officials mentioned the need for these materials, the lack of funding and resources to develop, print, and distribute materials were consistently brought up as major constraints. However several organizations have developed supplementary materials that could be reproduced and distributed more widely, as shown in Table C-3.

Table C-3. Existing Supplementary Readers

Organization	Type	# Titles	Grades
Room to Read	Leveled readers	193	1-2
	Decodable books	35	1-2
SIPAR	Leveled readers	120	Birth-8
KAPE	Decodable books	27	1

The assessment team reviewed three sets of materials during the data collection.

SIPAR Books

SIPAR is a Cambodian publishing organization (with French support) that supports improving literacy throughout the country. The organization has set up 301 school libraries across 24 provinces. They have 8 mobile libraries and 18 communal libraries. SIPAR has also developed a vast series of leveled books for children from birth to Grade 8. This series includes everything from board books to short chapter books. The picture books consist of a two-page picture with labels of all major items in both Khmer and English. These books contain anywhere from 6 to as many as 36 words on a page. Some of the pages are quite busy and may be overwhelming for young children, but they are clearly developed to be used to learn vocabulary and include comprehension or memory questions at the back of each book. The rest of the books are story books about various topics. The books for older students also include stories from countries such as Greece and Japan. The text in the books gets progressively more complicated and the progression seems well paced. The illustrations are full color and range in styles. The majority of illustrations are appropriately Cambodian, but they do tend to show characters in typical gender roles. Many of the books, especially the higher level books, have comprehension questions or extension activities at the end that could easily be used by teachers or family members to enhance learning.

Room to Read Libraries, Leveled Books, and Decodable Readers

Similar to SIPAR, Room to Read has also set up numerous school libraries and developed decodable and leveled readers. The main difference is that Room to Read materials are more focused on early grades. Room to Read libraries contain both leveled readers and Khmer versions of popular US children's books. Classrooms in Room to Read supported schools also

receive a series of simple, low-cost decodable books. These books are different from leveled readers in that they follow the sequence of the new Khmer textbooks and have short simple texts that students can read independently. The books use controlled text, meaning they include only words students have learned to decode because they have been taught the letter sounds in the words prior to reading the text. Decodable books are generally much simpler and shorter than leveled books. The books are printed in black and white and have one sentence and one illustration on each page. These books are ideal for having students learn to read connected text and comprehension skills early in grade 1 rather than waiting until the end of the grade 1 or the middle of the grade 2, as is done in the official textbooks.

Thunthean Seksa Toolkit

As part of the TRAC and TRAC+ projects KAPE has developed significant supplementary teaching and learning materials in the form of a toolkit and digital games to be used on tablets. The majority of these materials are simple games students can play that offer practice with specific skills and content in the textbooks. Most of these games are thoughtful and attractive for students. The games focus on only one skill or content area at a time and generally seem easy to use. They resemble learning materials that likely would be found in more sophisticated US schools. The games mainly involve making words or word parts, matching words and word parts to pictures, using flash cards, and other alphabetic principle-based activities. The digital games also contain alphabetic principle activities as well as a set of decodable stories that are read aloud to students and followed by comprehension questions. These decodable stories included in the digital resource are constructed similarly to those of Room to Read. All of these materials could be useful for students who are struggling with particular skills or content if implemented appropriately and with knowledgeable support.

The challenges with these materials are the cost and the likelihood of them being implemented with the degree of support and supervision necessary to ensure students are learning from them and not simply playing. The full toolkit is priced at $250 and the purchase and maintenance of a set of tablets could cost hundreds of dollars. As with many games used for learning, students will need someone to work with them to ensure the games are meaningful learning experiences for remediation rather than just a chance to play on a tablet or with letters and words. This involves having conversations around students' choices and why they are correct or incorrect as well as careful tracking of mistakes and improvements. Struggling students often need structured explicit guidance in order to overcome the particular difficulty they are experiencing. Literacy coaches and older students are trained through the project to work with students to use the games as learning tools, but it is not clear that they are able to provide the structure and explanations about Khmer language that struggling readers may need. Unfortunately the team was not able to observe this aspect of the project directly. Finally, according to some stakeholders interviewed by the team, the accessibility of materials remains limited. In addition, the materials are heavily reliant on plastic making them difficult to replace if lost/broken.

Instruction and Classroom Practices

As mentioned above, the new textbooks are a return to a more traditional way of teaching students to read Khmer. This meant a significant change in instructional practices was necessary for many teachers, although the team was told that many older teachers were likely still using the

traditional methods and approaches in their classrooms. Instructional training was not an emphasis for the ministry during the reform. There was sentiment across all levels of the ministry that because the books were a return to previous methods teachers already knew, they did not need instructional support to teach using the textbooks. To better understand the current classroom context the team observed several schools and gathered anecdotal information on instruction practices and on how students were engaging with teachers and the new books.

One of the most significant positive features of reading instruction is the time allotted specifically for Khmer in grades 1–3. School in Cambodia runs 6 days a week Monday through Saturday for 4 hours per shift. Teachers are supposed to teach 13, 40-minute Khmer lessons each week. This adds up to 520 minutes per week (or more than a third of the total instructional time) allocated to teaching students to read in Khmer. This amount of time is much more than is seen in many countries. In the United States for example language arts in grades 1–3 is generally programmed for 90 minutes per day over 5 days, a total of only 420 minutes per week. Multiple Khmer lessons observed by the team lasted more than the allotted 40 minutes possibly because on some days teachers have to teach two lessons in one day in order to fit all 13 lessons into the few hours per week students attend school.

The general picture of instruction gathered by the assessment team is not based on a systematic sampling of classrooms, but did include standardized approaches to lesson observations across 10–12 classrooms in four different provinces. Some trends in these observations are worth noting. The public schools visited included a mix of NGO-supported and non-supported schools and were all easily accessible from a main road. The amount and type of support being provided varied depending on the different projects active in the schools that the team visited.

Most classrooms had at least concrete floors, sufficient numbers of well-maintained desks, or tables made of varying materials. All classrooms had posters on the walls. Poster content varied from reminders about etiquette, to Khmer grapheme charts, to thematic subjects. Some student work was also on the walls, but this was not consistent across classrooms. Seating arrangements were generally 2–4 students to a table or desk. In most classrooms it was clear that high performing students were seated at the front of the room.

In general the team saw lessons that had the teacher at the front of the classroom reading words or letters and students repeating and/or writing on slates. Activities sometimes included group work, and in at least one instance a teacher assigned more knowledgeable students to read with students who were struggling. Teachers were using the textbook and the activities prescribed in the front matter for instruction. All teachers had the textbook and some showed team members their prepared lesson plans when asked. Teachers' instructional strategies focused on showing text such as letters or words, reading them for students, and having students repeat several times. In some classrooms, teachers had students write letters or words on slates, and in some instances making words or sentences in groups, or reciting or retelling a story, and sometimes answering questions. Teachers seemed to fairly consistently model what students should be learning or doing before asking students to practice. There were also many instances of teachers walking around the classroom to check student work and give feedback.

The main materials used in the classrooms were the textbook, students' notebooks and/or slates, and cards with letters, syllables, words, or sentences. The black board was probably the most frequently used instructional aid. Many teachers wrote the target items to read on the board and pointed to indicate where students should read. They generally attempted to point to individual graphemes in syllables and words to direct students' attention to the specific symbol. During most lessons students were given at least one opportunity to practice writing or making words or sentences that the teacher could check as an informal assessment of learning.

While the observed reading activities may not have been the most creative or complex, they were mainly those prescribed by the textbooks and supported the learning of the sound-symbol correspondences that are foundational to learning to read.

Although the team observed the above-mentioned positive practices, some significant yet correctable challenges did exist. In general there was an overabundance of repetition as a strategy for reinforcing sound-symbol correspondence. Activities that could have focused on building vocabulary or developing comprehension were missing from most of the observations. Some repetition may be unavoidable, especially given the complexities of vowel and consonant symbols and combinations in Khmer. But, in every instance students spent the majority of lesson time repeating, usually chanting chorally as a group. Such repetition, especially with so much emphasis on whole class response, quickly becomes unproductive primarily because chanted responses become disconnected from the text students are supposed to be reading. While the teacher may have been pointing to the graphemes written on the board or card, too often students (especially those in the back half of the room) would look away while repeating along with the others. For students in the back of the room, this was observed quite frequently. Without attention to print while repeating the sounds/words, the value of the student practice is lost.

More generally, the team observed that teachers did not give students adequate opportunities to practice the different skills being taught. Teachers often called on only one student at a time to come to the front of the board and write or read, which, when done repeatedly (as was observed), the rest of the class is left with nothing productive to do. This resulted in unengaged students drifting off task and at times disrupting class.

Many classrooms shared poor approaches to time and classroom management, which left many students either not fully or not at all engaged in the lesson. This was especially so for students in the back half of every classroom observed. Furthermore, teachers tended to call on students in the first few rows, exacerbating the disconnection of those seated further back. Finally while many teachers worked hard to model for students, at times the modeling morphed into doing the activity, with students watching and then simply copying what the teacher did, rather than actually applying the desired skill.

Many of the challenges seen in the classroom and discussed here had more to do with not challenges in the reading-specific instruction, but in general instruction and management of time and student engagement.

Options for Improving Instruction

Time management and efficiency of instructional time. Several of the instructional challenges that were observed in classrooms could be resolved with some simple strategies that would allow time to be used more efficiently. For example give all students an opportunity to practice or respond to teacher questions rather than asking several individual students to come to the front to answer the same questions. Asking students sitting in the back of the classroom, who tend to be less able to respond, to work with students who are more able would keep students engaged and allow for more work to be done and less sitting around waiting while not paying attention. Teachers could also spend less time having students repeat individual words or sentences. Teachers could have students turn and talk to partners or have short targeted activities for small groups while the teacher monitors. Using more time for all students to be actively working on a response or problem would significantly improve learning and allow teachers to move more quickly or have time for other instructional activities such as independent reading or differentiated instruction.

Attention to print. The team noted that students and sometimes teachers were not paying attention to the print while reading letters or words or sentences. It is key that there is careful attention to print or students will memorize the sounds but not learn the correspondence to the symbols. This is the key skill in learning to decode. If students are reading they should have their attention on the print at all times. If they are reading from their textbook, finger pointing, especially in grade 1, would be a very useful tool for both the students and the teachers. It is also useful to help the teacher to know if students are actually decoding or if they are just parroting what they hear others saying. Once students are more fluent they would no longer need to use their fingers as it could slow down their reading rate.

More opportunities for students to practice. Students spent much of the instructional time waiting or watching others answer questions. This meant only one student got to practice at a time and the teacher only evaluated that student's learning. It would be ideal if all students had a chance to practice and respond to all or most activities each day. Again a simple solution would be to have students turn to a partner first and then call on only a couple of students to share with the class. This allows the entire class to have chance to come up with a response and use that to be involved in giving feedback to the students who share with the whole class. This routine gives everyone a chance to try and stay engaged. It also gives the teacher a chance to walk around the class and evaluate many students' responses. Many other instructional strategies like this exist that could support more opportunities for students to practice.

Use of EGRA in Cambodia

The use of EGRA in Cambodia is a great story of success and caution. Cambodia's MoEYS has conducted two nationally represented EGRA implementations with minimal outside support beyond funding and some technical assistance. The results of these two assessments have led to the large-scale reforms already mentioned. Many actors in the education sector convey a sense of accomplishment based on what they interpret to be significant improvement when comparing the results of the 2010 baseline survey and a subsequent EGRA conducted in 2012. However, the

assessment team noted significant enough anomalies in the EGRA's carried out in Cambodia to raise serious concerns about how to interpret those data. Our review of existing information revealed that Cambodia failed to follow the well documented and widely available guidance which USAID has invested in developing through the EdData II Project.

Led by the PED in 2010 with technical support of GPE, a Khmer version of EGRA was adapted, piloted, and administered across the country. The study included 2,400 students in grades 1–6 in 40 schools across 18 provinces. This initial EGRA showed that significant numbers of students in grade 6 were unable to read a single word, and younger students were worse off. These results led MoEYS to step back and rethink its approach to teaching Khmer and reemphasize the importance of students learning to read in the early grades. In 2012 after the new textbooks had been distributed and teachers were oriented to the books, a second EGRA study was conducted and resulted in what is claimed to be significant improvement. Reasons to question those reported improvements are discussed here.

The Khmer EGRA instrument consists of eight sections, one of which was only given to students in grades 2–6 due to its level of difficulty. Six of the sections are consistent with current EGRA best practice, but two were removed from suggested guidance years ago based on reviews by expert panels. The sections in the Cambodia EGRA instrument are:

1. **Letter names and sounds** – Students read from a list of 100 different consonants, vowels, diacritics, and subscripts. These are in order as they are taught through the Chet Chem method. This implies items are in order from easy to hard. This section is reported to be timed for 60 seconds.
2. **Phoneme segmentation** – Students are read a word and asked to give the sounds in that word. There are 10 items in this section and it is all oral. This measure has not been recommended for use since 2008 due to students' lack of familiarity in many countries. It has been used recently in Kenya to compare students who were enrolled in intervention schools to control schools, although the teachers had been teaching this skill explicitly as part of the intervention.
3. **Initial Sound Discrimination** – Assessor reads 3 words to the student, and students have to give the consonant sound in the word that is different from the other two words.
4. **Simple Word Reading** – This is a list of 50 words that students should be able to read by the end of grade 1 according to the PED. They are again listed from easy to hard. Students are supposed to have 60 seconds to read as many words as they can correctly.
5. **Oral Reading Fluency /Reading Comprehension** – This is a short list of related sentences written by participants in the adaptation workshop. Students are supposed to have 60 seconds to accurately read as much of the text as they can. This is followed by 5 literal comprehension questions.
6. **Oral Comprehension** –This is a shorter list of sentences on how to cook rice that are read to students followed by 5 literal comprehension questions. Adaptation workshop

participants also wrote this text. The PED explained that this skill of listening is harder than the reading passages.

7. **Dictation** – A sentence is read to students 3 times while students write the sentence on lined paper.
8. **More Difficult Reading Fluency/Reading Comprehension** – This is a longer more difficult list of related sentences for students to read, supposedly as much as they can in 60 seconds. It is shown in paragraph form and was written by the adaptation team. The text reading is followed by 5 literal comprehension questions. The more difficult passage is given to only grades 2–6.

Challenges Regarding the EGRA Instruments

While the majority of the instrument includes the best practices and sections recommended in the RTI-developed EGRA toolkit and Guidance Notes, it also has some issues to consider concerning the adaptation of the Cambodian instrument. First the current version of the EGRA instrument was based on the old textbooks, and it is not clear if the items are still relevant and grade level appropriate based on the content of the current textbooks. The items for letter and word reading are in order from easy to hard according to the PED. Generally EGRA items are in random order so that even slower reading students have a chance to read a range of levels of difficulty and demonstrate a more complete picture of the depth of their knowledge. In the letter sections in particular a slow reader may know some of the diacritics at the end of the test but will likely not get the chance to attempt them because he or she may not reach the end of the test.

The passages and comprehension questions are of particular concern. These sections are the only measures of comprehension in the assessment and thus most important and often difficult to get right. None of the three passages is a coherent story, but instead each is a list of related sentences as described by the PED. For example, the reading fluency and comprehension passage, as translated into English is:

> Hello all friends. My name is Sophy.
> I am 7 years old. My brother is Sophea.
> He is 5 years old. I also have a young sister.
> Her name is Mary. We lived in Phnom Penh.
> We go to school from Monday to Saturday.
> We like reading and writing. My father is a farmer.
> My mother is the fish seller in the local central market.

The accepted practice for EGRA is that all passages should be a narrative story that includes an introduction of the characters and setting, a problem, and a solution. The experts who developed the guidance for EGRA note that students are most familiar with this format and it is generally the easier text genre to read and understand. However, none of the stories fits this description. The chosen passage format also does not easily allow for a higher level of comprehension questions. There are no questions that ask students to use their own information or background knowledge combined with information in the text in order to respond. These types of inferential questions are generally required as part of EGRA to evaluate a deeper level of comprehension. Several of the questions are also far too vague to clearly know the correct answer. For example

the first question in the oral comprehension section is, "What do they eat?" There are no characters mentioned in the text to know who "they" refers to. Also the PED mentioned that many children's answers were completely unrelated to the text but still logical such as, "They ate bread." It should be noted that the team had to read a translated version of these question so it is possible some of the questions are more appropriate in their original form, although based on conversations it is unlikely that this would be the case for all or most of the questions.

Finally, the phoneme segmentation and dictation sections are not generally recommended as highly reliable and valid measures. These sections have been removed from the EGRA guidance following expert panel reviews. The phoneme segmentation measure generally results in floor effects where few or no students are able to successfully respond. After repeated applications, we have found that it is difficult to assure reliability in administration and scoring of the dictation subtest. Scoring is especially complicated as items must be weighted, and determining those weights requires substantial, language-specific expertise.

Training and Implementation

According to the PED only two days were set aside for training on the administration of the instrument. There was no mention of inter-rater reliability during the training, nor of practice with students. Typically training for first-time assessors would last for 5 days and include several hours of practice daily, and some practice with actual students, with one or two inter-rater reliability tests to ensure all assessors are administering the assessment in the same way. When testing thousands of students, standardization of the administration is the only way to ensure that all students have the same opportunity and experience regardless of the assessor.

One issue with implementation at the school level that was revealed through conversations with the PED is the locations chosen for testing. In some schools students were tested in the front of their classroom because there were no spare rooms available at the school. This is problematic in that students could have been uncomfortable being watched by their teacher and classmates, which would lead to lower performance. Also there was no way to ensure that students waiting to take the test did not hear the responses multiple times, helping those who were tested later perform better on the test.

A second implementation issue is that the same version of the EGRA instrument was used for both the 2010 and 2012 studies. While the studies were two years apart there is still a chance that students who took the test could have been familiar with it. There have also been several NGOs using the instrument for impact evaluation and monitoring of their projects so it is not out of the question that students have seen the instrument at least once if not multiple times between administrations.

Additionally, the team received conflicting accounts of how the subtests were timed when administered with students. As mentioned above, the letter names and sounds, word reading, and oral reading fluency subtests were all supposed to be conducted over 60 minutes, allowing computation of the number of items correct per minute. However, many informants indicated that the test was administered using a time increment allotted per item or per line of items. The team was told that students were given a fixed interval to respond, and if they did not respond to

an item during that interval it was marked "no response" (which counts as incorrect) and they were instructed to move to the next item. And, more importantly, some interviewees indicated that the students were asked to attempt all the items in this manner (rather than seeing how many they could attempt and correctly respond to during 60 seconds). If this was indeed the practice used when administering the test, then any reported measures of fluency would be completely inaccurate and unusable.

Results and Scoring

The team reviewed the consultant's report (Seymour, 2012) that compared the EGRA results from 2010 and 2012. The majority of the report is extremely flawed in the way that it reports the results. First, results for EGRA should be reported by section as the skills are not all equal in difficulty, and it is important to understand which skills students are struggling with in order to make decisions about how to change instruction and teaching materials. The report instead provides one table that combines all the grades and gives across-grade mean scores by section, and another table that shows the most difficult section by grade. The first table gives little usable information. There is no reason to combine student outcomes across grades 1–6. Combining the scores across grades and subtests makes it impossible to know how students in each grade are doing and obscures what would otherwise be useful information about how students are progressing from one grade to the next on different skills.

The second table is somewhat more useful but still gives minimal information on how to change instruction to improve comprehension. The main issue with the report is that the author took all the items on the test except the words in the passage reading and added them together to get a total composite score of 184 for grade 1 and 189 for grades 2–6. No weighting was done to account for easier or harder skills. The "score" for each test was the number of correct items out of the total. The results were then presented in percentages. For example, the table below, taken from the Seymour (2012) report shows mean results by grade and year. The results presented here **ARE NOT** a valid way to report results because some skills are more difficult than others, skills build on each other, and not all skills are appropriate for all grades.

Table C-4. Mean Overall Test Scores by Grade with T-Test Results[37]

	2010		2012		T-Test	
Grade	*N* Students	Score	*N* Students	Score	T-value	P-value
1	399	13.87%	399	30.38%	-11.75	< 0.0001
2	401	24.95%	400	45.43%	-11.06	< 0.0001
3	400	36.53%	400	69.60%	-18.42	< 0.0001
4	400	45.22%	400	78.60%	-20.21	< 0.0001
5	400	55.75%	398	83.19%	-17.36	< 0.0001
6	397	60.17%	400	85.33%	-18.30	< 0.0001
All	**2397**	**39.40%**	**2397**	**65.42%**	**-30.59**	**< 0.0001**

[37] Seymour (2012) pg. 14

This is a major flaw in the report. The report shows significant improvements across province and grade, however there is no way to know what skills were improved. If students improved only on letter identification or simple word reading but decreased in their comprehension scores this report would still show large improvements because there are more possible items for the letter and word tests than there are for the comprehension tests. Yet students who can decode and not comprehend should not be considered successful readers. It is clear that the author of the report misunderstood how to score and analyze EGRA, making the results as communicated in this report **unusable as measures of progress** in Cambodia.

Options for Improving the Use of EGRA

The main recommended option would be to have a thorough review and revision of the entire EGRA process. New versions of the EGRA need to be developed and equated if Cambodia would like to continue to use this assessment. It would make sense to conduct a new EGRA adaptation workshop with EGRA and Khmer language experts as well as experts from the MoEYS. Following this a significant training effort should take place for at least 5 days. This training should include practice with students and inter-rater reliability evaluations. There should also be further reinforcement of how to manage the logistics of test implementation, such as choosing appropriate locations for giving the test, supervision of enumeration with daily quality assurance, and quality control of data compilation. The approach to analyzing and reporting results needs to be completely overhauled.

The team also recommends that any future large scale EGRA studies use electronic data collection systems to improve administration reliability and reduce cost of printing paper forms for thousands of students. This would also eliminate the need for manual data entry, eliminating the associated possible errors and costs.

Quality Assurance and Decentralized Capacity for School Monitoring and Support

The Quality Assurance Department (QAD) in its current form is a relatively new department in the ministry. In 2009 the minister changed the name and orientation of the Inspectorate Department to Quality Assurance. This decision was made to better reflect his new focus on improving quality, and therefore this departments holds two main responsibilities related to improving the quality of education: the inspection of schools and classrooms, and the development and implementation of national assessments. There seems to be significant capacity within the leadership of this department to advance the minister's focus on using data to improve quality.

Inspections

The inspection office oversees the implementation of all quality assurance inspections and works with other relevant departments to resolve issues in schools as needed. Before 2014, inspections were content area-focused, such as for Khmer, math, or science. This meant that inspectors were subject matter specialists who only observed lessons and issues related to their specialization. Beginning in 2014, there are now two types of inspections. One, called a regular inspection, is

conducted by District Training and Monitoring Teams (DTMT). This includes review of school management and administration as well as observations related to pedagogy in all content areas. The other is a thematic inspection carried out from the ministry level. This inspection is intended to be more of a support visit based on issues that would have been brought forth through the regular inspections.

Regular inspections are the most frequent inspections conducted, and their purpose is to check that schools are able to comply with government policies on instruction and school management. These inspections are used to find the needs and issues at the school level and report them to the ministry where further support can be given as needed. There are currently two groups of inspectors; inspectors who come from the previous system and newly trained inspectors. The older inspectors are teachers who have been promoted and now have a certificate for primary education inspection. The certificate consisted of a 10-month training course specific to conducting inspections. The new inspectors will start in 2016 and are education staff, but they do not necessarily have teaching experience. These new inspectors should have at least a bachelor's degree according to the director of quality assurance. When the team asked at the district level there was a shared understanding of the requirements; however, the reality of staff shortages meant that some staff in the DTMTs had not yet earned a bachelor's degree. The government is currently recruiting 525 new inspectors to train and assign.

Changes have also been put into place concerning the frequency of school visits. The earlier inspection system had no money for transport reimbursement; therefore, the schools closest to the office generally received the most visits, leaving remote schools virtually never inspected. The director of QAD explained that, under the new system, regular inspections can only cover 50 percent of the schools due to funding constraints for transport and personnel. The current goal for frequency of inspections is to see half of the schools in the country once in the next 5 years. The future goal is to see all schools in the country at least once every 5 years. According to the QAD director, the provinces are in charge of selecting the schools to be inspected, and these selections must be justified as part of the reporting process.

Tools are given to the inspectors to use while observing at the schools. These tools are also referred to as check lists and include questions for the school principal around management and the school development plan, questions for teaches around classroom management and instruction, questions for students, and questions for community members or parents concerning their general satisfaction with the school. There is currently a plan to store all the data collected from these inspections in EMIS however the logistics of who will be able to access these reports is still being considered.

Data collected during the inspections is written up in a report and must be verified by the schools. If the schools do not agree with the report a discussion must take place to explain the issues and come to agreement on what the report should reflect. The director of quality assurance explained it can be difficult to get the provinces to share the information, and there are issues with the reliability of the reporting on some indicators.

The thematic inspections are intended to be based on the culmination of regular inspection reports. As trends in issues arise, the QAD will work with relevant technical departments to plan for ministry-level visits to schools, bringing along technical experts. The QAD director mentioned that there is a need for more technical experts to conduct these inspections. The higher level inspections can also lead to continuous professional development that could address specific issues.

Currently this department is being supported by Swedish International Development Corporation Agency. A team from the QAD will be traveling to Sweden to learn more about the Swedish inspection system in hopes of putting more measures in place to make inspections useful.

The inspection system as it stands now has a great potential to support schools and teachers. Inspections as a vehicle for supporting schools and teachers rather than evaluating or punishing are not a typical approach for many countries. However in Cambodia it is clear from the district directors to the head of QAD that the main purpose behind these inspections should be to improve the quality of education. An issue with the system is the funding for enough sufficiently well trained inspectors and the amount of data they are required to collect during each school visit. It is clear there are not enough inspectors and the ones that do exist do not necessarily have a degree or specialization in pedagogy. There is also a significant lack of funding for transportation costs to visit schools. A system whose goal it is to see each school once in 5 years will likely make little impact. Just the teacher and student turn over alone will cause inspections to be irrelevant on a 5-year cycle. A system that is well funded that aims to make school and teacher support truly impactful would need to have knowledgeable inspectors who visit schools on monthly basis. What is in place in this system is the will and concern for teachers and schools to get the support that is needed, which is much more than many countries and should be used to accomplish as much as possible.

National Assessment

The second mandate of the QAD is to oversee and implement national level assessments. The main assessment implemented by the department is what is referred to as the national assessment. This assessment is given to students at grades 3, 6, and 8 on a 3-year cycle. This means that grade 3 students are given the assessment and 3 years later the same students take the grade 6 assessment, then they take the grade 8 assessment. Once this cycle is complete a new grade 3 class takes the grade 3 assessment. This is different from many national systems where all grade 3, 6, and 8 students would sit for the national assessment at the end of each school year.

The assessment system was developed based on a system and style used by the World Bank. The World Bank originally conducted the assessments under an earlier project, however the responsibility has now been fully given to the QAD. The World Bank supported the training of ministry officials to develop and implement the current assessment system. The QAD develops the assessment. Each version is a mix of newly developed items and old anchor items that allow the ministry to see progress over time.

Each of the three assessments is a typical summative standardized assessment consisting of several reading passages followed by multiple choice questions. The grade 3 assessment in

particular uses questions focused on grade-level vocabulary and lower level literal comprehension. There are a few items that ask students to write a response and some dictation of words. The quality assurance director explained the assessment is aligned with the new textbooks and is based on the curriculum standards. Students have an hour and a half to complete the assessment.

Ministry staff rather than classroom teachers administer the assessments. The national sample includes 210 schools across Cambodia. These schools are chosen using EMIS data and IEP SAM software. Analysis of the assessment results and report writing currently requires outside technical support, although staff capacity is being built over time.

Assessment results are supposed to be used to reflect on and improve all levels of the education system. The QAD director explained that the report is supposed to be shared along with recommendations for policy makers, the Department of Curriculum Development (DCD), and the Teacher Training Department (TTD). However he and his staff are not able (nor best situated) to make curricular or training recommendations. It is therefore up to each department to look at the results and interpret what if any consequences there are for each department.

Cambodia's current national assessment system is another opportunity that already exists within the system to improve quality education. There are however spaces for improvement within the system. There is clearly an importance placed on having data and using them to make decisions at all levels of the system. More department-level collaboration could be encouraged so that assessment results could include recommendations for each relevant department. The assessment itself could also include more of an emphasis on higher level comprehension skills, for example, asking students inferential questions for each reading passage.

This department is also responsible for overseeing the entire landscape of assessments being planned for in Cambodia. Currently Cambodia is considering participation in such international assessments as Programme for International Student Assessment (PISA) and (Programme d'analyse des systèmes éducatifs de la Confemen (PASEQ). The director believes these assessments will provide more information on skills than the national assessments that are more curriculum-based measures. There is also a new regional assessment being developed as part of the ASEAN integration. This assessment is in the preparation stage defining items and topics to be included in the instrument. The only large scale assessment that this department has not been involved with is the EGRA studies in 2010 and 2012. The director was aware of the assessments but he made it clear that the PED alone implemented these assessments. There is clearly a substantial emphasis within the ministry and in QAD on assessment data. It would be important for the ministry to consider if all these data are necessary to improve quality, whether some assessments are in fact redundant, and therefore if some funds and energy could be reallocated to designing interventions that can support school-level improvements in instruction.

School Level Management, School Improvement Planning, School Financing

There are numerous institutional arrangements and policies and practices in place intended to improve school governance and management. School support committees bring together stakeholders and staff at the school-community level to conduct school self-assessments and develop school improvement plans. School self-assessments are governed by the Child Friendly School (CFS) framework and indicators, and tools for evaluating all 177 of these are available for school support committees to use. Improvement plans are then developed, outlining how the community will support the school and how school resources will be used to address the indicators that need improvement. Often, communities focus on maintaining the school grounds and making improvement to infrastructure. Basic recurrent needs are often met through the program budget (an allocation from the MoEYS to each school) and through school improvement grants (SIGs). These two sources of funding combine to furnish each school with a few hundred dollars for the school year. To date, schools have not received their full allocations (often only getting one or two disbursements out of four during the year), largely because of the slow, bureaucratic processes the MoEYS uses to distribute these funds. Decentralization reforms being pushed by the government seek to move to a direct allocation of funds to the local level, which may alleviate some of these constraints.

Whether school improvement planning and management of resources at the local level is currently supporting interventions that can improve early grade reading is entirely dependent on the nature of local initiative. In most cases, this means that school communities are focusing on the things like infrastructure and visible improvements to the school environment. Some school communities are recognizing the need to do things like purchase books for their libraries or intervene to better preserve and replace as needed the MoEYS-provided textbooks. An opportunity may exist to take better advantage of the system of school improvement planning (notably, by simplifying it considerably) and focus efforts more directly on supports for improved teaching and learning in early grades.

Teachers and the Teaching Profession

Teacher Requirements

Primary education teacher requirements have changed significantly over the past few decades in Cambodia. During the Khmer Rouge 75 percent of teachers and 96 percent of university students were killed (World Bank, 2014). There was a great need in 1979 and the years that followed to rebuild the teaching force. Thus willing teachers were trained with very minimum standards, some for as little as one week to 3 months. Starting in 1982 teacher training centers began to offer year-long formal pre-service courses. By 1990 the pre-service course was increased to 2 years. According to the TTD, until 1996 the requirement to enter pre-service preparation was only 7 years of basic education. At present the requirement is 12 years of basic education. Some interviewees have mentioned a 9 years and 10 years of basic education requirement during this period as well. The requirements for teachers have slowly increased throughout the decades so

there are still teachers who only have 9 or fewer years of basic education throughout the system as well as district-level staff.

Currently the requirement for those who wish to become a primary education teacher is 12 years of basic education and 2 years of education at a provincial teacher training center (PTTC). There is currently a plan to increase the requirements to 12 years of basic education and 4 years at the TTC, essentially making the teaching degree into a bachelor's degree by 2020. According to the current Teacher Action Policy there are currently more than 75,000 teachers who have less than a bachelor's or equivalent education in the system. This increase in time spent at the PTTC in theory will better prepare teachers before entering the classroom. It will also extend the amount of time it will take to produce new teachers, which Cambodia is in desperate need of. There is also no guarantee that by simply increasing the number of years pre-service students spend at the PTTC the quality of their education will be increased. The understanding that teachers need more and better education is a clear opportunity for improved primary education; however, there is also need to review and possibly revise the quality of education received at this level.

Teacher Shortage

The teacher shortage is a major issue in Cambodia. It is well known from the school, district, province, and national level that the teacher shortage is one of the biggest problems facing primary education in Cambodia today. According to the TTD the 2015–2016 school year already has a shortage of 19,000 teachers 14,559 primary teachers and 1,000 preschool teachers. In one district in Siem Reap the district director explained that he had 397 teachers, but 603 classes, leaving a gap of over 200 teachers in one district for the current school year. Each year the MoEYS decides based on its budget and planning how many teachers can be hired. For the 2015–2016 school year only 3,000 teachers can be hired for all levels, preschool through upper secondary. The director of the TTD explained that usually the MoEYS allows for 5,000 teachers to be hired per school year; however, this year MoEYS has lowered the number. There was no explanation from the TTD for this decrease, although some believe that the ministry of finance will withhold funds from other ministries that are not able to fully spend their appropriated funds. The MoEYS has had trouble using its funds fully and in a timely manner so it is possible that there are fewer funds available.

The largest gaps in teacher needs seem to be in rural areas where very few teachers are willing to stay permanently. In many districts urban schools have plenty of teachers or even a surplus of teachers; however, the rural schools are almost empty. The MoEYS had tried to mandate that all new teachers be assigned to a rural area school for 2 to 3 years to help solve this issue. This solution is problematic because once teachers' obligated time in a remote school is finished, they often move home or back to the city. This causes constant turnover of teachers and a lack of motivation that could be detrimental to the quality of instruction. One possible solution that has been discussed is to recruit teachers more locally and ensure that they are then assigned in or near their home communities. It is unclear if this planned policy change is already in place or is still being discussed at this time. Another option has been to increase allowances for remote assignments from $15 to $20 but the assessment team was told teachers were dissatisfied with this amount and would prefer the increase to be double. Thus teachers are still leaving.

Many officials feel that part of this shortage was caused by the increase in minimum education requirements in the early 2000s from 10 to 12 years of basic education. Fewer people are meeting the new stricter requirements. While having more highly educated teachers may improve teacher quality, because of the numbers of students who do not make it all the way through the 12 years of education there is a smaller pool of students from rural areas to apply making it even more difficult to find teachers willing to work in those areas. According to the recent World Bank study on teacher quality, teacher shortages are also due to the low salary and the fact that teaching is not a particularly attractive profession. The study found that monthly income of teachers as a percentage of other professionals in Cambodia is 60 percent, compared to Vietnam, where it is 88 percent; or Thailand, where it is 144 percent (World Bank, 2014, p. 3). Teacher salaries have been increased recently to help make the career more attractive, but this increase means that the government will be able to afford fewer teachers for the same amount of money, essentially maintaining or increasing the shortage.

In order to try to make up for the shortages districts have three main options.

1. Contract teachers – These are people who are not necessarily trained teachers but could be retired teachers who are given a yearlong contract to teach a class. These teachers have to have contracts renewed each year, leading to high turnover. There used to be a provision for training these teachers for one to one and a half months through the TTD, but once trained many would leave after a year or ask to become a state recognized teacher. Thus the TTD stopped providing training to these teachers.
2. Doubleshifting – Many teachers will teach two classes: one in the morning and one in the afternoon. These teachers used to be able to teach the same grade until the MoEYS noticed that teachers would sometimes combine the classes and only teach one shift with 80 students in the room. Now teachers have to teach two different grades, which requires two times the knowledge and preparation time for minimal increase in pay.
3. Multigrade classes – In smaller rural schools where there are not enough teachers, grades can be combined into one class. This solution is not unique to Cambodia, but it does require special training and knowledge to know how to engage with each grade level and differentiate instruction appropriately.

This issue of teacher shortages has no easy solution. Lowering PTTC entry requirements may allow more people to apply, but quality will likely be impacted. Increasing salaries to make the profession more attractive only reduces the amount of teachers the MoEYS can afford to hire. Temporary teachers such as contract teachers means a revolving door of untrained teachers. Local recruitment may be a viable first start but this will take time the MoEYS does not seem to have. In January of 2015 the ministry released a Teacher Policy Action Plan that spells out a detailed plan for improving teachers and the teaching profession through 2020. Short- and long-term activities for improving teacher recruitment include:

- Admitting candidates with an A, B, or C on the grade 12 exam automatically to TTCs
- Allowing the BA holders of higher education institutions to receive a teaching license

- Providing accelerated training for BA holders to become basic education teachers by cooperating with higher education institutions
- Improve financial and social benefits to align more closely with other professions

Pre-Service Teacher Training

The TTD is responsible for preparing all levels of teachers, from preschool to upper secondary. Preschool and primary school teachers are prepared at the PTTCs. There are a total of 18 PTTCs for primary-level teachers and only 1 that prepares teachers for preschool. The lower secondary teachers are prepared at one of 6 Regional Teacher Training Centers (RTTCs), and upper secondary teachers are prepared through universities, as they are required to have a bachelor's degree. The curriculum for the PTTCs is developed by the TTD and sent to the PTTCs to implement. There does not seem to be much autonomy in the way of content at the PTTC level, even though it is likely that students differ greatly in the amount of knowledge they have. One PTTC director mentioned that the Khmer lecturers have to spend part of their time reteaching Khmer to the students because they are not well prepared. This would be one instance where more local input into the curriculum could be helpful.

In order to enter the PTTC students need to have completed at least 12 years of basic education; however, the director of the TTD stated that students are NOT required to pass the end of cycle exam in order to be accepted at this time. According to the World Bank study on teacher quality, students need to take a ninth and twelfth grade leaving exam to apply to a PTTC followed by a TTC entrance exam. Scores on this entrance exam are ranked and accepted by the MoEYS based on availability. Each year 5,000 students are accepted each year. (World Bank, 2014, p. 33–34) In 2010 the ministry approved a set of teacher standards. These standards cover four domains: professional knowledge, professional practice, professional learning, and professional ethics. None of the PTTC directors who were interviewed mentioned these standards. According to the World Bank only 22 percent of PTTCs were aware of these standards in 2014 (p. 39).

Primary school teachers receive 2 years of preparation at the PTTCs. This preparation includes a combination of course work and practicum. Course work includes classes on psychology, pedagogy, methodology, classroom environment, culture, and core subjects such as Khmer, math, and science. Students are also taught how to prepare lesson plans using the ministry required template and standard. The practicum for year one students is made up of 2 weeks of observations in classrooms and 4 weeks of practice teaching. Year two students have 8 weeks of practice teaching. The practicum is spread across grades 1–6 and students are evaluated each year on their practice. This exposes students to all grades but could also overwhelm them with too varied of an experience. There does not seem to be an opportunity to specialize in particular grades for primary level.

The preparation for Khmer instruction in particular is based on the approach to teaching in the textbooks for grades 1–6. According to the PTTC directors the team spoke to, lecturers have been trained on the new textbooks in some cases by Room to Read, as in Siem Reap. PTTC directors were happy with the new grade 1–3 Khmer textbooks, saying the return to the old way of teaching Khmer is a much better way of teaching. As stated above the director of the Siem

Reap PTTC explained the Khmer classes in his PTTC also include some instruction on Khmer language skills, as many of the students enter the PTTC without being fully prepared.

Lecturers at the PTTCs are generally former teachers. The World Bank estimates 70 percent of lecturers are former teaches while 10 percent are former school directors (p. 41). The minimum requirement to become a lecture is a bachelor's degree, however in at least one PTTC the director acknowledged that some lecturers have only the 12 years of basic education and 2 years of teacher training. The standards were lowered due to staff shortages and the difficulty of finding candidates with the minimum education requirements. Lecturers are organized in units by subject area. Each unit has a chief or leader who is responsible for providing pedagogical oversight by reviewing lesson plans and observing lessons. These units use the fourth Thursday of every month as a technical meeting day in the same way that the public schools would. Lecturers meet and write lesson plans during this time.

The Teacher Policy Action Plan touches on improvements to education through the following activities:

- Pilot 12+4 teacher education program in Phnom Penh and Battambang RTTCs
- Introduce BA+1 pre-service education and training (PRESET) stream in TTCs
- Transform TTCs to Teacher Education Colleges (TECs)
- Upgrade TTCs to meet teacher education professional standards (TEPS) and raise overall quality (PRESET and in-service education and training (INSET))
- Upgrade qualification of TTC trainers to get at least MA

In-Service Training

One of the main roles of the TTD is overseeing the continuous professional development (CPD) for all teachers. The TTD works in close coordination with several of the technical departments to develop and implement trainings as they are needed. From our conversations with the director there is no minimum requirement for hours of CPD, but instead CPD happens when a need arises. For example when the new Khmer textbooks were ready to be rolled out the PED worked with the TTD to develop a training agenda, materials, and logistical plan to have the teachers trained. CPD is then funded either by the MoEYS or by an NGO if it is a particular project-based training.

CPDs are usually conducted in a cascade system where a set of core trainers from the provincial level including the TTD, other relevant departments, PTTCs, and district level staff come to Phnom Penh to be trained and then return to their provinces to train the teachers. Facilitators for the professional development are generally required to have had some kind of teaching experience and a bachelor's degree, though that is not always the case according to the TTD.

There is no formal system set up to evaluate these trainings or to track which teachers have been trained on what. The TTD mentioned that during planning time there are discussions between departments about what kinds of professional development have happened and how many teachers participated. Follow-up support for teachers is limited. It is up to the provincial and

district offices to inspect schools and make sure that teachers are implementing what has been taught.

One unique aspect of teacher CPD that exists in Cambodia is the fourth Thursday of the month. On this day classes are suspended and all levels of the education system spend the day planning. It is built in to the school year for teachers from preschool to the PTTCs. Teachers have an opportunity to plan together on this day. Some school directors use this time to engage and support teachers mainly through review of lesson plans and giving feedback. This time is also often used for professional development or cluster meetings. While this takes away from instructional time it also provides a really unique opportunity to have teachers be supported and support each other on regular basis.

Training Related to Early Grade Reading

Between July and September of 2011 all grade 1 teachers received what has been called an orientation to the new Khmer textbooks. The textbooks were distributed in March of 2011 so teachers had some time with the books before the CPD was made available. The CPD lasted 3 days according to the PED, but others at the province and district levels have reported that the CPD lasted 2–4 days. The PED led the content development and implementation of this CPD. Across the ministry this CPD is commonly called an orientation to the book, implying that there was little focus on how to teach using the methodology. This first year of grade 1 CPD was funded by GPE and is thought to have included all grade 1 teachers at the time. Without a true system to track who has attended the CPD, it is difficult to know if all teachers were trained or not. One district office director in Kampong Cham told us that none of his teachers had been trained. All provincial directors agreed that all teachers had been trained.

In 2012 GPE funding had ended, leaving the ministry to fund and implement the CPD for grade 2 teachers. This CPD took place over 2–3 days and did not reach all provinces and districts. According to PED 10 provinces of teachers were not trained due to budget constraints.

In 2013 when GPE funding resumed all grade 3 teachers were trained according to the PED. Again there are some district directors who do not agree with this, but there is no clear way to verify it.

The content of the orientation to the books seems to have been similar across grades. It was explained to teachers that the new books used the traditional methodology for teaching Khmer. The books also officially reverted to the traditional orthography, replacing the modern simplified orthography that had previously been used in schools. Teachers reviewed the front matter where the different activities are explained and as well as the sections of the book. In at least one province teachers were given time in groups to write lesson plans. There was no mention of theory or practice of the new lessons. Teachers were trained by province, meaning 100 to 200 teachers in one CPD. In Kampong Cham the provincial director explained that the teachers worked in groups of 25 to develop lesson plans for the school year. The director explained that school directors and vice directors also participated in these CPDs in order to be able to better support their teachers.

Some Options for Future Support

Pre-service improvements:

1. Preparation could focus on how to teach reading skills. There is little in the Khmer curriculum for pre-service teachers that is specific to teaching reading skills. When asked, one PTTC director told the team students do not receive a copy of the grade 1–3 textbooks, but rather use a PTTC textbook that is focused on teaching Khmer, not necessarily on reading skills.
2. Lecturers should be experienced teachers with deep knowledge of their specialty. Currently lecturers are not necessarily even former teachers. As the government focuses on improving the standards for incoming teachers it should also be considering the quality of those who are preparing teachers. The new teachers will only be as good as their teachers.
3. General teaching strategies, feedback, time management, and differentiated instruction were all missing from the classrooms observed during the assessment. PTTC directors did not mention these topics specifically when asked about the curriculum for new teachers. It would be helpful have a focus on more general teaching strategies that could help teachers save time and keep students engaged.

Options for in-service improvements:

1. A system could be put in place to better track participants in CPDs. This data could be collected electronically and sent direct to EMIS or some other database. This would allow the TTD and other departments to be able to verify who has been trained and who has not.
2. Teachers need follow-up and support in the classroom after CPDs. There is little oversight or support for teachers once they have been trained. Without some accountability and support teachers could easily struggle to implement new strategies and revert to previous ways of teaching. This essentially leads to wasted time and funds. Using the vice director or the cluster school system there could be one person whose responsibility it is to provide pedagogical support to teachers in the classroom.
3. Use the fourth Thursday planning days for more teacher reflection and support. While having set time for teachers to plan is important, this day could also be used to have teachers meet and discuss their successes and challenges with other teachers. Vice directors and cluster school leaders could be trained to guide conversations and connect teachers who are struggling in a systematic way.

Early Grade Reading Program

1. The orientation to books was probably not sufficient for most teachers to be able to teach the new lessons in the new textbook. There is an overwhelming sense that because the textbooks are using the "old way" teachers should be familiar with how to teach.

However there is a generation of teachers who were never taught the Chet Cham method, and there is no guarantee that teachers were teaching this approach correctly in the past. A real professional development course with instruction and practice could significantly improve teachers' abilities.

2. A new round of professional development on the new textbooks is also needed for teachers who were not trained in the first round. Almost four years have passed since the initial grade 1 training.

Teacher Support Options

Cambodia has placed a high value on teacher performance as a way to improve quality in schools, yet the infrastructure for supporting teachers regularly is not yet a reality. There are several levels of possible support for teachers from the POE to the school. The following is a discussion of the current options and their viability.

POE inspection. In each province office there are staff dedicated to school inspection. These staff visit schools and use a checklist based on the Child Friendly Schools model from the MoEYS to assess any major issues or concerns with the school. The QAD oversees these inspections and has explained that currently the inspections take place in only 50 percent of schools on a 5-year cycle. The goal is to have all schools visited at least once every 5 years. There are plans to hire and train 525 new inspectors for the 2015–2016 school year. One POE director stated there are 2 inspection staff in his office for the entire province. Support from this level does not seem feasible with so few inspectors and a lack of focus on instruction.

DTMT inspection. Each district office contains a team of technical staff who are dedicated to the DTMT. The DTMT is tasked with monitoring schools and teachers. The DTMTs also use checklists focused on a range of issues from administration to book use in classrooms. There does not seem to be a focus on instruction in the checklists; however, there is an understanding that the DTMT should be observing instruction and giving feedback to teachers. District directors that spoke with the assessment team varied widely on the amount of schools that are visited every month (4–30 schools per month) but it seems unlikely that all teachers are visited regularly. Budget for transport is also an issue as there are generally few funds to support DTMTs' going to all schools.

School cluster system. The school cluster system exists throughout the country, and each cluster school has a position called a technical grade leader (TGL). The TGLs are one teacher per grade nominated in this position to take the lead for their grade in professional development activities. These teachers are full-time teachers and are considered strong in a particular subject. The cluster system as it exists now is not fully functional in all parts of the country, but every school is assigned to a cluster. In theory the clusters are mandated to support teachers pedagogically. Budget constraints and time also prevent the TGLs from visiting classrooms regularly. If there were funds and time allocated this cluster system could eventually be a potential option for teacher support.

School director. According to the World Bank 67.1 percent of teachers do report having the school director visit their classrooms at least once a month. All schools have a director and they

do visit classrooms as part of their responsibilities but their responsibilities are also administrative, and there may not be enough time for the director to visit all teachers consistently. School directors, while they were former teachers, are not necessarily experts in early grade reading and would need professional development to support teachers fully. However there is a school director at each school who could provide at least some level of instructional support and monitoring.

School vice director .Many of the larger schools have a vice director. The role has been explained as pedagogical support. The vice director often teaches in schools with a teacher shortage, and in very small schools this role may not exist. However for schools that are big enough the vice director may be a useful resource for teacher support without major changes to the system.

Monthly technical meetings. Every fourth Thursday of the month schools, as well as PTTCs, POEs, and DOEs, dedicate their time to technical meetings. These meetings vary depending on the office; however, teachers meet either with their cluster or at their school every month. These meetings can be used for planning or for professional development. They are an ideal time for reflection and practice of new or challenging instructional issues. Meetings seem to be organized either by cluster or school director but it is not consistent across all schools. Many NGOs use this time to meet with teachers for professional development, but there is not one dedicated person in the system who seems to be consistently in charge of how this time is occupied.

Currently NGO-run projects are experimenting with the various options for teacher support. Room to Read implements their Literacy Program in four provinces, which involves working directly with teachers to improve instruction for grades 1 and 2. Room to Read's solution to teacher support is a mix of master teachers who teach half the day and support half the day, TGLs and District Education Office staff. These coaches get a stipend paid by Room to Read to visit teachers and collect any necessary data.

The vice director is being used as a literacy coach in the TRAC and TRAC+ schools. Vice directors are given a small stipend of $35 to do the extra work being asked of them. In 5 communities KAPE has been able to convince the local community of the value of this role, and the community rather than the project is now paying the stipend, making the literacy coach role more sustainable in those communities.

There does not seem to be one clear, ready, and sustainable option for teacher support at this time. Nevertheless there are several options that with some tweaking could be possibilities. Sustainability remains the biggest issue, as funds do not seem to be widely available for any of these positions to be able to travel to schools. This may make a school-level teacher support role more viable if there is a way to utilize the vice director for the larger schools and perhaps some combination of a school director or cluster TGL for smaller schools. In all options the various personnel would require professional development on instruction and teacher coaching strategies.

Private Education

Over the last 5 years, the private sector has moved vigorously without state collaboration to establish many independent private schools. This movement has been most visible in Phnom Penh, where an increasingly affluent middle class has created enough demand to apparently make such ventures economically viable. In this regard, the Municipal Office of Education, Youth, and Sport in Phnom Penh reports that there are now 119 private primary schools, compared to 164 public ones operating in the city. In Phnom Penh, only 15 percent of total enrollment at the primary level is reported to be in private schools; this figure jumps to over 40 percent in some urban districts. Private schools are registered with the MoEYS and are subject to nominal oversight by the municipal education office, but they appear to operate independently. Many private schools do not offer instruction that is substantively different from what is occurring in public schools. Private schools distinguish themselves in their approach to school management. For example, they rigorously enforce requirements for teachers to come to work on time and prohibit teachers from charging any under-the-table fees,[38] in stark contrast to what occurs in public schools. Increasingly, private education now offers a viable alternative (in urban areas) to the public education system, not only for the country's elite, but for many more people of moderate means. At issue is whether the MoEYS and its partners can channel these market forces in ways that support quality improvements in teaching and learning in both public schools and the emergent private alternatives.

[38] Study by KAPE and SCI in 2013

Annex D: Roles and Responsibilities of Early Grade Reading Relevant MoEYS Departments

Primary Education Department

The Primary Education Department (PED) is the main body that directs all technical issues related to primary education. It is overseen by the General Department of Education. Responsibilities encompass all that is necessary for instruction and learning in grades 1–6. The department staff work across MoEYS to develop and implement curriculum, textbooks, teacher professional development, and student assessments. This means subject matter specialists work with curriculum writers to develop textbooks. If training is needed, staff at PED develop the content and work with staff in the Teacher Training Department (TTD) to organize and plan the training of trainers and teachers.

PED leads the Early Grade Reading Assistance program that has focused on improving early grade reading in grades 1–3. The department directed the work to develop and implement the 2010 and 2012 early grade reading assessment (EGRA) studies. Staff worked with World Bank consultants to develop the assessment instrument and train data collectors from the PED and other relevant departments. A World Bank consultant was hired to conduct the analysis and reporting. Subsequently PED led the writing of the new Khmer textbooks for grades 1–3. After the 2010 EGRA, a working group was established to draft the grade 1 textbook. The textbook was piloted and then revised before being printed and distributed. Textbooks for grades 2 and 3 followed the same process in 2011 and 2012. PED also developed the professional development for teachers called an orientation to the book, which focused on understanding the textbook and writing lessons plans rather than instructional theory or practice. Technical specialists from PED led the textbook and teacher training working groups collaborating closely with the Department of Curriculum Development (DCD) and TTD, which also participated in the working groups.

Curriculum Development Department

The main responsibility of the DCD is to oversee the development of curriculum and textbooks for grades 1 to 12. Prior to 1996 the DCD and its staff were responsible for writing all curriculum and textbooks themselves. Staff in this department are not necessarily subject-matter specialists; however, during the 1990s UNICEF conducted a training of several existing staff to grow their knowledge and skills specific to curriculum development. Many of these staff are still working for the department and participated in the writing of the new Khmer textbooks. Currently the writing has become a collaborative process using cross-departmental working groups and support from international consultants as well as the staff from the DCD.

The DCD also plays a role in supporting the assessment of students throughout primary school. They are working with the Quality Assurance staff to develop the grade 3, 6, and 8 assessments. Their office of evaluation is working to develop and implement end of year assessment guidelines as well. These have not yet been finalized, but will be given to teachers so they can use them to know how to monitor and test students throughout the school year.

There is a plan for a new curriculum to be written in 2016 with training in 2017. The completion of development and training will be dependent on available funding. Teachers do not receive the curriculum document, but would receive training. The document would go to school directors. Staff in the DCD will work with the TTD to develop and implement the training as needed. The current curriculum is focused on the number of subjects and the frequency that each should be taught for all grades.

The DCD's role in early grade reading assistance has been to support the writing of the new grades 1–3 Khmer textbooks. Staff from this department were a part of the working group that drafted the content of the books as well as the working group who reviewed the drafts.

Teacher Training Department

The mandate of the TTD covers both pre- and in-service training of teachers. Pre-service teacher training is provided by 18 provincial teacher training colleges (PTTCs) for primary education teachers; 6 regional teacher training colleges for lower secondary; and National Institute for Education (NIE) for secondary school teachers. Pre-service responsibilities include developing curriculum and standards for teacher preparation. The TTD also oversees the students who are selected to attend the PTTCs and hiring of new teachers. This includes helping to deal with the teacher shortage and teacher placement issues.

The teaching force in Cambodia was decimated during the conflict period and began slowly rebuilding starting in 1979. The shortage of educated citizens resulted in very low teacher selection and qualification standards. According to the director, "if you could read you became a teacher." During the early 1980s MoEYS provided very limited teacher training, from 1 week up to 3 months. From 1982–1996 the requirements for becoming a primary school teacher were 7 years of primary school plus 1 year of secondary school.

Since 1996, MoEYS increased the qualifications for primary school teachers to 12 years of primary and secondary education plus 2 years at a teacher training college. The MoEYS is planning to change and "upgrade" the primary school teacher qualification standards to 12+4.

The TTD oversees and implements continuous professional development (CPD); however, staff are not mandated to develop the trainings on their own. Generally technical departments or NGOs come to the TTD staff to develop CPD based on needs as they arise. The TTD works closely with departments such as PED and DCD to plan and develop CPD modules. These modules are then used to train cross departmental staff as well as provincial level staff. The provincial level staff then train teachers and other relevant stakeholders. It is up to the departments to track participants attending the trainings as MoEYS has no system for tracking in-service teacher training. The provincial inspection office is responsible for monitoring if teachers are using the skills for which they were trained.

The TTD role in early grade reading assistance has been to support the orientation to the new textbooks given to teachers in grades 1–3. PED worked closely with the TTD to develop the content of the orientation and plan logistics. NGOs such as Room to Read and Save the Children also worked with the TTD to train grade 1 teachers.

Quality Assurance Department

The newest of the MoEYS departments is the Quality Assurance Department (QAD). It has two main responsibilities: school and classroom level inspection and assessments for quality improvement. Prior to 2009 the department was known as the Inspection Department, but with the minister's new focus on data and quality improvement, the name was changed and an office of quality assurance was added. The QAD is led by a highly competent and capable leader who has received Global Partnership for Education (GPE) technical support and international training at International Institute for Education Planning (IIEP). He is focused on getting more people to more schools; developing and administering the new grade 3, 6, and 8 national assessments; and introducing additional regional (ASEAN, SEMEAO) and international assessments (PISA). Working closely with the World Bank, capacity is being built to enable the department to analyze and report on the results of the assessment. The inspection system is also getting more capacity. In 2016, 525 new inspectors will be trained, allowing all schools to be visited at least once every 5 years. The department recognizes that more frequent and higher quality school inspections are needed. QAD is also transforming the purpose for school inspections from a punitive inspection approach to one that focuses more on pedagogical support for schools to ensure the curriculum reforms are being implemented in schools.

QAD has no specific role in the early grade reading assistance activities. The PED led the development and implementation of an EGRA in 2010 and 2012 that was used to better understand students' early grade reading skills and track impact of the new Khmer textbooks. However, the QAD was not involved in a significant way in these studies.

ICT Office

The work of the ICT Office in the MoEYS is guided by the 2009–2013 ICT for Education Master Plan. Its main thrusts can be summarized as follows:

- ICT skills and equipment at upper secondary level, particularly for ICT and science instruction
- ICT skills and equipment at teacher training colleges, with a focus on basic ICT productivity skills and the use of video to support science instruction
- ICT skills and equipment at all higher education institutions, with a focus on ICT productivity skills and eLearning
- ICT to enhance efficiency in the management and administration of education at all levels, with a focus on education data/information sharing across the levels of the education system

The principle responsibility of the ICT Office is to oversee the implementation of the ICT for Education Master Plan. However, according to interviews with MoEYS staff, resource constraints impede the ICT Office from fully carrying out the plan. Theoretically, the MoEYS allocation includes funding for ICT activities, but complicated internal and external (with Ministry of Finance) budget approval and funding disbursement processes delay allocations and expenditures to the point of rendering the relevant offices inoperable. Furthermore, given the

limitations in funding and comparatively low salaries in the public sector, the ICT Office appears to struggle to attract and retain the kind of specialized human resources needed to effectively plan, lead, or support and monitor activity implementation. The ICT Office has a total of 8 staff, half of whom have an education background, and half of whom have a more IT background, but none with advanced degrees or specialized expertise in the field. MoEYS is relying on advice and collaboration from the NGO community to do much of its strategic planning and implementation work.

Further details regarding the ICT sector in Cambodia are provided in Annex H.

Planning Department

The Planning Department is responsible for the education policy coordination and formulation including the 2014–1018 Education Sector Plan (ESP). They have introduced an education "think tank" at a local university to conduct research and studies on issues relevant to the ESP. It is clear that the MoEYS planning function is centralized, with low planning capacity and execution at the sub-national levels. As part of the overall government decentralization, every provincial office is responsible for identifying provincial priorities and developing provincial plans, which are supposed to align with the ESP and annual budget planning. Decentralized planning is supposed to extend to district education offices and schools, with each operational unit identifying needs and developing a plan.

Finance Department

The Finance Department is responsible for planning and managing the budget for MoEYS. However, the role of the central ministry and the roles of the provinces in developing and executing the education budget is in flux as the Government of Cambodia is in the process of implementing significant financial reforms. Paramount among these is the introduction of greater decentralization in the preparation of education plans, and therefore budgets. According to the director of the Finance Department, for the present and next fiscal years, provinces are expected to develop their own budgets and to submit those directly to the Ministry of Economy and Finance (MoEF), with MoEYS playing only a facilitator role, helping provincial offices of education (POEs) prepare their budgets and communicate with the MoEF. The technical departments in MoEYS will communicate to the POEs what they should be including in their plans so those plans can align with ministry priorities and overarching strategies. The subsequent allocation of resources based on the POE-developed budgets reportedly will go directly to the POEs. The team was informed that provinces will then be directly accountable to the provincial finance office and the MoEF, and only tangentially to the MoEYS.

The introduction of a decentralized approach does mean that at the provincial level, the education budget will be negotiated by the governor and other provincial authorities as one among all ministerial budgets.

Ministry of Economy and Finance, General Department of Budget

The assessment team also met with MoEF to better understand how funds for education are allocated and disbursed. MoEF officials stated that education receives 6 percent of GDP, which is contrary to widely available data which puts that figure at 2 percent. According to MoEF education receives 7 percent of the recurrent GDP budget for capital expenditures and 18 percent of the budget for recurrent expenses. MoEF noted some challenges between the budget and calendars that can affect funds' efficient disbursement. The school year runs from Sep/Oct–June/July and the budget calendar runs from Jan 1–Dec 31.

Budget planning for the education sector is linked to MoEF economic projections and a 3-year budget strategy plan, which has to be passed by the cabinet. MoEF is anticipating 6–7 percent growth next year, which will result in higher budget allocations to education.

Currently all levels of the education system are run on Program Budgets (PBs). Each province, district, or school has its own PB that is used for expenses specific to that level of the system. The PB budgeting system is intended to focus and link budgeting and expenditures to activities and achievements. This should align with upcoming reforms, which will move budgeting from a line item budget approach towards outcomes based budgeting. This is intended to increase and regularize financing flows to central line ministries and sub-national operating units.

The new reforms are expected to change operation procedures for school expenditures. Instead of quarterly disbursements that have to be accounted for before another disbursement can made, schools will be able to account for funding on an annual basis. MoEF states that these changes should also give schools more autonomy and flexibility to purchase items needed for school operations. Schools will need to prepare plans against which items should be purchased. Under the new financing arrangements, all the line ministries, including Education, will be required to prepare sub-program plans and activity level budgets, which must align with sector policies. The notion of greater spending autonomy is somewhat confusing in terms of procedures.

To address accountability issues, MoEF is putting in place a "checks and balances" system for line ministries, which requires two reports. The first is a Financial Report, which must report on how expenditures are linked to outcomes. The second is a Performance Report, which is intended to report on results achieved.

When speaking about the numerous NGOs working in the primary education sector MoEF explained there is currently no system in place for tracking or coordinating education projects funded by NGOs. MoEF highlighted the need for NGOs to at least report on funding levels, which seems to be one of the requirements for the pending NGO law. MoEF also lamented that there are too many NGO- and development partner-funded education programs that, when they end, put a burden on the MoEF to continue funding project activities. This is something MoEF is unable to do.

When asked about challenges and opportunities, MoEF suggested the following:

- Work closely with MoEYS to align program support with the ESP
- Stop doing "one-off" programs that cannot be financed or sustained by the ministry after external financial ends
- Some ministries do not fully understand how PBs work

Annex E: Decentralized MoEYS Capacity

Provincial Offices of Education

The team visited four provinces during the assessment. These visits served as an opportunity to understand the layers of administration and implementation of MoEYS policies. A Provincial Office of Education (POE) runs the education system in each province. The office is made up of a director, vice director, and several smaller offices similar to the national level MoEYS. According to one provincial director, the main role of the POE is to advocate to the ministry for the districts and schools within the province. The provinces also must work with the districts to ensure that all policies from MoEYS are implemented in schools. Staff at the provincial level is a mix of administrators and technocrats; some play the role of master trainers and support inspections of schools. The POE holds a monthly meeting with all districts during the fourth Thursday planning day. This meeting is generally attend by the district director and focuses on any MoEYS plans or issues as well as any district-level issues that need to be addressed. Funds for this meeting are not always available; however, it seems the meeting generally takes place regardless.

The director is also responsible for addressing needs of the district such as teacher shortages or supplies needed. Each POE has a budget that can be used to address district-level needs if possible, otherwise the office will liaise with the national office to request resources for the districts. The provincial office acts in many ways as a manager of the MoEYS policies, while the district seems to be more of the implementer of the policies. In this way the provincial staff do not always have the same view or information as the district offices as to the reality of what is happening in schools.

In-service

Generally any continuous professional development (CPD) that is implemented in a province is mandated by MoEYS. When the need for CPD is identified and developed the province selects and sends staff and provincial teacher training college (PTTC) staff to Phnom Penh to be trained as master trainers. The new trained personnel then return to the province and train the district and school staff. The POE does have the ability to develop and implement its own CPD; however, this is dependent on its budget. The budget is not typically sufficient for added expenses. If MoEYS cannot provide extra funds it is unlikely that any provincially developed CPD would be implemented.

Inspection

The POE also supports school-level inspections in the system. One director mentioned he had two staff dedicated to inspections in primary schools. These two staff members attempt to see 5–10 schools per district (this number varies depending on the province) targeting the early grades for observation. District-level staffs as well as school directors also participate in these inspections. There are multiple checklists used during these visits for school, classroom, and new Khmer textbooks specifically. These checklists are sent to the province by MoEYS. Data from

these inspections is also reported back to MoEYS. Often the successful implementation of the inspections is complicated by lack of transport funds from MoEYS.

Role in Early Grade Reading Assistance Implementation

The POE's main role in the implementation of the new Khmer textbooks was ensuring that books got to schools and training teachers. Province-level staff were sent to Phnom Penh for training and returned to train teachers. Trainings were held in each district with 100–200 teachers participating in each (Table E-1). According to one director, teachers worked in groups of 25. The main work of this CPD was to write lesson plans. The textbook was divided among the groups and each group wrote approximately 25 lesson plans. At the end of the training, lesson plans were written for the entire year. After training the POE staff used their responsibility for inspection to follow up with school-level implementation of the new textbooks and instructional approach; however, checklists do not seem to include indicators for instruction.

Table E-1. Provincial Organization (MoEYS data)

	Kampong Cham	Siem Reap	Prey Veng	Svay Rieng
Total Staff	11,269	6,252	7,061	4,547
Provincial Office of Education Staff	133	108	108	90
District Office of Education Staff	210	129	156	112
Offices (same as Districts)	17	11	13	8
Staff Dedicated to Primary Education	6,169	3,562	3,884	2,329
Districts	17	12	13	8
Primary Schools	796	500	536	261
Primary Students	275,174	164,236	156,133	73,220
Primary Teachers	4,482	2,712	2,777	1,938
Classes	7,066	4,363	4,479	2,055
Teacher Shortage[39]	2,584	1,651	1,702	117
Contract Teachers	405	448	3	0

District Offices of Education

Along with visits to the POEs the assessment team also visited at least one district office of education (DOE) in each province. DOEs are responsible for school-level monitoring and support, ensuring that the MoEYS policies are being carried out in schools and schools have what they need to do so. Table E-2 provides an overview of teacher shortages.

Table E-2. Data Indicating Teacher Shortages in Selected Districts[40]

	Kampong Cham	Siem Reap 1	Siem Reap 2
Primary Schools	49	75	60

[39] Number of classes less the current number of teachers.
[40] Based on assessment team calculations using MoEYS data.

Primary Students	15,000	21,177	18,000
Primary Teachers	800	397	500+
Teacher Shortage	120	206	200

District Technical Monitoring Team

One of the main roles of the DOE is school visits for monitoring and support. Each district has several technical staff who are dedicated to visiting schools. This group of people is called the District Technical Monitoring Team (DTMT). The work of school monitoring is divided into three main focuses: School Directors, Primary Schools, and Secondary Schools. The different groups use checklists to guide their visits. These checklists are mainly geared toward collecting administrative data such as enrollment and textbook distribution. Checklists also include Child Friendly Schools indicators. There does not seem to be a checklist or indicators focused on instruction specifically. The DTMT team is comprised of technical staff. Multiple district directors noted that there are not sufficient staff numbers for their district, so school cluster heads and school directors are at times pulled in to support the work of the DTMT.

Districts differed on the number of schools visited each month. One district explained that the DTMT visited 30–40 schools per month, while another said 6 schools per month. All districts agree that securing funds for school visits is an ongoing issues. One director noted that some of his schools require a boat to reach and frequently there are no funds to pay for transportation.

Relationship to POE

Multiple districts related that support from POE was minimal in their opinion. Staff from POE come to the district office and schools on occasion but mostly when the district calls them. Few staff, lack of budget, and lack of time seem to keep the POE staff in their offices more than in the districts and schools. The POE does hold monthly meetings on the fourth Thursday of each month for all the districts. These meetings discuss technical issues and MoEYS policy implementation.

Role in Early Grade Reading Assistance Implementation

The DOE is the main monitor of the early grade reading reforms that are taking place in schools. DTMTs are responsible for monitoring that the new Khmer textbooks are in classrooms and that they are being used. They give advice on implementing the lessons as they feel it is necessary. DTMT staff were to be trained with teachers in all districts, however it is clear not all were trained. In districts where NGOs implemented training of the new textbooks, teachers were sometimes the only participants in these trainings. MoEYS trainings on the other hand included all DTMT staff and school directors, as well as teachers. Multiple DOE directors also noted that the trainings, especially by NGOs, took teachers and staff away from instructional time, and they would prefer teachers be trained during the built-in planning times on the fourth Thursday of each month or during school breaks. There do appear to be some discrepancies in information about the program between the district and province offices. One POE director stated that all teachers were trained and all students have books, while the district director under him said none

of his teachers had been trained and most but not all students have books. Overall DOE directors seemed satisfied with the new textbooks, yet they noted a need for more training of teachers and district staff as well as resources, such as funding for school visits.

School-Community Level Management

The success of any/all initiatives to improve education in Cambodia requires better management and administration of schools and more mutually beneficial relationships between schools and their communities. MoEYS recognizes that the ultimate success of educational reforms is best served by policies to devolve authority to the lower levels in the administrative hierarchy, although it also readily acknowledges that many of the prerequisites for this to happen successfully are not yet in place. The many years of oppression under the Khmer Rouge and subsequent civil war have created a management culture among many local administrators to avoid risk and wait for direction from above. Such attitudes do not serve the ministry's hopes to promote local initiative and responsibility.

Over the years, MoEYS has approached decentralization from several angles. The earliest measures to promote decentralization were mediated by the creation of a cluster school structure that sought to promote local resource sharing, mentoring from master teachers (or Technical Grade Leaders as they are known at local level) based in core schools serving satellite schools, and accountability through cluster-wide testing. Although the cluster school pilots that took place during the 1990s were recognized as very successful (e.g., Bredenberg & Ratcliffe, 2002), full sustainability was never achieved because the cluster school structure was never part of the official administrative structure recognized by the MoEF.[41] Thus, clusters could never be directly resourced by government, even though they were created through an official MoEYS policy in 1995. This situation crippled clusters' ability to function effectively without the assistance they received from donor-funded projects. However, when used by projects, the cluster school structure serves as a vehicle for delivering teacher in-service and local capacity building.

Another angle through which the MoEYS has sought to promote decentralization was through the creation of commune-based EFA committees or CEFACs. The creation of these bodies followed recommendations of the Dakar Framework for Action in 2000, which called for revisions in the approach to Education for All (EFA) by member countries that would enable broader community participation. These efforts coincided with the creation of a legal framework in Cambodia for devolving authority to newly created commune councils under the Law on Administrative Management of Communes and Sangkats in 2002.[42] CEFACs consist of a commune chief and/or vice chief, a local resource person for Women and Children's Affairs, village chiefs, and a cluster school director and/or secondary school director. The CEFACs were designed to form a link between local governments at commune level and the schools under MoEYS. The committees not only serve a function to keep local people informed about what is

[41] This structure starts with MoEYS at the top and moves down to POEYS, DOEYS, and schools.

[42] Popularly mandated local government in 1,621 communes was established after local elections that took place in February 2002. The *Law on the Administration and Management of Commune/Sangkat (LAMC)* provides a comprehensive framework for the decentralization program of the Royal Government of Cambodia.

happening in schools, but also as a means to mobilize local support. Past projects, such as Improved Basic Education in Cambodia Project, have had success in using CEFACs to mobilizing local commune resources through the Commune Investment Planning (CIP) process. This allowed funds received from the Ministry of Interior (MoI) to be used to contribute to the recurrent costs of project activities.

Nevertheless, efforts to enlist commune councils in a meaningful effort to decentralize educational services have been hindered by the line-ministry structure governing the schools and the councils where the former are under MoEYS and the latter are under MoI. Thus, any recommendations that schools might receive from commune councils are non-binding and vice versa.

The most recent initiative to facilitate decentralized control over the state schools relates to an experimental social accountability framework that is governed by the Strategic Plan on Social Accountability for Sub-national Democratic Development (2013). Under this plan, the Royal Government of Cambodia has begun to rollout new mechanisms to promote social accountability including community score cards and joint accountability action plans. This initiative is an inter-ministerial effort that is coordinated by the National Committee for Sub-national Democratic Development. Under this framework, local communities and civil society work with government service providers in the health and education sectors to review services and set local goals for improvement. These mechanisms are not intended to be channels for complaining about services but rather to improve service provision through mutually agreed milestones. Piloting of the Social Accountability Framework has shown some success, although implementation has been patchy and *ad hoc*. Nevertheless, the government has begun to rollout the social accountability framework to 120 districts in 2014 with more to follow in coming years.

Annex F: Development Partners

Development Partner Coordination and Collaboration

The community of development partners (DPs) supporting education in Cambodia maintains a strong relationship with the MoEYS through participation in the Education Sector Working Group (ESWG). While there is not a formal Sector Wide Program (Swap) in the education sector, coordination among DPs is assured through the operation of the ESWG, presently chaired by UNESCO and UNICEF and including representation from the NGO Education Partnership (NEP) network. This group of DPs also serves as the local education group (LEG), providing ample opportunity for alignment, coordination, and collaboration. It meets monthly on its own and jointly with MoEYS leadership each quarter and in an annual retreat, the latter serving as a joint annual review opportunity.

Externally funded programs are ideally designed to support the ministry's Education Strategic Plan (ESP), and some do so more explicitly than others. For example, funding from the Global Partnership for Education (GPE) and from the European Union (EU) contribute significantly to portions of the activities announced in the current ESP (as discussed below). By all accounts, MoEYS and its main development and implementing partners all enjoy productive collaboration, with the ministry openly seeking and making use of the advice, experience, and expertise of its collaborators. Increasingly, the funding agency partners of MoEYS have shifted their focus from a previous emphasis on inputs as proxies for educational quality to placing more emphasis on measureable outcomes as the ultimate objectives of sector plans, strategies, and programs.

What follows are summaries of some of the programs of assistance of the ministry's main partners.

USAID Past Education Programs

USAID first began making investments in the basic education sector in 1996 with the $30 million Cambodia Assistance to Primary Education Project (CAPE). Focusing on a nationwide teacher education program linked to cluster school resource centers, CAPE unfortunately ended after only 1.5 years of operation due to the political events of 1997. Nevertheless, a lasting achievement of this project was the creation of a large national nongovernmental organization (NGO) known as Kampuchean Action for Primary Education (KAPE) that has carried on the work of CAPE until the present day. Subsequent restrictions placed on development aid by Congress resulted in a hiatus in direct USAID support for education until 2004 with the start of the Cambodia Basic Education Project (CBE; 2004–07). CBE was a national program that helped MoEYS develop curriculum standards at grades 3, 6, and 9 as well as a local life skills program at upper primary and lower secondary school level. The curriculum standards provide useful measures for assessing learning outcomes in Khmer, mathematics, science, and social studies. USAID also supported more regionally focused projects such as the Educational Support to Children in Underserved Populations Project (ESCUP; 2005–08) and Schools for Life (SfL; 2008–09) that developed many educational innovations to address teacher shortages, promote stakeholder-driven development models (e.g., through the use of activity menus), and facilitate

educational services to un-served communities through intermediate classrooms. These projects also pioneered solar-powered computer labs and bilingual education models for the Cham Muslim minority. Both ESCUP and SfL were integrated projects that refined the implementation of the earlier Child Friendly School (CFS) pilots on a broader scale, particularly in remote and underserved areas. They were also the first projects to provide concrete experience in expanding CFS programming to the secondary school sector.

The most recent major education development projects supported by USAID include the Improved Basic Education in Cambodia Project (IBEC; 2009–14) and the School Dropout Prevention Pilot (SDPP; 2011–15). IBEC was a $10 million project that sought to scale up much of the work done under ESCUP and SfL, but with the addition of a national flagship component to develop a life skills education curriculum at lower secondary school level. These efforts included inputs to create institutional environments at school level that would support the actual implementation of life skills modules, thereby addressing many of the challenges that had constrained life skills education in the past (e.g., no teacher overtime, poorly defined learning cycles, lack of teacher guides, etc.). The curriculum was officially adopted by MoEYS in 2014 and will stand as a lasting contribution to efforts to address soft skill deficits among youth frequently cited by local employers. IBEC also worked closely with MoEYS to develop the new reading textbooks and participated in activities to assess the new readers, revise them, and help in printing for IBEC target areas.

SDPP is a large $8.7 million project managed out of USAID/Washington that focuses on evidence-based piloting of activities to reduce school dropout at secondary school level. The project has implemented a rigorous experimental design to test the efficacy of student information and communication technology (ICT) access and an early warning system as measures to reduce dropout. One major achievement of this project was to rollout the IBEC solar-powered thin-client lab model to over 100 secondary schools in a very short period of time. SDPP research findings will be shared with the public at the end of 2015.

USAID has also been supporting educational innovation in the area of reading through the All Children Reading (ACR) innovation grants. Civil society partners in Cambodia have already received two ACR grants. One of these was for the Total Reading Approach for Children Project (TRAC; 2012–14) and more recently the E-books for Khmer Project (2015–17). These are explained in more detail below. USAID has also provided support to the sector through the Development Innovations Project (DI; 2013–16), which seeks to improve the efficiency of development in all sectors through technology. DI provides small innovation seed grants to civil society partners to promote the use of effective technologies in what they do. One such grant was recently awarded to World Education in 2014 to develop an electronic testing platform to increase the reliability of school-based testing based on new reading benchmarks that were developed with MoEYS through the TRAC project. The completed platform will be ready for general use in schools in mid-2015.

GPE

GPE is currently funding the Second Education Sector Support Project (SESSP) as a follow on to the program previously supported through the precursor to the GPE, the Education for All (EFA) Fast Track Initiative. The objectives of the current SESSP are to assist the government in expanding access to early childhood education and contribute to improved access and quality of basic education, particularly for children from disadvantaged backgrounds.

The four components of the GPE program and their levels of funding are shown Table F-1 below. Component 1 includes the construction of 100 school buildings that will house both pre-school and primary classrooms as well as 500 community-based early childhood education (ECE) classrooms. Additionally the program will support the establishment of another 500 home-based and 1,000 community-based pre-schools. The GPE support will also finance materials for the ECE schools and centers as well as the training of a cadre of ECE trainers, of parent leaders (for the home- and community-based approaches) and ensure support for 24 national ECE resources centers. The SESSP supports increasing access for disadvantaged students to primary and secondary school through the expansion of the existing scholarship program. In addition, MoEYS's school health program will receive funding to expand and teachers will be trained in disability screening.

Table F-1. GPE Program Components and Funding Levels

Project Components	Project Cost (US$M)	GPE Financing (US$M)
Improving the Access and Educational Experience of Vulnerable and Disadvantaged Students	23.80	23.80
Benchmarking Student Competencies	4.30	4.30
Improving the Cambodia's Teaching Force	2.50	2.50
System Strengthening and Project Management and Monitoring and Evaluation	7.90	7.90
Total Costs	**38.50**	**38.50**

SESSP Component 2 provides support for the implementation of nationwide early grade reading and math assessment (EGRA/EGMA) surveys and the development and provision of textbooks for reading and mathematics. Additionally the Education Quality Assurance Department will receive technical support related to the development of the national assessments for grades 3, 6, 8, and 11. Component 4 provides funding to support in-service training for teachers related to inclusive education and for teaching phonemic awareness. Management and leadership training for school principals is also included. The last component of the SESSP will fund the construction of 20 district education offices and provide training to central, provincial, and district officials related to the implementation of a unified ECE and primary education approach.

EU

The EU is the largest bi-lateral donor to education in Cambodia. It provides grant assistance for a variety of education programs including budget support and thematic projects implemented by local NGOs. The largest share of EU funding is provided through budget support at approximately $5 million per year. The EU also co-funds the Capacity Development Partnership Fund (CDFP), which is essentially a trust fund for building MoEYS capacity building and systems strengthening. The CDPF started in 2011 and a new Phase II agreement was signed for the period 2014–2018, to align with the ESP. A final evaluation is in progress that will assess the impact of the first CDPF program. The funding for CPDF 2.0 is approximately $5 million. The CDPF covers a wide range of technical areas that includes: planning, management, budgeting, evaluation, and implementation capacity. The CPDF is a very flexible mechanism that can provide support in almost any technical area related to ESP implementation.

The four EU criteria that must be met for Cambodia to be eligible for budget support include: 1) public financial management reform; 2) macroeconomic stability; 3) budget transparency; and 4) progress on sector strategies. All four eligibility criteria must be met for Cambodia to receive base tranche payments. Variable tranche payments are made based on specific indicators that are aligned with ESP. There are range of access, quality and management input, process, and outcomes indicators that are used for variable tranche disbursements but, importantly, none that focus specifically on learning outcomes. One quality indicator is related to assessments but only requires that assessments be done, analyzed, and shared.

The EU advised USAID to ensure that any new program aligns with the ESP and complements what other development partners are doing. EU diplomatically questioned some of the current USAID programs, including TRAC and the New Generation School, which appear to be standalone programs that don't align with ESP. EU also cautioned that a strong focus on early grade reading could have a negative unintended consequence of de-valuing other important sub-sector needs, such as math. EU also advised USAID that any further support for use of EGRA should align with the new grade 3 national assessment.

UNESCO

In addition to co-chairing the ESWG, UNESCO is supporting a national adult literacy program targeting over 90,000 learners between the ages of 15 and 45. The program is funding over 3,600 literacy classes and will put in place 660 master trainers, and will then collaborate with MoEYS to recruit and support literacy teachers to organize and run the classes at the local level. Literacy teachers will be chosen from among the existing ranks of teachers, and they and their adult learners would receive all the necessary materials. The program aims to offer adult literacy courses in every commune in the country, with the expected outcome of learners who can read/write basic text and do basic arithmetic. The effort is co-funded by UNESCO and the MoEYS, with close to 85 percent of the funding coming from the Cambodian government.

UNICEF

Like UNESCO, UNICEF serves as the co-chair of the ESWG and also supports some programs in the sector. In 2003–2004 UNICEF piloted CFS schools in collaboration with KAPE. The program was successfully implemented and over the years was mainstreamed into MoEYS's approach to school monitoring and school improvement planning. UNICEF continues to work with the government to track CFS indicators in support of the master plan for implementing the MoEYS policy on CFS (for both primary and lower secondary schools). Currently UNICEF is supporting training for school principals and school committees linked to the MoEYS school improvement planning efforts. UNICEF also supports community-based early childhood education.

SIDA

The assessment team was informed that the Swedish International Development Agency (SIDA) is supporting the reform and revamping of the inspection service of MoEYS and in general assisting with the improvement of quality assurance in the education sector. However, no specific details regarding the exact nature/amount of SIDA assistance were obtained, as the team was unable to meet with any representatives of the agency.

WFP

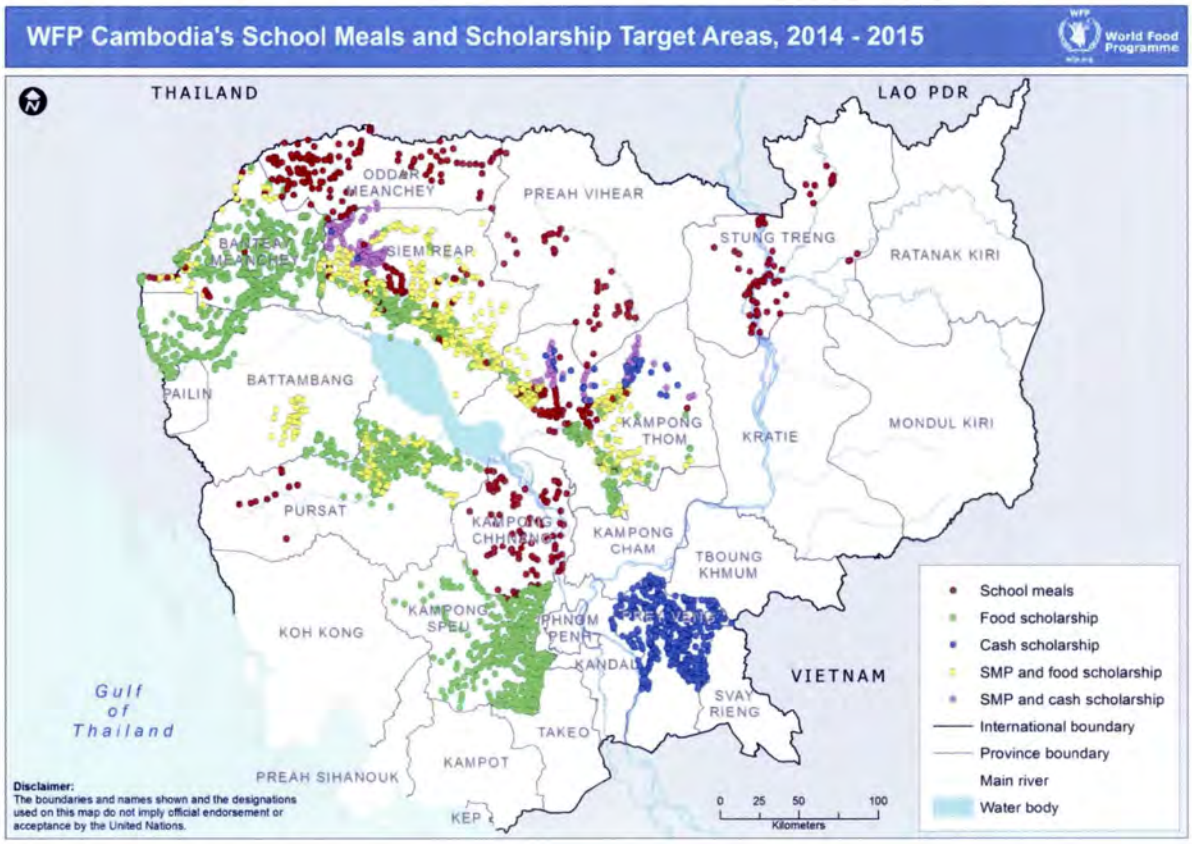
Under the authority of the McGovern-Dole International Food for Education and Child Nutrition Program, the US Department of Agriculture awarded a grant of $20 million to the World Food Program (WFP) to implement a school feeding program and provide several other investments in improving the quality of primary education in Cambodia. The full set of program objectives includes the following:

- Improve student attentiveness and attendance through the provision of school meals, take home rations, and the establishment of school gardens;
- Improve the physical learning environment by building and rehabilitating school infrastructure, including kitchens, wells, and water stations and systems;
- Increase access to clean water and sanitation services through the construction of latrines;
- Improve health and dietary practices among students, parents, teachers, school officials and other community members by increasing knowledge of health and hygiene practices, nutrition, and safe food preparation and storage practices, and by providing requisite food preparation and storage tools and energy-saving stoves;
- Develop partnerships with farmer groups to supply food to schools and work with MoEYS to develop a sustainability strategy; and
- Improve the quality of instruction through the distribution of school supplies and materials and the training of teachers and school administrators.

The program covers a broad swatch of Cambodian communities in the provinces and districts where most of the country's population is concentrated (Figure F-1). Over 150,000 students in

primary schools are benefiting from the school meals, and the schools they attend are receiving a variety of inputs related to the preparation and serving of meals. The program also aims to improve the schools' sanitation conditions by installing latrines. Furthermore, it aims to improve the quality of instruction by distributing school supplies and offering training to teachers and school administrators. Most of the effort under this program is directed to addressing the nutritional needs of students, but the program does expect to have impact on learning outcomes. Unfortunately, the relevant performance indicator chosen to monitor outcomes related to learning is student performance in reading in grade 6.[43]

Figure F-1. Map of WFP Programs



[43] The exact wording of the performance indicator is as follows: Percent of student (boys) who, by the end of grade 6, demonstrate reading comprehension equivalent to their grade level as defined by national standards at USDA supported schools. Ref: USDA, 2013 Commitment Document for Agreement FFE-442-2013/035-00.

Annex G: Implementation Partners Supporting Early Grade Reading

The NGO Education Partnership (NEP) was established with support from the Asian Development Bank during the first round of educational reforms at the start of the last decade. The purpose of NEP was to facilitate consultative development with a wide range of civil society development partners as a condition for continued bank support. Thus, the creation of NEP did not come from civil society partners themselves but rather originated as part of government and multilateral donor planning. NEP's role initially overlapped with EDUCAM, another open forum for education coordination, which it eventually replaced. Whereas EDUCAM was a more inclusive grouping of education stakeholders that could include individuals, NEP is a member-based umbrella organization limited to organizations working in the education sector only. NEP has sometimes struggled to define its mandate, which some see as confined to information-sharing and coordination while others see the need for a more active role that includes research, advocacy, and direct implementation of projects. The latter agenda has sometimes made some NEP members uncomfortable, since bidding for projects would make NEP a potential competitor for dwindling resources. Currently, NEP serves the NGO community by representing it on such coordinating bodies as the Education Sector Working Group (ESWG) and during the National Education Congress. This is a difficult role for NEP, given that the members it represents are so varied and do not often speak in one voice. While NEP has not been at the forefront of efforts to revise the reading curriculum, the agency has been an active advocate for improving teacher standards, stopping the payment of unofficial student fees, and improved school governance, all of which are highly relevant to effective programming to promote improved reading.

The remaining pages of this annex provide brief synopses of the main NGO programs supporting early grade reading.

Project Synopses

Agency:	***Child Fund-Australia*** (Key Implementing Partner: Kampuchean Action for Primary Education [K		
Project Name:	*Easy 2 Learn (E2L)*	**Duration:**	January 2015 – June 2015 (anticipated ex 2015)
Funding Level:	$345,000	**Funded by:**	Child Fund
Target Schools:	8 primary schools (15 more planned for 2016)	**Provinces**	Svay Rieng (with anticipated expansion t
Narrative Description	The Easy 2 Learn (E2L) project's goal is to develop child friendly school models that are excellent across s educational quality, inclusiveness, and local stakeholder (i.e., parents, community, school support commit engagement. Activities for E2L address the following areas: • Improved educational access • Improved educational quality and relevance • Improved early grade literacy outcomes (with use of mLearning) • Improved school management and stakeholder outreach activities Key elements in the Total Reading Approach for Children Project (TRAC) that Child Fund is now supportin the use of recently approved Reading Benchmarks, the establishment of Literacy Coaches, emplacement of L the Rapid Response System (RRS) and mobile learning (employing the use of tablets) in a limited number of Child Fund and KAPE entered into a long-term partnership to pilot E2L in 8 schools in Svay Rieng Province to 23 schools in Kratie, a new province to the north, and Svay Rieng in the coming year (2015–16). E2L has		

	framework that aligns with the Child Friendly School Policy. Under the E2L project design, however, Child I incorporate the TRAC model in its entirety to promote intensive early grade reading support in project school eventual expansion to even more schools in coming years. This decision came about after successful negotiat and KAPE to work together as partners combined with successful advocacy on KAPE's part to promote the T						
Documented Impacts	Child Fund and KAPE implemented an EGRA baseline for the 2014–15 academic year and will be monitorin interventions periodically over the next several years. The monitoring framework for the project is not a qua the original TRAC project but rather takes in ongoing administration of early grade reading assessment (EGR track change from baseline to endline. The project also employs process-focused assessment tools to monitor inputs that include the use of toolkit materials, attitudinal and behavioral changes among teachers, parents assessment of performance of literacy coaches.						
Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Community Engagement
	X	X	X	X			X

Agency:	***Kampuchean Action for Primary Education (KAPE)*** (Key Implementing Partner: Thunthean Sek		
Project Name:	*E-books for Khmer (E4K)*	**Duration:**	2 Years (2015-16)
Funding Level:	$245,000	**Funded by:**	All Children Reading (ACR)
Target Schools:	10 pilot schools and 4 Control Schools	**Provinces**	Kampong Cham, Tbong Khmum
Narrative Description	The *E-books 4 Khmer* Project (E4K) proposes a technology-based approach to improve the reading scores of t primary grades who, according to World Bank research, continue to demonstrate below standard levels of prof with the introduction of new textbooks by the Ministry of Education, Youth, and Sport (MoEYS) in 2012. W rates of failure approximating 50% in national testing undertaken in 2010, it is still an unacceptably high focuses on *Khmer and reading material development* in which the current readers for grades 2 and 3 are refi with interactive features, including multi-modal presentations that build on children's oral language skills. quizzes and test exercises to increase the efficiency and validity of teacher assessment. There are *four programmatic pillars* in the project that center around the development of e-books. These inc (in electronic form), (ii) the development of digitized testing and quizzes to be integrated into the readers, (i that promote differentiated classroom literacy structures (DCLS; e.g., levelled reading groups) in which child proper level (as opposed to the one-size fits all readers currently in use); and (iv) the commercial distri participation of a private sector partner called *Thunthean Seksa.* The availability of basal e-readers will be protocols. The development of basal e-readers entails a content analysis of existing readers and determinatic development of refined text that moves from low to higher complexity as the child learns to read. These n independent developers who will help transform them into interactive e-readers, based on project specificatio readers but will supplement them in a big way. The fourth pillar in the project focuses on promoting commercial availability of e-reader app licenses through currently 1 million accounts in Cambodia and rising). This pillar will be developed by a private sector part currently sells teaching aids and literacy toolkits and has carried out market research to expand into the comm such as the ones proposed. TTS will develop a marketing plan and distribution network that will focus on utili to market the e-reader applications. Profits from sales will be re-invested into the project to buy mobile techno in KAPE programming areas to facilitate sustainability and expansion of the innovations developed.		
Documented Impacts	Impacts will be empirically measured through a randomized control trial employing a dosage model in which support ranging from no support (control schools); another condition entailing DCLS inputs but no technology both DCLS and technology inputs. Schools will be assigned to different conditions using propensity match sc in early grade reading assessment scores. Schools will be selected based on principles of random selection managed schools as defined by the project.		

Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Comi Engaj
	x	x	x	x	x		

Agency:	***Kampuchean Action for Primary Education (KAPE)***		
Project Name:	*Schools for Excellence*	**Duration:**	Oct 2012 to September 2015
Funding Level:	$135,000	**Funded by:**	Classroom of Hope
Target Schools:	15 schools	**Provinces**	Kampong Cham
Narrative Description	The Schools for Excellence (SfE) project started in two clusters in Krouchmar District in Kampong Cham pro number of Cham minority children. The project seeks to increase the quality, relevance, and access to educ friendly school environments that address the needs of all children, including girls, minorities, and children trains teachers on how to create attractive learning enviornments and classrooms with a variety of teaching how to use child-centered teaching methodology to improve children's learning outcomes. Furthermore, childı peers through a mentoring program that pairs students together to improve learning. Life skills activities studetns with useful skills for themselves and their families' daily lives and future income. Life skills progran and reduce the dropout rates of children by making school more relevant. In 2014, Classroom of Hope agreed to allow KAPE to introduce the Total Reading Approach for Childre supported schools in order to intensify efforts to improve early grade reading. Given the highly variable na which suffer from severe teacher shortages, TRAC interventions were not implemented uniformly across a received training to use the Reading Bencmarks and Literacy Toolkits as well as a large number of interventi Response System, not all schools received enhanced library services and mobile learning. Similarly, the teach not possible to appoint full-fleged literacy coaches in all schools either. SfE is currently advocating for the pla in target schools through a process of local recuritment of candidates to attend the provincial teacher training scholarships. Upon the completion of their studies in 2015, these candidates will be posted to SfE target schoc Mitigating these shortages will enable the project to expand the number of litercy coaches, which will fru TRAC-mediated interventions. The project was particularly successful in engaging community support with s from parents to purchase the Literacy Toolkits, whose procurement was co-funded with project resources. KAPE is currently negotiating with the donor to extend the project for at least one more year beyond its curren		
Documented Impacts	KAPE implemented an early grade reading assessment (EGRA) baseline for the 2014–15 academic year and v of TRAC-based interventions periodically over the next several years. The monitoring framework for the proje design as in the original TRAC project but rather takes in ongoing administration of EGRA tests in project s baseline to endline. The project also employs process-focused assessment tools to monitor the effectiveness o the use of toolkit materials; attitudinal and behavioral changes among teachers, parents, and students; and a of literacy coaches.		

Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Community Engagement
	x	x	x	x			x

Agency:	***Room to Read***		
Project Name:	*Literacy Program (previously called: Reading and Writing Instruction Program)*	**Duration:**	Started in 2010 (on-going), each annual i years of support.
Funding Level:	na	**Funded by:**	Room to Read
Target Schools:	213	**Provinces**	Prey Veng, and Tboung Khmum
Narrative Description	Room to Read supports reading through various education programming initiatives, including book pul libraries, supporting girls' education, and school construction. In addition, they implement the Literacy Progı intervention that aims to strengthen the teaching and learning of reading and writing in the early primary grade amongst students. The program works in conjunction with Cambodia's existing national reading curriculum plans, classroom materials, and comprehensive teacher professional development. The program works in n launched in Cambodia during the 2010-2011 school year in grade 1 classrooms in 20 schools in Siem F continued into grade 2 classrooms at these schools during the 2011-2012 school year, and then expanded to Siem Reap province during the 2012-2013 school year. Then added 22 schools in Prey Veng in 2014. The moderate to large impact on reading skills (see Documented Impact section below). Room to Read began ma 2015 to further improve reading outcomes using the following strategies: 1) Targeting foundational reading solid early literacy foundation, 2) strengthening the teaching of comprehension skills, and 3) Improving the		

	quality of the Literacy Program through standardised training modules for staff and teachers.						
Documented Impacts	By the end of grade 2, children involved in the RWI program made more than twice as much progress on comprehension than children in comparison schools, with pupils in original treatment schools reading an ave compared to 11 words per minute by their comparison school counterparts. After the intervention, 26% of pup fluency target of 45 words per minute (compared with 8% in control schools), but nearly 20% could not read passage (58% in control schools), and 46% could not correctly answer a single comprehension question.						
Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Community Engagement
	X	X			X		

Agency:	***Save the Children International*** (Implementing Partners include: Kampuchean Action for Primary Buddhist Social Development Association)		
Project Name:	*I'm Learning! (Research Pilot)* *Quality Learning Environments Expansion*	**Duration:**	January 2013 – December 2018
Funding Level:	$3+ million	**Funded by:**	Save the Children
Target Schools:	• 15 schools (I'm Learning Pilot Research Schools) • 112 schools (QLE Expansion)	**Provinces**	Kampong. Cham, Tbong Khmum, Kampo Preah Vihear, and Pursat,
Narrative Description	The "I'm Learning!" project started as a pilot in 15 schools to test a new implementation framework Environments (QLEs). This framework has been developed by Save the Children based on its experience in m in four guiding principles inlcuding: (i) Emotional and Pyschological Well-being; (ii) Physical Well-bei Outcomes (particularly in Literacy and Numeracy); and (iv) Effective Community and Parental Engagement. T in 2013, along with two other countries: Uganda and Zimbabwe. All three countries are carrying out longitudi school populations leading to a global research report on the effectiveness of the QLE Framework. Technic being provided by the University of Oslo. After a period of piloting in 15 schools (as well as 15 comparison schools), Save the Children started an expan in 2015 that will include in total 112 schools. Implementation is being carried out jointly with two local p Buddhist Social Development Association. The project will employ an integrated design that will encompass as well three programmatic theme areas. Under the expanded QLE framework, there will be extensive focus o • Improved children's literacy in grades 1 to 6 using a combination of *Literacy Boost* and Total Rea Project *(TRAC)* • Improved early childhood care and development services for pre-school children • Improved school environments • Safe Learning Environments As a key implementing partner, KAPE will be working with SCI to integrate key elements of TRAC into the use of reading benchmarks, literacy coaches, reading toolkits, and technology where feasible.		
Documented Impacts	A longitudinal research project is tied to the project to study the effect of the QLE approach on children's lea study is being carried out in 5 treatment schools and includes 10 comparison schools. KAPE is coordinati support from the University of Oslo and the Royal University of Phnom Penh.		

Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Community Engagement
	X	X	X	X	X		X

Agency:	***WeWorld*** (Key Implementing Partner: Kampuchean Action for Primary Education [KAPE])		
Project Name:	*Reinforcing Education Access with Community Help (REACH)*	**Duration:**	July 2012–July 2015 (anticipated extensi
Funding Level:	700,000 Euros	**Funded by:**	We World (formerly Intervita)
Target Schools:	24 schools	**Provinces**	Svay Rieng and Prey Veng
Narrative Description	The REACH Project was designed by KAPE with support from WeWorld to be an integrated project desig Friendly School policy framework developed by the Ministry of Education, Youth, and Sport (MoEYS). REA 10,000 children and their families in Svay Rieng and Prey Veng provinces—areas affected by seasonal m complete their primary school education. REACH is designed to 1) reduce the negative impact of traffickin minors and their families, 2) improve access and quality of education, 3) reduce the dropout rate among at-r families livelihoods through income-generating activities. Key activities of the REACH project include inc creating child friendly learning environments through teaching aids, attractive displays, and child-centered tea with stakeholders to build their capacity in monitoring, planning, and evaluation of education processe generation activities through the introduction of and training on microfinance activities. In 2014, KAPE and WeWorld agreed to intensify efforts to both improve early grade reading and document l based development has now become increasingly important for WeWorld as the agency tries to re-align its		

	documented changes in learning outcomes. Accordingly, WeWorld began providing support to KAPE to unc November–December 2014 followed by mainstreaming of key elements of the Total Reading Approach for C all WeWorld supported sites. This process has begun as a pilot in four core schools (in four clusters) that will be to all schools after an anticipated extension of project funding for 3 years starting in July 2015. WeWorld is of the reading benchmarks recently adopted by MoEYS through teacher training and the use of literacy supporting a Rapid Response System of interventions that includes the use of literacy toolkits, peer tutoring learning.						
Documented Impacts	KAPE implemented an EGRA baseline for the 2014–2015 academic year and will be monitoring the impact periodically over the next several years as the project's funded extension gets underway. The monitoring fra a quasi-experimental design as in the original TRAC but rather takes in on-going administration of early grade tests in project schools to track change from baseline to endline. As in KAPE's other projects, REACH al assessment tools to monitor the effectiveness of program inputs that include the use of toolkit materials, attitu among teachers, parents, and students, as well as an assessment of performance of literacy coaches.						
Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Community Engagement
	X	X	X	X			X

Agency:	***World Education, Inc.*** (Key Implementing Partner: Kampuchean Action for Primary Education [K		
Project Name:	*Total Reading Approach for Children (TRAC)*	**Duration:**	2 years (October 1, 2012 – September 30,
Funding Level:	$300,000	**Funded by:**	All Children Reading (ACR)
Target Schools:	8 schools (plus 4 comparison schools)	**Provinces**	Kampong Cham & Siem Reap
Narrative Description	The Total Reading Approach for Children Project (TRAC) was an innovative pilot project implemented in ei schools in three provinces that used an integrated approach to improve early grade reading outcomes among reading projects only focus on one area of a child's reading environment (e.g., materials development, teache reading both at school and at home through various interventions: • *Reading Benchmarks:* After a national reading test administered in 2010 found that as many as 54% expected grade 1 reading skills, the Ministry of Education, Youth, and Sport (MoEYS) developed n returned to a more phonics-based approach to reading instruction. TRAC closely collaborated with M system for the new textbooks. In creating these benchmarks, the team divided the grade level readin interval having specific tasks that state which skills the students should have mastered after that inte interval, which allows teachers and literacy coaches to identify which students are struggling and the regular basis rather than just at the end of a term, allowing teachers to provide students with the targ reading skills. • *Literacy Coaches:* TRAC selected and trained literacy coaches at each school, the first time such a p schools. Coaches were generally vice directors at the school whose job it is to provide pedagogical s worked closely with teachers in administering the benchmark assessments and the Rapid Response S the liaison between schools and parents. • *Rapid Response System:* Literacy coaches implemented the project's Rapid Response System after u identify struggling students. This Rapid Response System includes parental engagement, peer tutori activities, and an mLearning mobile application that includes 31 units that are aligned with the MoE assessments described above.		
Documented Impacts	The project gathered empirical data on the impact the project had on reading outcomes. While the early grade still being analyzed, through the preliminary data for the eight target and four comparison schools, it was con reading performance of grade 1 and 2 students: • Looking at magnitude of reduction of those students falling in the category of "poor," the number of changed from 22% to 4%, or a change of 81.8% from Interval 1 to Interval 9 in Year 2 (compared to • When comparing the number of children falling in the category of "poor" from Year 1 to Year 2, the scored "poor" across all intervals declined by 34%. • In comparing treatment and comparison schools, reading test scores for children in treatment school registered a statistically significant difference in reading outcomes on EGRAs than did those for stu In addition to impacts on reading outcomes, TRAC also had positive impacts on parent engagement and teach		

Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Con Eng
	X	X	X	X	X	X	

Agency:	***World Education, Inc.***						
Project Name:	*Technology for Education Systems Transformation (TEST)*		**Duration:**	September 1, 2014 – May 31, 2015 (antic 2015)			
Funding Level:	$100,000		**Funded by:**	USAID/Cambodia's Development Innov			
Target Schools:	10 schools		**Provinces**	Kampong Cham, Siem Reap, and Tboung			
Narrative Description	The Technology for Education Systems Transformation project (TEST) expands on World Education, Inc.'s Children Project (TRAC), 2012–2014, which worked to improve early grade reading outcomes among Camb and 2. TEST developed a mobile application that automates the student reading assessments, known as the C System (CAS), that World Education developed under TRAC in collaboration with the Ministry of Educatior Sport (MoEYS) and Kampuchean Action for Primary Education (KAPE). The mobile application enables tea classroom learning trends and connect individual students to the learning resources that will most help them. Initial implementation of TRAC's CAS relied on pen and paper tests, which were prone to significant vulner process: • Time consuming. • Prone to a lack of uniformity in administration, teacher scoring error, and teacher mistakes. • Allowed for potential bias in assessment and data compilation. The TEST app mitigates these challenges by automatically scoring the assessments, making it easier to condu regular intervals. Based on student scores, the app identifies struggling students and prescribes additional lear TRAC's Rapid Response System, which allows teachers to provide timely targeted support. The app also col sends it to a central server that aggregates data about learning trends and may be used in the future by MoEY grade reading performance and inform future curriculum development. The TEST app is being piloted by approximately 57 teachers impacting 2,050 students in seven schools acros Cambodia, with plans to expand to over 100 additional schools in October 2015.							
Documented Impacts	To date, the TEST project has successfully developed an assessment app that has digitized the TRAC benchm will be gathering data on the effectiveness and usability of the app at the end of the project.						
Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Community Engagement
	x		x	x			

Agency:	**World Education, Inc.**		
Project Name:	*Total Reading Approach for Children Plus (TRAC+)*	**Duration:**	2.5+ years (December 1, 2014 – Septemb
Funding Level:	$3.5 million	**Funded by:**	World Vision Cambodia
Target Schools:	170 schools	**Provinces**	Banteay Meanchey, Siem Reap, Preah Vi Takeo
Narrative Description	The Total Reading Approach for Children Plus project (TRAC+) expands World Education's TRAC project schools to 170 public primary schools. TRAC+ is being implemented in 13 districts across five provinces. TF follow key interventions from TRAC, including grade 1 and 2 reading benchmarks, literacy coaches, and the which consists of reading toolkits, an mLearning application, parent engagement, and peer tutoring. In additi interventions, TRAC+ also includes the following additional activities: • *Grade 3 Reading Benchmarks:* Similar to the grade 1 and 2 benchmarks developed under TRAC, World with the Ministry of Education, Youth, and Sport (MoEYS) and local partner Kampuchean Action for Pr develop benchmarks for the national reading textbook for grade 3. • *School Management and Leadership Training:* As strong school management is important to the success TRAC+ will provide annual leadership training to school directors and deputy directors using a modified Management and Leadership curriculum developed under the USAID-funded, World Education-implem Education in Cambodia project (2009–2014). • *Reading Activities for Grade 4–6 Students:* To ensure students continue to engage reading support beyor developing reading activities for grade 4–6 students to participate in outside of school hours to help ther reading skills. • *Government Advocacy:* While World Education engaged MoEYS under the TRAC project, TRAC+ will MoEYS to ensure wider-scale rollout of the TRAC benchmark system and other interventions, such as s • *Capacity Building of World Vision Cambodia Staff:* As the technical capacity of World Vision staff is qu will work to improve the technical capacity of World Vision staff so that they are prepared to continue T life of the project.		
Documented Impacts	As it is still early in the project, results pertaining to student learning outcomes are yet to be collected. Howe comprehensive monitoring and evaluation component comparing outcomes between treatment and comparis endline assessments that will be collected annually.		

Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Community Engagement
	X	X	X	X	X	X	X

Additional Anticipated Programming

Agency:	***The Asia Foundation*** (Key Implementing Partner: Kampuchean Action for Primary Education [K/		
Project Name:	*Books for Asia: Children's Digital Library*	**Duration:**	October 2015 to September 2016
Funding Level:	$10,000	**Funded by:**	The Asia Foundation
Target Schools:	4 schools	**Provinces**	Kampong Cham (1), Svay Rieng (2), Kar
Narrative Description	The Asia Foundation's well-known *Books for Asia* program was localized in 2014 with transfer of the projec As part of its programming, *Books for Asia/Washington DC* has been in negotiations with *Libraries for All,* pilot recently developed software that will enable electronic access to books in any language in most schoc endorsement from the Minister of Education for the introduction of digital library pilots in a new national initi Schools, local partner KAPE is currently working with *Books for Asia* to develop a collection of electron English that will stimulate reading behaviors among primary school children. The e-library project will targe four primary schools. Digital library investments will occur in existing physical libraries that comprise main the emergence of hybrid library prototypes in Cambodia's public schools. KAPE is already working with a lo Cam Ant to develop a platform for Khmer-language e-books and will generate additional synergies with electronic collection of Khmer language books using an app developed by *Library for All.* The library sites under this project will be configured so that schools can still access electronic materials even The project will also work closely with several book-producing partners in Cambodia, such as Sipar, Mary Association. Project staff will train librarians, teachers, and other school stakeholders in organizational library p protocols, access protocols, community and child outreach goals, and how to use mobile devices to ensure tha new materials. The project aims to meet the following objectives: • Increase access to digital holdings by children • Promote well maintained and organizaed libraries where there is easy access to mobile devices • Encourage active participation by book publishers and developers in using the digital library as a vehicle • Convert and make available a large number of Khmer language texts to electronic form • Develop a wide variety of electronic materials including books, educational games, and other interactive • Gain interest from ministry counterparts and donors with potential for expansion • Promote digital book holdings through the private sector.		
Documented Impacts	Assessment of the project will be based on assessments of the average number of books read by children a: document attitudinal and behavioral change among children as these relate to reading behaviors.		

Programmatic Themes	Teacher Education	Learning Materials Development	Assessment	Technology	Research	Policy Development	Community Engagement
	X	X		X			

Annex H: Applying ICT4E to Support Early Grade Reading

Sector Overview

Technology development in Cambodia has made great strides in recent years. Most notable has been the rapid growth of mobile phone ownership since 2010, accompanied by continuously declining fees[44] and lowering prices for devices, making mobile telephones increasingly affordable for an ever larger proportion of the population. According to the Telecommunications Regulator of Cambodia, by the end of 2014, there were over 20.5 million mobile phone subscriptions for a population of just over 15 million (meaning many individuals own more than one mobile phone subscription).[45] In parallel to this increase, the country registered a steep decline in fixed phone subscriptions–down to just over 360,000 by the end of 2014. Internet subscriptions, historically low compared to neighboring countries,[46] have steadily increased to over 5 million by the end of 2014,[47] with mobile Internet making up a significant portion of those users.[48] TV and radio penetration may be as high as 90%, based on data in a recent survey among youth about their access to these media at home or in their neighborhood.[49]

Facebook is the country's leading social media tool with an estimated 1.4 million monthly users, of whom over 80% are said to connect via their mobile devices. Facebook users in Cambodia are predominantly between 18 and 34 years of age, with about 62% men and 38% women.[50] At times, telecommunications providers run promotions that zero-rate, or significantly decrease, the cost to access Facebook for a limited amount of time. Notably, the Ministry of Education, Youth and Sport (MoEYS) Facebook page ranks in the top 30 Facebook pages in the country, with over 400,000 followers. The page is maintained by the MoEYS Information and Communication Technology (ICT) Office and provides practical information to its followers, including updates on important dates, regulations, examination information, and access to educational resources. Detailed user data for this page were not collected.

According to a recent detailed study of mobile phone ownership and use in Cambodia, with over 2,000 respondents nationwide,[51] some 93% of Cambodians actually own a mobile phone

[44] The average cost of a one minute in-network phone call during the day is $0.05/min; the cost of an SMS on average $0.01 data plans, for compatible phones, average around $5/month. A range of special offers and programs by telecom providers may bring cost down. All payment plans, however, seem to require a minimum investment of some $5–6 per month to retain an active number. These costs may change rapidly as promotions change.

[45] http://www.trc.gov.kh/mobile-phone-subscribers/

[46] http://www.budde.com.au/Research/Cambodia-Telecoms-Mobile-Internet-and-Forecasts.html

[47] http://www.trc.gov.kh/internet-subscribers/

[48] Phong, K., Sola, J. (2014). *Mobile phones in Cambodia*. Research funded by USAID/Cambodia and The Asia Foundation.

[49] BBC Action Research. (2014). *Media habits and information source of youth in Cambodia*. Report supported by UNDP and Sweden. Retrieved from: http://www.kh.undp.org/content/dam/cambodia/docs/DemoGov/Media%20Habits%20and%20Information%20Sources%20of%20Youth%20in%20Cambodia.pdf

[50] http://geeksincambodia.com/facebook-statistics-in-cambodia-2014/

[51] Phong & Sola, 2014.

themselves, while an additional 6% percent have at least access to one. Respondents for this study were between 15 and 65 years of age, 56% female and 44% male; 92% of women and 96% of men report owning a mobile phone. Furthermore, the proportion of smartphones, capable of accessing the Internet through a browser and featuring a full keyboard, has risen dramatically in recent years. The study found that over 26% of respondents owned a smartphone, a 30% rise over last year's numbers. Over 50% of phones reviewed for the study were capable of displaying Khmer script, which had been a significant barrier for mobile text-based communication adoption in the past. However, among mobile phone users, SMS-based communication remains limited in favor of voice calls. This seems to be largely due to the complexity of texting in Khmer language even on a phone that, technically, should be able to render the script.

Mobile money services in Cambodia are predominantly through a single third-party payment provider, Wing, with reportedly over 1.5 million customers nationwide, of which nearly 70% are said to be rural.[52] Wing was virtually un-rivaled in Cambodia until recently, when new actors entered the market. The company is reported to have reached $4.5 million in transaction volume in 2014, with an average transaction size of $110.[53] Wing operates in both USD and Cambodian Riel, which allowed the company to expand its services to "Payroll, B2B, Billing and Bulk Payments to our ever-growing list of services."[54] A key factor in Wing's success, however, were internal remittances from hundreds of thousands of rural textile workers and other such migrants who have little to no access to formal financial services.

According to the Ministry of Posts and Telecommunications, the country's first telecommunications law is scheduled to pass later this year. The law includes provision for a Universal Service Fund (USF). The USF is to be financed through a 2% revenue contribution by the telecommunications operators. Focus areas of the USF, among others, are planned to be on connectivity to rural areas, local content development, and support to education, particularly for remote and marginalized populations. The USF is anticipated to start in 2017.

Cambodia's IT sector is already vibrant, with a wide range of ICT equipment locally available. Cutting edge devices, such as thin clients and tablets are possible to procure and support locally. In contrast to dropping smartphone prices, tablet devices remain relatively costly. Illustratively, as of May 2015, a regular cell phone costs $18, a cheap smartphone is $120, and a Samsung Galaxy Tab 3 tablet is $180 list price in local stores. IT support expertise in terms of after-sales services or external contracting services is available though, based on remarks from interviewees, it may vary considerably in expertise and responsiveness. It appears that projects can use specialized IT support, but there is a limit to the relevant human resources available locally.

In terms of software development, particularly mobile app development, Cambodia's market is still emerging. The Royal University of Phnom Penh and the Institute of Technology Cambodia, two of the most renowned universities with graduates in the IT sector, only generate some 600–

[52] http://www.cgap.org/blog/wing-pushes-digital-finance-frontiers-further-cambodia
[53] https://mobilemoneyfordevelopment.wordpress.com/2015/02/13/wing-pushes-digital-finance-frontiers-further-in-cambodia/
[54] Cited from http://www.wingmoney.com/about-us

700 graduates per year, of which only a portion will have concentrated on web development, and even fewer on software and mobile app development. Although there is a multitude of programs in other public and private universities, the lack of IT professionals was reason enough for the Ministry of Posts and Telecommunications to recently found the National Institute of Posts, Telecommunications, Information and Communication Technology to provide professional training in ICT, software development, and engineering. Construction has been ongoing. Mobile app development expertise is predominantly found in Phnom Penh, and mainly concentrated in a few small consulting companies.

ICT in Education in Cambodia – Access, Policies, and Plans

Anecdotal data from the select primary school librarians, teachers, school directors, and district and provincial level education staff interviewed during the field-study portion of this assessment confirmed the above national trends in technology penetration.

There seems to be near universal mobile phone ownership also among primary school teachers and education administrators, with a significant portion of them also owning smartphones. Theoretically, should the above-referenced rates in smartphone ownership continue at about 30% growth per year, it can be expected that within the next 3–4 years, smartphone ownership could be near universal in the country.

Aside from wide access to TV and radio, personal ownership of other technologies, specifically desktop or laptop computers or tablets, is minimal among primary educators and education administrators. None of the teachers or school directors interviewed for this sector assessment had fixed internet in their home. At school level, those who did use internet, gained access through their mobile device. Facebook was widely known by all stakeholders interviewed, and some are active users.

Educational broadcasting, via television or radio, popular in some countries in the region particularly up until 5–10 years ago, has not been widely used in Cambodia, outside of some few UNESCO and nongovernmental organization- (NGO-) led radio programs, mostly in the non-formal education subsector. Furthermore, also predominantly for non-formal education, there are efforts underway to leverage technology as part of private- or donor-funded community learning centers. MoEYS reports to have deployed six vans with technology equipment to provide access to instructional materials and learning opportunity in remote environments serving particularly marginalized populations in the border provinces.[55]

There has been development in technology access in schools and education offices, particularly in the last 5–10 years, mostly in line with the countries ICT for Education (ICT4E) policies and plans. Two documents predominantly guide these efforts, the 2004 Policy and Strategies on Information and Communication Technology in Education in Cambodia, which has not been

[55] MoEYS. (2013). *ICT for Education in Cambodia*. Presentation Regional Consultation Workshop Promoting Non-Formal Education and Lifelong Learning by Using ICTs. Retrieved from: http://www.dvv-international.la/files/userfiles/ICT%20in%20education%20in%20cambodia.pdf

updated since; and the country's 2009–2013 ICT for Education Master Plan. As of May 2015, no updated master plan has been released.

In addition to these, a range of other policies and plans reference ICT and its anticipated role in education in the country. These include the 2003–2015 Education for All National Plan and the Education Strategic Plan 2013–2018, which generally anticipate an expansion and use of ICT as three things: 1) a teaching and learning tool; 2) a means of improving education service productivity and management through improved information sharing, communication, and knowledge management – and specifically improved quality of education data; and 3) a means to access learning opportunities for disadvantaged groups in remote areas. The recently completed Cambodian ICT Masterplan 2020 sets out e-education as a priority area for the country. The plan, however describes related goals and initiatives and action programs only in very general terms with a focus on digitization of personnel information, student information, records and certificates; digitized library systems; creation of school portals; development, localization and distribution of digital education content; promotion of eLearning and development of related solutions. This plan also recognizes the opportunity provided by mobile technology.

Furthermore, in 2014, a detailed education managing information system (EMIS) master plan was put in place that sets out specific strategies and costed actions to assure timely, quality education data for planning, monitoring, and evaluation, to improve education service access and delivery. The plan also foresees a digital student tracking system (which Global Partnership for Education [GPE] is providing support for establishing), as well as an EMIS aimed at supporting quality assurance through collection of student learning achievement data. The team could not determine the exact status of these systems at the time of this study.

The overarching goal, however, as reiterated across all the available plans for ICT in education in Cambodia is to ensure Cambodia's international competitiveness in an increasingly global and interconnected knowledge-based economy.

The 2009–2013 ICT for Education Master Plan remains, however, the most recent document setting out specific objectives, results, and indicators across sub-sectors. Its main thrusts can be summarized as follows.

- ICT skills and equipment at upper secondary level, particularly for ICT and science instruction
- ICT skills and equipment at teacher training colleges, with a focus on basic ICT productivity skills and the use of video to support science instruction
- ICT skills and equipment at all higher education institutions, with a focus on ICT productivity skills and eLearning
- ICT to enhance efficiency in the management and administration of education at all levels, with a focus on education data/information sharing across the levels of the education system

The 2009–2013 ICT for Education Master Plan also included a number of principles to guide ICT use in education. These include —among others—the requirements that 1) only low-energy devices be deployed to teacher training colleges (TTCs) and secondary schools; 2) copy right for

all deployed software/content be owned by the MoEYS, or be open source; 3) all software distributed to schools must be able to spell-check in Khmer, order words according to the Cambodia standard character order, and format numbers and dates in the traditional format for Cambodia; and 4) all related activities should be done in consideration of equity between rich and poor, rural and urban, and male and female.

Central to the plan's implementation, the ICT Office in the MoEYS was to lead and manage the processes and tasks noted therein.

Since the development of the master plan, progress has been made along all of the main thrusts outlined above, although to varying degrees.[56]

According to interviews with MoYES staff, resource constraints impede the ICT Office from fully carrying out the plan. Theoretically, the MoEYS allocation includes funding for ICT activities, but complicated internal and external (with Ministry of Finance) budget approval and funding disbursement processes delay allocations and expenditures to the point of rendering the relevant offices inoperable. Furthermore, given the limitations in funding and comparatively low salaries in the public sector, the ICT Office appears to struggle to attract and retain the kind of specialized human resources needed to effectively plan, lead, or support and monitor activity implementation. The ICT Office has a total of eight staff, half of whom have an education background, and half of whom have a more IT background, but none with advanced degrees or specialized expertise in the field. MoEYS is relying on advice and collaboration from the NGO community to do much of its strategic planning and implementation work.

The master plan objectives for deployment of ICT equipment to the 18 regional teacher training colleges, 25 provincial and 163 district education offices, and over 2,000 secondary schools in the country have also not been fully achieved to date. For provincial and district education offices access to ICT equipment seems to be near universal, yet with highly varying degrees of coverage and capacity to maintain it. Based on anecdotal evidence, much of the equipment in the education offices seems to have been procured and provided by MoEYS, or donated by UNICEF and others. There is high variability in the quality of the devices received (some seem to have been secondhand) and the education offices' ability to keep them functioning. Some budget is provided to district offices of education (DOEs) and provincial offices of education (POEs) to maintain and repair their IT infrastructure. No budget is provided to these decentralized levels for new procurement of IT equipment, which is centrally managed by MoEYS, specifically if over $200 in cost per item. Based on the anecdotal evidence collected during the study field visit, very few of the offices have a formal arrangement for IT support with a local service provider or IT expert. Instead IT support seems to be most often provided by the person with the most skills, irrespective of their formal position. Depending on that skill level, the environment of the office (air conditioning or appropriate venting is not available in all offices), and the availability of stable power, device longevity may be seriously affected.

From interviews with stakeholders, it seems as if the majority of ICT equipment for TTCs came from various donations, or was received as part of larger donor-funded initiatives. The latter

[56] MoEYS (2014). Accomplishments related to the 2009–2013 ICT for Education Master Plan.

includes the Asian Development Banks' (ADB's) provision of 18 thin-client learning centers with 30 workstations each to all TTCs under the 2008–2014 Enhancing Education Quality (EEQ) project,[57] complemented by the Flemish Association for Development Cooperation and Technical Assistance (VVOB)[58] provision of ICT equipment including 120 computers, as well as LCD projectors and DVD players to all provincial and regional TTCs. From reports, interviews, and site visits, it seems as if access to ICT equipment is by now assured in TTCs, but at less than 30% of secondary schools in the country. Information from the small number of interviews conducted for the purpose of this study seems to indicate that this equipment is regularly used, but mostly for computer skill training/computer study courses. A range of training activities of varying length usually accompanied the donor-funded deployments, in addition to a standardized curriculum for pre-service teacher educators.

Progress seems to have been made also in the systematic delivery of ICT-based professional skills in upper secondary, particularly in related curriculum and materials development with support from the Open Institute. However, due to the lack of equipment, the related grade 11 and 12 courses can only be taught in a third of the secondary schools.

Further, about 300 videos and 200 interactive multimedia applications to support science and life skills instruction had also been developed and deployed to TTCs and secondary schools by a range of actors including ADB, VVOB, and Open Institute.[59] Some of these were drawing on open education resources available in the public domain and made accessible in Cambodia through the Krou website, a repository of open education resources, via the MoEYS.[60] Anecdotal feedback from interviews with the heads of TTCs as well as POE and DOE chiefs indicates that they were aware of those resources, though it was not possible to get a true sense of the degree of their effective use within the context of this study. The master plan for ICT also foresaw the use of video as a key tool to support teacher training. Throughout 2010–2011, some 32 videos for primary school teacher training were developed under a joint initiative of a range of NGOs and actors in the country called "River of Knowledge" and distributed to teacher training institutions as well as made available on the Krou website.

Plans for substantive activity in the field of open and distance learning seemed to have been scaled back during the original implementation period of the master plan, due to a lack of

[57] ADB. (2015). *EEQP Project Completion report*. Manila.
[58] MoEYS, 2013.
[59] MoEYS, 2014.
[60] Krou website (http://krou.moeys.gov.kh/en/) was originally funded by VVOB. For primary education, the current site predominantly features downloadable electronic copies of the official primary curriculum.) The repository has been made part of the MoEYS website since 2012. The MoEYS ICT Office has the vision to turn the Krou website into a dynamic environment with a wide range of resources across the education subsectors, potentially with an app-based companion. However, lack of funding to lead a consolidation and review of educational resources with the NGO community, and to develop new ones, including the app, limit the office's ability to execute on its plan. The sector assessment did not conduct a comprehensive review of the Krou website's technology backend. There may need to be changes to facilitate content curation, posting, and search should this system's use be thus expanded.

maturity of the system,[61] yet about 80 higher education institution staff participated in a series of courses related to this topic.[62]

Private sector partnerships to date mostly addressed the provision of connectivity to education offices and schools. Through an agreement with Metfone under the "Internet in Schools" initiative, at least 500 schools were connected to the Internet since 2009. The program ended earlier in 2015 and schools that did not continue paying for the connectivity fee themselves have been taken offline. No new memorandum of understanding (MOU) is currently planned between Metfone and the government to extend this program. Furthermore, at least 50 secondary schools were connected in 2012 under the Ezecom EzeCampus initiative. However, the field visits, observations and interviews conducted by the study team seem to indicate that the quality of the connectivity service provided through these programs is severely limited, with Internet not stable or working—at times also due to inappropriate use by the schools—putting into question the value of these arrangements, particularly in the longer term. Comments from interviewees seem to indicate that marketing and other business opportunities are the driving factors for these provisions, which may further limit interest in longer-term sustained support and quality of services on the side of the private actors.

Device and direct cash contributions were also obtained from Barclay Bank, Intel, Microsoft, and Apple Corporation under the USAID-funded Improved Basic Education in Cambodia Project.

Limitations in rural electrification (only 7% of primary schools and 24% of secondary schools have electricity),[63] lack of funds for timely equipment procurement, absence of an established, vibrant content development sector, and lack of systematic capacity building for all target users and support personnel continue to be significant barriers for MoEYS to fully realize the objectives set forth in its ICT planning documents.

As can be seen above, primary education, besides related activities at teacher training institutions, has not been prominent in the country's ICT-related policies, plans, nor activities to date. Interviewees offered limited resources and the resulting need to prioritize interventions on certain sub-sectors and areas as an explanation for why primary education does not figure in ICT plans. Given the extremely low rate of electrification of primary schools very few primary schools could avail themselves of ICT. If any, a school may have a single device or two for school administration. According to anecdotal evidence there may be a few private schools in the country with a more substantive technology profile. And a few donor-funded initiatives specific to early grade reading are expecting to expand the availability of tablet technology for remedial and supplementary reading instruction in at least 108 primary schools in 5 provinces later this year.

[61] MoEYS, 2014.
[62] MoEYS, 2013.
[63] UNESCO. (2014). Information and Communication Technology (ICT) in Education in Asia. p. 28. Retrieved from http://www.uis.unesco.org/Communication/Documents/ICT-asia-en.pdf

It is notable that none of these plans, nor any of the interviews, or any of the site visits to general primary schools and teacher training institutions throughout this sector assessment, indicated any consideration or use of ICT for special needs learners.

A new ICT Master Plan (ICT Master Plan 2020) and a new National Policy on Science, Technology and Innovation have been drafted, but may not yet be officially released. Based on the draft documents made available to the study team and interviews conducted with a range of stakeholders, it seems as if primary education will continue to be of lower priority in these plans for the next few years. The country plans instead to sustain a technology focus in general research and innovation, ICT skills development, eLearning, as well as science and mathematics instruction to accelerate overall social and economic development.[64]

Applying ICT4E to Support Early Grade Reading

As outlined in section 1, above, only very few initiatives to date have specifically focused on technology to support early grade reading instruction and learning. Notable are 1) TRAC/*Aan Khmer*, 2) TEST, and 3) E4K that are part of a more comprehensive implementation approach. For each, a description of the app/technology itself is provided, the necessary hardware to access it outlined, as well as the implementation mode to date explained.

TRAC/*Aan Khmer*

As outlined in the Project Synopsis in Annex G, the Total Reading Approach for Children (TRAC) initiative was funded by All Children Reading and implemented by World Education and Kampuchean Action for Primary Education (KAPE) from 2012–2014. Relevant to this technology-related chapter of the sector assessment, one part of the rapid response system was *Aan Khmer*, a game-based Khmer early grade reading support software aligned with the revised grade 1 Khmer language textbook and deployed on tablet devices (Figure H-1).

Description of the application and alignment with national plans: *Aan Khmer* is an app that aims to promote Khmer alphabetic principle, vocabulary, and fluency among early learners. Its content is aligned with the grade 1 Khmer language textbook, but may also be appropriate for learners before that stage, as well as at the beginning of grade 2. The app contains 31 units, each made up of three main components: 1) learn—new content (mostly letters and combinations of letters) is presented to the child; 2) practice—the child is presented with three different activities to practice the new content; 3) short story—where the new content is applied within connected text and presented as a read-along to the child with audio support. Individual user accounts allow children to continue engagement with the app based on where they left off last time and track their progress towards completing the units.

[64] National Committee on Science and Technology. (2012). Draft National Policy on Science, Technology and Innovation.

Figure H-1. Screenshot from *Aan Khmer* Application

As outlined above, Cambodia's national plans and policy do not foresee current technology integration into the primary sub-sector except for teacher education. As such, this specific initiative is not aligned with the countries policies and plans. However, based on feedback from MoEYS, the ministry has been regularly consulted and informed about the initiative and its progress.

Technology requirement and support: The software is currently optimized for tablet devices running Android 4.2 or up. Smartphone customization should be possible. The app takes up 160MB. In the small-scale deployment in eight schools to date, no formal and systematic approach to IT support was established, but project staff reacted to issues when informed, providing remote support or driving to the schools as needed.

Implementation details: To date, *Aan Khmer* was deployed as one of several remediation and additional practice tools for grade 1 and 2 students learning to read in Khmer. It was deployed on 7-inch Samsung Galaxy Tab tablet devices in a set of 20 per school. In eight schools it was used throughout 2013–2014. Grade 1 and 2 teachers would conduct a comprehensive continuous assessment after each interval. Based on those results, a few children in each classroom would be selected for remedial activity. The literacy coach in each school would then conduct a range of non-technological activities with these children, and/or refer them to the specific units in *Aan Khmer* that correspond to the curriculum-based objectives for that interval for the child to gain extra practice on. This was done during one of the two breaks in the school day or in a dedicated remediation class of 40 minutes that the literacy coach would coordinate on a weekly basis. Estimated average exposure per child in the remediation group was about 2 hours per week.

An additional implementation case for remedial intervention was peer tutoring, where grade 6 students would use the app together with a grade 1 or 2 child in need of additional practice and support. Other children, not part of a remedial intervention initiative for that interval would also be able to access the app on shared tablet devices during breaks and free lessons.

Initial training for literacy coaches and teachers on the use of *Aan Khmer* was done at each school for one day. The training was supported by the actual application on the tablet and a training/user manual. A half-day training was conducted for peer tutoring, including grade 6 students.

Impact to date: Although TRAC did undergo an impact evaluation, results are not unambiguous. The main limitation lies in the study design, where the individual components of the intervention package (benchmarks, continuous assessments, literacy coach, resource toolkit, and *Aan Khmer* on tablets) have not been independently studied to isolate the unique contribution of each. It is thus may not be possible to determine the impact of the *Aan Khmer* application within the context of this specific implementation. Comparing schools from year 1 and 2 may give some idea of difference in impact with and without Aan Khmer however a cleaner study would be to implement the study in the same year to be sure that there is no confounding effects due to the TARC Design was implemented for two years in some schools and information was leaked etc.

Estimated total cost of ownership[65] per child: As outlined in the Project Synopsis in Annex G, the original All Children Reading grant to develop the TRAC intervention over its two-year timeframe, including customizing *Aan Khmer* to Cambodia, totaled $300,000.

Based on cost data provided by World Education and KAPE, the cost of the **entire TRAC** program—not just the *Aan Khmer* app—for one school year is about $2,075 per school, including the following:

- The literacy coach's training and stipend
- Initial procurement of 20 tablets (prorated over a 3-year life-time), training on their use, and maintenance (ICT Officer time only)
- Printing of the benchmarking booklets and assessment forms for each grade 1 and 2 teacher, and related training
- The teaching aid toolkit
- Parental engagement activities
- Materials for peer tutoring activities
- Library enhancement costs

World Education and KAPE estimate that the per student cost of the intervention averages about $7 per child per school year. The tablets chosen for TRAC initially, from a Malaysian company, have not performed as well as other, more established brands in terms of longer term battery and processor power. The project team is thus moving to a more expensive tablet, with a negotiated price of over $140/tablet, which will bring the per school cost up. The referenced cost, however, does not include implementing organization overhead, staffing, travel, and other such

[65] Total cost of ownership is usually defined as the direct and indirect costs of a product, or in this case, a technology application. Among other costs, it usually includes initial costs of procuring and installing hardware, developing/purchasing and installing/deploying relevant software, developing related materials, and the costs of initial training, as well as any long term costs for communication/data transfer, technology maintenance and support, related refresher trainings, license/software or material upgrades and their deployments, as well as hardware replacements.

programmatic and development—including software updating/maintenance—costs that are considered part of total cost of ownership (TCO). This is important to note in light of scale up, as the overhead, staffing, and travel cost of roll-out of this program to schools, including procurement of the equipment and furniture, site-preparation and enhancements, initial school staff and community information and advocacy, and trainings, as well as implementation monitoring and the logistical costs of ongoing technical support are most likely significant.

Under TRAC, *Aan Khmer* was not originally designed to be a self-standing intervention but an integral part of a rapid response and remediation system, which was a wise choice to encourage appropriate pedagogic integration and purposeful use. In a scenario, as that suggested below, in which *Aan Khmer* may be able to be used as a more independent application to structure and support community and parental engagement in reading, the TCO for the app alone will be very different, much lower and more feasible at scale.

Leveraging existing devices with individual users and rolling out *Aan Khmer* alone would have costs that most likely would include the following:

- Marketing and promotion, which is critical for such a tool
- User support
- Development costs to maintain the integrity of the app, in light of changing versions of the Android operating system and other system update and integration issues outside of the app
- Development costs for bug fixes or required enhancements within the app.

It is not possible in the context of this study to estimate actual costs for this, but such a cost analysis should be undertaken if considered as part of a future intervention.

Remarks: From a technological and design perspective *Aan Khmer* is a very well designed app. The app's underlying technologies are modern, its administrative and content development backend powerful—particularly for development of many different dedicated local language versions. The user interface overall seems intuitive. The artwork and graphics are engaging. The app seems to have worked well so far in the implementation mode outlined above. The app allows for a maximum of five individual user accounts (including tracking progress) per tablet. A guest account allows for unlimited use and practice, but won't track progress. From a pedagogical perspective, the app includes widely used features to support select grade 1-level alphabetic principle, vocabulary, and fluency skills. It gives students needed practice time with sound symbol correspondence; however, without a teacher or more knowledgeable other there is no way to ensure students are repeating sounds or words as the app requests. The decodable stories are an excellent opportunity for students to begin reading connected text as they are gaining knowledge of new sounds and words. It would be made even more effective if the app gave students a chance to read the stories by themselves instead of having the app read the story to them. Among the practice activities, of which there are some 20 different ones throughout the scope of the 31 units, however, there may be a few that may require some editing to be even more effective and/or aligned with recent research on reading instruction.

According to the project team, there are plans to share the app more widely with parents and other teachers, and for it to be used beyond remedial education or sporadic practice in project schools. One vehicle planned is distribution via the Google Play store. For this, however, the app, which is about 160MB, would need to be specifically prepared and possibly re-structured due to the Play store's 50MB limit per app.

According to the MoEYS ICT Office, the ministry is indeed eager to make the app more widely available, for example on the Krou website or via Facebook, to ensure that not only a select few schools get access to it, but also as many teachers and parents as possible. Parental and teacher use of the app may be limited by the requirement of an Android-compatible device. With the above-indicated trends in smartphone ownership, it may not be an entirely unrealistic expectation, however, that a significant portion of the population could, in the near future, if not already now, access the app. In that scenario particularly, *Aan Khmer*, with appropriate guidelines on how to use the app in a home or classroom setting, could provide a valuable resource to strengthen early reading acquisition inside and outside of Cambodian classrooms.

TEST

The Technology for Education Systems Transformation (TEST) is continuous assessment software aligned with the new grade 1–2 Khmer language textbooks and continuous assessment approaches already piloted under TRAC. TEST is being developed with funding from the USAID/Cambodia Development Innovations initiative and implemented by World Education in Cambodia. Development started in December 2014 and will be completed in June 2015. To date, the software has been tested in former TRAC schools, but has not yet been formally deployed.

Description of the application and alignment with national plans: TEST has been designed as an electronic support to the specific continuous assessment approach and instruments developed under TRAC. Thus, the tool supports 17 teacher-monitored, group-administered, multi-part continuous assessments, as per the benchmarks and paper-based assessment materials developed and trialed throughout 2012–2014 in the TRAC schools. The app has a teacher and a student side, each requiring different tablet devices and wireless networking for test administration and data syncing.

The app requires initial set-up of the student role, collecting basic information on each student (in line with MoEYS student registration information for primary schools), and a picture to aid identification.

The teacher side, running off one teacher tablet per classroom, contains six main functionalities, as well as an administrative interface to manage the electronic student roll. In advance of each assessment, the teacher needs to select the students to be assessed from the electronic roll, and to pair their tablets to the teacher's.

The teacher then selects the interval for which to conduct the assessment from the list provided. Test items are then shown on the teacher tablet, with instructions guiding them on how to read the items out to students, as depicted in Figure H-2.

Figure H-2. Screenshot of Test Items from TEST Application

The same items are simultaneously shown on the student tablets, together with a timer for each item. Students choose their response to the items, and their results get communicated to the teacher tablet and logged, then the next item of the interval assessment is presented (Figure H-3).

Figure H-3. Screenshot of Student View from TEST

Once all items are complete, TEST analyzes those data and rapidly provides an overview of the results, identifying those students who require remedial attention. The app then allows the teacher to review results for the entire group of students selected for remediation, as well as by student, providing itemized summaries by reading component. Teachers then, for each student identified, can assign specific remedial activities for consideration by the literacy coach and print that assignment directly from the tablet. Additionally, TEST allows the teacher to record feedback from the literacy coach or others in the completion of the assigned remedial practice. Finally, the app allows for each child who had been selected for remedial activity for this interval to re-take the interval assessment and to compare the results to the score from their original assessment to confirm whether or not interval learning objectives and benchmarks have now been mastered.

Student results are tracked and available on the tablet long-term. The app also automatically backs-up to a SD card whenever a log in or exit from the app happens on the teacher tablet. The app is planned to have a cloud-based data management and reporting component. Results from assessments are regularly uploaded from the teacher tablet to the server. Where wireless upload is not possible at the school, data can be uploaded from the SD card at another location by swapping it out from the teacher tablet. It is planned to make data available to MoEYS departments both online and via email reports.

As outlined above, Cambodia's national plans and policy do not foresee current technology integration into the primary sub-sector except for in the area of teacher education. However, national plans do promote education data/information sharing, particularly in the new EMIS master plans with an aim towards timely, quality education data for planning, monitoring, and evaluation. The EMIS master plan also has activities linked to the implementation of a quality education management information system (QEMIS) to support quality assurance through the collection of student learning achievement data. Depending on the nature of the planned QEMIS, which is not clearly described in the document, TEST (should there ever be a way to scale it up in some form nationwide) may be able to contribute relevant reading achievement data to this effort.

Technology requirement and support: The app is currently optimized for tablet devices running Android 4.2 or up. Smartphone customization should be possible, but may require very careful user interface re-design due to the nature of the assessments and required minimum font sizes to facilitate learners being able to read the assessment items.

The software requires at least two tablets to function and can accommodate at maximum 35 synchronously paired student tablets. To establish the tablet pairing, a local area network is required, for which wireless access points will also have to be deployed to each school.

The project did not yet plan for dedicated IT support for TEST at this point in time.

Implementation details: TEST has not yet been formally implemented to date, other than for testing in some of the original eight TRAC schools. The anticipated model is one where schools would receive 15 tablet devices, as part of the more comprehensive TRAC intervention (described in the Project Synopsis provided in Annex G), and teachers would use the app to

conduct the interval assessments after every interval with groups of 15 students at a time. It is anticipated, based on feedback from the trials done to date, that each group of 15 students may take up to 30 minutes to assess, including accompanying procedures of student selection and assessment logistics, which means it would require approximately 1.5 hours to complete the continuous assessment for a class of 45 children.

Based on experiences with trials in the original TRAC schools, that is with teachers already used to the paper-based interval assessments, the project team estimates an additional 2 days of training for the TEST app itself (the original teacher training, without the app, was a total of 3 days for the overall benchmark, continuous assessment, and rapid response system approach).

Impact to date: The app has not yet been formally deployed or evaluated.

In terms of anticipated impact, it needs to be noted that the app itself is not designed to directly improve student achievement, but instead to enable close monitoring of student outcomes.

Estimated TCO per child: As also outlined in the Project Synopsis in Annex G, the cost of developing TEST and rolling it out to 10 schools already using the TRAC intervention (and having received all the inputs mentioned for *Aan Khmer* above), is $100,000, of which about a third is being invested in the actual programing effort to develop the app through a local company.

No further cost data have been collected or projected for TCO for this app alone. Again, it is important to consider that TEST is also not a self-standing application, but a modification of the continuous assessment approached used under TRAC; thus the calculations as per the overall TRAC approach and *Aan Khmer* detailed above, apply. It is important to note, however, that the implementation scenario for TEST does not only have practical scale-up limitations, as outlined in the next section, but also related cost implications. Again, it is not possible in the context of this study to estimate actual costs for this, but such an effort should be undertaken if considered as part of a future intervention.

Remarks: From a technological and design perspective TEST is a well-designed app, particularly as its functionality is relatively sophisticated. The app's underlying technologies are modern, its administrative and content development backend aimed at maximizing administrator ability to edit and update tests without requiring significant programming support. The initial user interface overall seems intuitive, although, following more in-depth user testing, there may be opportunities to enhance some of the screens and simplify workflows to reduce the amount of clicks required to move through the app. The student-side user interface and graphics for the assessment are simple and not distracting from the items. The project's plans for a cloud-based data reporting backend is innovative and could add significant value to implementation monitoring of both teacher adherence to test administration and student reading progress.

Main concerns in regard to this app are on data privacy and feasibility of scale-up.

The app, due to the nature of its design, collects individual student data, including student names, ages, and their picture and performance data. These data are all part of what is being backed-up to the central server and planned to be made available to various system actors for monitoring.

This raises significant ethical and data privacy concerns from an outside perspective. To address these, the project should seriously consider encrypting and/or removing student identifying information when data are being sent to the server. While removing would be safest, the project uses the cloud-based data uploads also as a means of backup should a teacher tablet fail. With all information saved on the server, the app can thus be re-installed and all data to date replicated on a new tablet, which is an advantage.

It is also recommended that the project carefully consider only sharing and reporting aggregated scores and unidentifiable student and teacher data at school level, preferably even at district level. Key would be to establish a clear rationale for reporting what information to whom, and then balancing the need for individualized information with the possibility for it to be used in inappropriate ways, including for punitive purposes.

Secondly, the implementation mode for which the app is being designed, that is, as a group-administered assessment tool, renders it virtually unfeasible for wide scale-up. The current implementation model foresees at least 15 tablet devices running the app per primary school. With nearly 7,000 primary schools in the country, even such relatively "low-cost" devices are not going to be feasible to purchase at scale (the tablets alone, not including other elements of their TCO including long-term maintenance, etc., would be 15 x $180 = $2,700 list price per school). While some schools may be able to collect or attract funding for such an expense, the majority will not, not in the near future (next 2 years) and not even in the mid-term (3–5 years). There may be options to minimize the number of tablets or devices truly needed to make use of the app, e.g., by turning the approach into an individual assessment (thus not making use of the teacher/student tablet pairing feature), where the teacher sits individually with each child to conduct the assessment, working off just one tablet. Given the length of the various interval assessments, it is estimated that individual assessments could be completed in about 6–10 minutes per child including logistics. Given that they are done every 4–5 weeks, an effort of 45 x 10 minutes for a total of some 5–6 hours for an average classroom is extensive. However, it may be possible to expend that kind of time over 2–3 days to assess a whole classroom and identify the children needing remediation, particularly if there is a literacy coach at school level who could lead the effort.

Another consideration, however, is the fact that the TEST app is not designed as a stand-alone continuous assessment tool, but is part of a larger intervention of inputs, at minimum including the benchmark book, and a literacy coach at school level. The latter's role is to take the assessment results from TEST and organize the remediation practice for the children. Thus the actual scale-up cost of the app will have to include those elements as well, rendering it perhaps even less feasible.

In sum, the app's potentially significant contribution to dynamic monitoring of student progress in reading, if tied to appropriate support systems at DOE, POE, and/or MoYES level, remains theoretical in light of the longer-term barriers to nationwide scale-up of the currently chosen implementation mode.

E4K

E4K (2015–2016) is an All Children Reading-funded initiative to develop leveled e-books to complement the revised grade 2 and 3 Khmer language textbooks for students and the *Aan Khmer* application described above. The project is implemented by KAPE and TTS. The app has not yet been actually developed, but a software development company has been identified and specifications shared.

Description of the application and alignment with national plans: The E4K interactive e-book app is planned to contain a total of 24 texts of 3 different difficulty levels each, for a total of 72 stories. Ten of the 24 texts will be aimed at grade 2 readability and 14 of the texts at grade 3. For each story there would be a "read to me" feature, interactive elements, and a "read on my own" feature, followed by questions and quizzes to get at comprehension. The plans also foresee an individual tracking feature for parents or teachers to monitor the children's progress. Those features are all to be available offline, but where connectivity is available, a cloud-environment is planned.

Technology requirement and support: Currently planned for tablet devices running Android 4.2 or up.

Implementation details: The e-books are planned to become an integral part of the TRAC+ initiative and other expansions of the TRAC intervention by KAPE and a range of their partners.

Impact to date: The app has not yet been formally deployed or evaluated.

Estimated TCO per child: The app is to be deployed together with *Aan Khmer* and thus may factor into the above calculation, adding only minimal cost (e.g., for a potential printed guide to support pedagogically effective use of the app or for additional training if required).

Remarks: As the app has not yet been developed, a technological, design, and pedagogical review cannot be done at this point in time.

Yet the potential for this app, complementing *Aan Khmer* for grades 2 and 3, providing opportunity for additional and structured early reading practice outside of classrooms (where applicable technology is available), is promising.

In addition to these integrated technology applications, there are examples of self-standing apps already available for download to the public that may function as supplementary resources, particularly for use outside of the classroom. Examples include *Khmer library*, *Draw Khmer*, *Khmer Alphabet* and interactive e-books like *Tiger, Monkey and Rabbit*.

a) Khmer library

Description of the application: *Khmer library* is a self-standing Android app developed by Aide et Action, offering access to books for children, teenagers, and adults in Khmer and foreign languages. The app has been available on the Google Play store since 2014. According to Aide et Action, it has been downloaded 80,000 times to date, has 38,000 users and contains over 700 books, though no data were shared on how many of these would be appropriate for early readers. After installing the app from the Play store, one requires connectivity to download each book. This also requires registration and sign-in (also possible with Facebook account).

Technology requirement: Currently optimized for Android 2.1 all the way through 4.4.

Remarks: From a design perspective the app is overall straightforward to use, although some enhancements of the user interface may make it more accessible, as the app seems to require a lot of steps in a workflow. From a technological perspective, it seems to require significant bandwidth to load the books the first time, and then bandwidth for every download. Requiring a log-in to read even a single book may turn potential users off. The pedagogical quality of the Khmer books found there could not be evaluated. From a technological perspective, there are international examples of mobile applications not requiring smartphones that serve a similar purpose; such innovative content management systems may make the app more useful for a wider audience.

b) Draw Khmer Alphabet

Description of the application: *Draw Khmer Alphabet* is a self-standing Android app distributed by Mobile One that engages children in filling in the letters of the Khmer consonants and vowels. The app, available on the Google Play store, was last updated in January 2015, has been downloaded at least 10,000 times to date. Upon download, the app offers eight sets of items for drawing, including images, as well as the numbers, vowels, and consonants of the Khmer alphabet. Upon selecting, e.g., the latter, all consonants of the Khmer alphabet are presented on

the screen. Upon selection of one, a screen like the one in the screenshot in Figure H-4 is presented for tracing.

Figure H-4. Example of Tracing of a Letter in *Draw Khmer Alphabet*

Technology requirement: Currently optimized for Android 2.3.3 and up.

Remarks: From a design perspective, the app is overall straightforward to use. The app contains ads if used while online, which may be inappropriate for a young user. The sound, an instrumental piece of music, is automatically switched on, and may be distracting for a young learner at the actual drawing phase. It can be switched off, but that needs to be a deliberate action. From a pedagogical perspective tracing letters is a common and useful practice to support students' learning to write and to associate the letter with its sound if they are repeating the sound as they trace. The pedagogical value of the app could be enhanced by adding the sound of the letters to each and asking students to say the sound of each letter. This would likely require well-trained supervision.

c) Khmer Alphabet

Description of the application: *Khmer Alphabet*, a self-standing Android app distributed by iMer that engages children in pronouncing and writing the Khmer consonants and vowels. The app, available on the Google Play store, was last updated in November 2014, and has been

downloaded at least 1,000 times to date. Upon download of the app, the main navigation screen shows a picture with flowers, three of which contain an illustrative vowel, consonant, and number. Upon selecting one of those flowers, e.g. vowels, a screen listing all vowels (in form of flower petals) is presented. Upon selecting one of these, the vowel alone is shown as a flower and the vowel is sounded out.

Technology requirement: Currently optimized for Android 2.3 and up.

Remarks: From a design perspective, the app is simple to use, yet the overall flower design seems distracting. The app also contains ads if used while online, which may be inappropriate for a young user. From a pedagogical perspective, while providing the sound of the letter with each letter is a nice feature, the presentation of each letter on the screen is far from optimal as the letters are presented in too small of a font to be appropriate for an emerging reader.

e) Tiger, Monkey and Rabbit

Description of the application: *Tiger, Monkey and Rabbit* is an interactive e-book optimized for iOS devices, developed by CamAnt. Upon download, the interactive e-book starts and shows text, graphics, and interactive elements on each screen. There is read-along narration with text highlights, and reading comprehension questions at the end of the story. The book can be read in both English and Khmer, but only Khmer is provided as audio support. The book's interactive elements allow the user to have animals or items make sounds or move on the screen.

Technology requirement: Currently optimized for iPhone or iPad devices with at least iBook 3 and iOS 4.3.

Remarks: From a design perspective, the app is made with much attention to engaging graphics. The story is based on a Khmer folk tale. Some of the animated graphics, e.g., the floating ladybugs in the screen shown here, may be distracting the reader from following the audio-supported read along. Similarly, it will be good to validate that the graphics are purposeful to the story's narrative for each page of the text. The questions at the end of the story are a good element to promote reading comprehension. To add further pedagogical value for early reading, the app could contain more inferential questions, as well as feature questions at the beginning and during the story.

Critical Issues Related to System Capacity to Improve Early Grade Reading

ICT4E: Promise and Practical Constraints

Table H-1 outlines key promises and constraints for the practical and effective use of technology in the primary sub-sector of education in Cambodia, given many of the factors discussed thus far in this annex.

Table H-1. Promises and Constraints for the Practical and Effective Use of Technology in the Primary Sub-sector

Promise	Constraints
Near universal mobile phone ownership means information and communication devices are already in the hands of parents. Internet penetration (mostly mobile) is estimated to be nearly at 30% among the population above 15 years of age.	To date mostly used for voice communication. SMS/text on basic phones is difficult in Khmer language. 3G coverage not yet universal, particularly in remote areas. This will increase as customer demand increases. Assumed limited experience among parents to use their phones to support children's education.
Near universal ownership of cell phones among educators. Anticipated wide ownership of smartphones by 2018.	Mobiles phones are used predominantly for personal voice communication or personal Internet consumption. Engagement with the phones as devices to mediate access to job-related or

Promise	Constraints
	professional development resources rare. Relevant content to do so (for instructional support, assessment, data management, professional development) also lacking to date.
Existing ICT Office at MoEYS to guide and oversee ICT for Education activities and developments.	Seemingly understaffed to lead, oversee, and coordinate ICT-related plans and activities; lack of specialized expertise and operational resources to provide more than basic support and services.
Existing policy on ICT for Education with a focus on video for teacher development, although no concentration on primary education.	Policy not focused on primary sub-sector and outdated. Objectives for 2009–2013 only partially achieved. Lack of resources and advisory services to update the policy. MoEYS has no active guidance on use of mobile technology and related resources to schools. Limited consideration on pedagogical use of technology and no guidance on total cost of ownership for initiatives.
MoEYS has existing Facebook presence with a significant follower population (400,000). Facebook is widely known among educators.	While possibly a platform for information sharing, content provision and advocacy, there are data privacy and security concerns with Facebook. USAID regulations may restrict use of Facebook.
POE, DOE have computers to support at minimum data / information management, and can keep those largely operational. Basic Internet connectivity at DOE, POE, and TTS level.	Equipment is more often a patchwork of desktop computers of which many are old, were secondhand, and do not function well. Expertise in using technology is limited in many DOEs. There seems to be lack of relevant systems to guide provincial and district-level data management for effective planning. New EMIS system just emerging.
TTCs have modern, sustainable thin-clients labs and all trainees acquire basic computer familiarity and skills through a standardized curriculum.	Lack of relevant content to leverage existing ICT infrastructure for instructional support, assessment, and professional development for lecturers of Khmer language. Reliance on MoEYS curriculum and student textbook.
Existing expertise for the use of video in primary teacher training; and access to necessary equipment.	Only 32 videos so far have been developed for the primary sub-sector, and their use seems to be limited. Any new videos focused on early grade reading instruction will need to be more accessible, promoted, and integrated with a larger instructional support mechanism for teacher pre-service or in-service training.
Competitive IT equipment market, moderate local IT support expertise and services available.	Cost of smartphones and tablets sinking rapidly, but still not universally affordable. After-sales support for select hardware may be limited.
Fledgling, yet growing, mobile app development expertise locally available. New institute to further feed the local IT market with qualified expertise. First examples of private investment into app development in the field of early reading.	The market for educational software is still very small as demand is only starting to emerge among parents and educators, and smartphone/mobile Internet is emerging. Developers will need a favorable environment to be able to develop and sustain/maintain apps longer term.

Options for the Practical Integration of Technology in Support of a Systemic Early Grade Reading Improvement Model at Scale

In light of all the findings gathered for this sector review, in particular the promises and constraints noted in Table H-1 above, the following technology supports are recommended for consideration as part of the core model for a national early reading program.

The below recommended options **must not** be perceived as a laundry list of where possibly technology could be used in an early grade reading program in Cambodia. Instead, key to considering any of the possible applications below is their **appropriate integration** with respective model components of an early grade reading program such as public advocacy, parental engagement, teacher training and support, or monitoring of teacher support.

1. Support a systemic intervention on **public advocacy for "early grade reading"**; and **promote accountability** for the most basic aspects of reading instruction through automated phone polling**.** Specific recommendations to consider:
    a. Build on emerging experiences with the USAID-supported mHealth Platform featuring a mobile phone interactive voice response system, interactive web sites, and Facebook pages.[66]
    b. Build on existing experiences in social advocacy with online and social media to promote a culture of reading in homes, e.g., by using voice messaging to cell phones to encourage a culture of reading at homes and in communities. There may be opportunities here for partnership with the leading cell phone providers as they are already using similar technology for promotional messages. There is also experience with Open Institute in the health sector in using such messages for behavioral change (MobileMamaAlliance[67]) with some initial pointers to preferred calling times, voice types, etc.
    c. Build on existing experience with citizen report cards for textbook monitoring, and promoting accountability for some of the most basic aspects to early reading instruction, e.g., automated polling calls to citizens gather input about whether the required Khmer lesson took place today, whether the kids used the official textbook at any time during the lesson, whether kids wrote into their notebook/slate today; etc.
    d. Build on MoEYS's existing widely followed Facebook page to reach interested public.
2. Provide **additional reading and early reading practice material** via cell phones for use outside of classrooms, in complement to the new grade 1–3 textbooks used in the classroom. It is important to consider not giving this kind of content away for free, but selling it at a small fee to parents. This could stimulate the market for the local educational software development industry, with an eye towards ensuring enough income from this kind of application to sustain and further the content longer-term. This could, for example, be practically done in cooperation with the Development Innovations project (or other project), by DI providing technical assistance to the developer community on the revised curriculum for early reading instruction (five components of reading, important pedagogical considerations in software development, etc.). Specific recommendations to consider:

[66] https://www.flickr.com/photos/usaid_cambodia/sets/72157652776368739/
[67]http://mobilemamaalliance.org/sites/default/files/mHealth%20Feasibility%20Survey%20Results_PIN_Jul13.pdf

a. Support wider distribution of *Aan Khmer* and E4K interactive e-books for those parents or homes with a smartphone, including—very critically!—tips for instructional use. This could include exploring partnerships with the leading telecoms to distribute the content on SIM cards.

b. Build on *Khmer Library* to get more text into homes; explore a potential partnership with Aide et Action for a dedicated *Khmer Early Library* version; explore even lower-tech content distribution options such as binu (http://binu.com), which has also been used as the backend for the widely used WorldReader app (http://www.worldreader.org/what-we-do/worldreader-mobile/) and does not require a smartphone.

3. Consider turning Room to Read's student workbook, and other organizations' print-based leveled readers, into a resource accessible via cell phones for student practice at home.

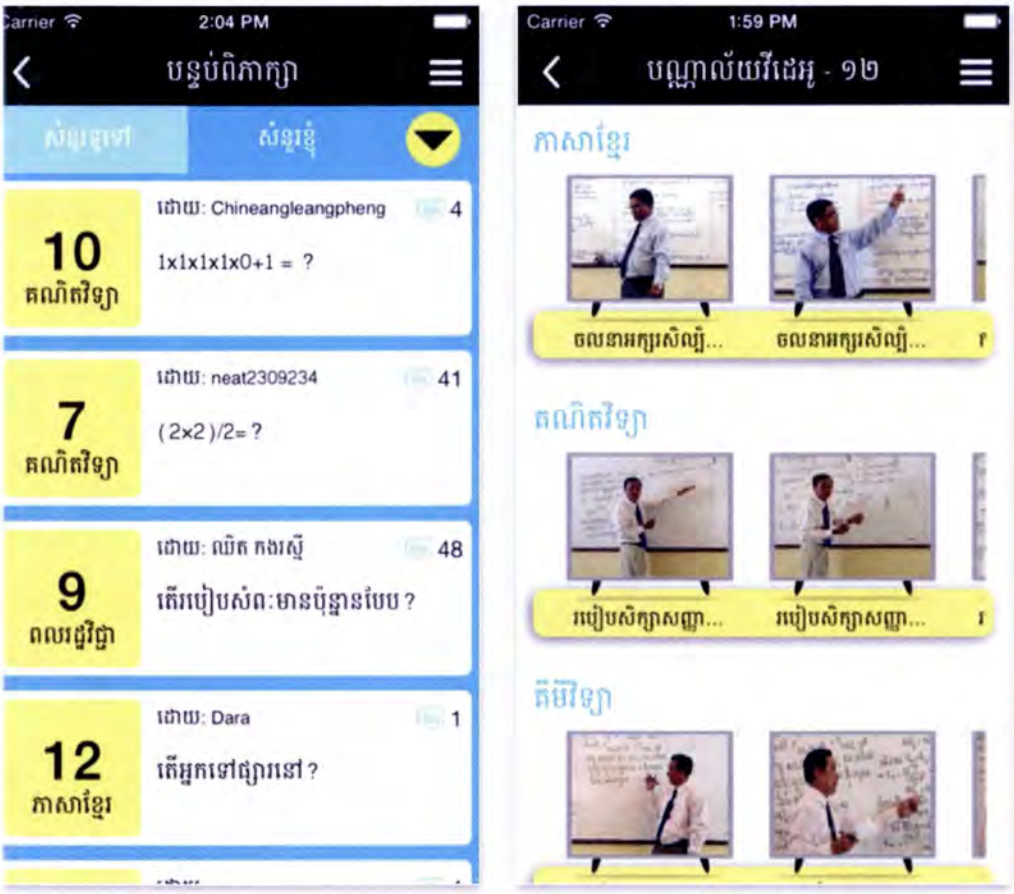
4. Strengthen (differentiated) instruction by providing descriptions of **alternative instructional routines with audio and video supports** for key lesson elements in the new Khmer textbooks, delivered as an app via cell phones either for teachers or literacy coaches (if made part of the model).

5. Build on existing experience, capacity, and equipment in the use of video for primary teacher training with VVOB and Open Institute.

6. Build on experiences of Cellcard on the XG Seus App "Student" that provided SIM cards to students (who had to show student ID to sign up) pre-loaded with a combination of secondary textbook library, video lectures from professors, educational games and quizzes, a student forum, and class calendar.[68] Example screenshots for this app are shown in Figure H-5.

[68] https://www.appannie.com/apps/ios/app/xg-seus/

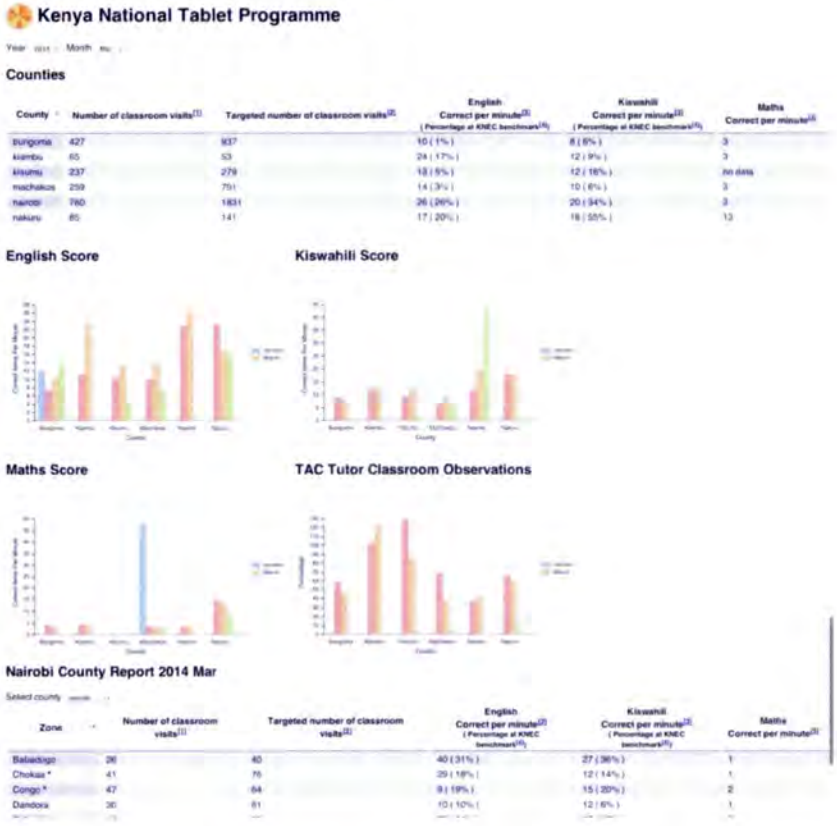
Figure H-5. XG Seus Student App



7. Building on (now) plans for *Khmer Educator* by Aide et Action, which is currently planned as a companion app for teachers. However, Aide et Action did not provide additional detail on this planned app to the study team.
8. Consider international experience with model videos and multimedia lesson plans, integrating audio support for key reading routines in the textbook.
9. Support **practical continuous or routine assessments** for instructional decision-making (and potentially remediation) by providing simple smartphone or tablet-based software to aid item management and scoring (and to address issues of potential "grade inflation" by schools).
10. Re-design TEST app to minimize equipment requirements and simplify application, yet for resulting data to inform instructional decision making and, if possible, remediation applicable in the early grade reading model to be defined.
11. **Enhance focus on reading instruction and pedagogical support** provided by DTMTs through software structuring school-level data collection, classroom observation, and pedagogical guidance to teachers.

12. Build on international experience, e.g., from USAID/Kenya Tusome (formerly also knows as the "Kenya National Tablet Program" supported by DFID), using smartphones/tablets to help DTMTs provide instructional support to teachers during school visits (Figure H-6). Also use phones/tables to promote accountability for school visits with the help of reports on DTMT-like school visits that summarize results from select student assessments towards national benchmarks.

Figure H-6. Kenya Tusome Data Analysis



13. Enhance immediacy and quality of data collection in EGRAs at the national level through the use of electronic data collection tools.

14. Consider use of Tangerine for future application of EGRAs (http://www.tangerinecentral.org/aboutsite).

Annex I: People/Organizations Consulted for this Assessment

Name	Position
Government Personnel	
1. H.E. Nath Bunroeun	Secretary of State, MoEYS
2. H.E. Chan Sothy	Director General of Budget, MoEF
3. H.E. Chea Manit	Director General of General Department of Information and Communication Technology, Ministry of Posts and Telecommunications (MPTC)
4. H.E. Vat Chun	Undersecretary of State, MPTC
5. Mr. Leang Seang Hak	Director, Teacher Training Department, MoEYS
6. Mr. Eng Kim Ly	Director, Department of Curriculum Development, MoEYS
7. Mr. Chan Sophea	Director, Primary Education Department, MoEYS
8. Mr. Lim Sothea	Director, Department of Planning, MoEYS
9. Mr. Ly Sithi	Director, Department of Finance, MoEYS
10. Mr. Mok Khemera	Director, e-Government Department, MPTC
11. Mr. Ong Channa	Vice Director, Quality Assurance Department, MoEYS
12. Mr. Sok Tha	Director, ICT Office, MoEYS
13. Ms. Sodany Tan	Deputy Director, ICT Policy Department, MPTC
14. Ms. Mao Tannavy	Vice Director, Department of Curriculum Development, MoEYS
15. Mr. Yin Sida	Head of Administration Office, PED-MoEYS
16. Mr. Om Serey Dy	Director, Provincial Office of Education, Youth, & Sport, Siem Reap
17. Mr. Tuon Sokhom	Vice Director, Provincial Office of Education, Youth, & Sport, Kg Cham
18. Mr. Yos Sarath	Director, Provincial Office of Education, Youth, & Sport, Svay Rieng
19. Mr. Chea Sok Chamrern	Office Head, Primary Education Office, POEYS-Kampong Cham
20. Mr. Has Mongthara	Office Head, Primary Education Office, POEYS-Svay Rieng
21. Mr. Prom Borath	Director, Provincial Teacher Training College, Kampong Cham
22. Mr. Leav Ora	Director, Provincial Teacher Training College, Siem Reap
23. Mr. Sao Sitha	Director, Provincial Teacher Training College, Svay Rieng
24. Mr. Huot Menghong	Director, District Office of Education, Youth, & Sport, Kampong Siem, Kampong Cham
25. Mr, Ros Bunthorn	Director, District Office of Education, Youth, & Sport, Chikreng, Siem Reap
26. Mr. Su Sarath	Vice Director, District Office of Education, Youth, & Sport, Puok, Siem Reap
27. Mr. Phan Chantha	Director, District Office of Education, Youth, & Sport, Svay Chrum, Svay Rieng
28. Mr. Thouch Sarout	Vice Director, District Office of Education, Youth, & Sport, Svay Chrum, Svay Rieng
29. Dr. Sopheap Seng	President, National Institute of Posts, Telecommunications and ICT (NIPTICT)
School Personnel	
30. Mr. Phal Sovan	Director, Demonstration Secondary School, Kampong Cham Town, Kg Cham
31. Ms. Sorn Somalee	Literacy Coach, Demonstration School, Kampong Cham Town, Kg Cham
32. Mr. Beng Heng	Director, Demonstration Primary School, Kampong Cham Town, Kg Cham
33. Nang Chhun Lin	Director, Wat Angkor PS, Kampong Siem District, Kampong Cham
34. Bun Krin	Director, Hun Sen Kamrou PS, Chikreng District, Siem Reap
35. Kim Soeum Eng	Director, Spean Thnout PS, Chikdreng, Sieam Reap
36. Roth Sophy	Director, Kork Thmey PS, Pouk, Sieam Reap

Name	Position
37. Mr. Orn Sophan	Vice Director, Kraol Kor PS, Svay Chrum District, Svay Rieng
38. Mr. Chea Neang	Director, Preah Chor PS, Kampong Trabaek, Prey Veng
39. Mr. Nyiek Kim	Literacy Coach, Preah Chor PS, Kampong Trabaek, Prey Veng
40. Mr. Brak Savy	Director, Prey Slae PS, Peareang, Prey Veng
41. Mr. Sun Veasna	Director, Sromor Kaw Kor PS, Peareang, Prey Veng
Development Partners	
42. Sean Callahan	Acting Mission Director, USAID/Cambodia
43. Sheri-Nouane Duncan-Jones	Director, Office of Population, Health and Education, USAID/Cambodia
44. Mr. Tsuyoshi Fukao	World Bank Officer
45. Ms. Lynn Dudley	Education Specialist, World Bank
46. Mr. Chea Huot	Education Officer, UNICEF
47. Ms. Rachel McCarthy	Education Officer, UNICEF
48. Mr. John Friend-Pereira	Education Officer, UNICEF
49. Mr. Sophea Mar	Senior Social Sector Officer, Asian Development Bank
50. Gianpietro Bordignon	Representative and Country Director, World Food Program
51. Edith Heines	Deputy Country Director, World Food Program
52. Kong Kannitha	National Program Officer (Education), World Food Program
53. Mr. Santhosh Khatri	Education Specialist, UNESCO
54. Mr. Heng Sieng	Development Assistance Specialist, USAID-Cambodia
55. Corinne Boulet	Attache Education, Health and Social Development, European Union
Civil Society Partners	
56. Mr. Keo Sarath	Education Adviser, Save the Children International
57. Mr. Henk VanBeers	Director of Program Development & Quality, Save the Children
58. Mr. Soeum Vanna	Sector Technical Officer for Education, World Vision
59. Ms. Huot Socheatha	Chief Editor, Sipar
60. Mr. Mao Lan	Grant Manager, DAI
61. Ms. Jessica Hein Zeiman	ICT Strategic Initiative Manager, DAI
62. Mr. Jan Noorlander	Education Program Director, CARE
63. Mr. Chhorn Chayuth	E4K Project Manager, KAPE
64. Mr. Soeung Vann	Beacon School Initiative Manager, KAPE
65. Mr. Mai Sarith	REACH Project Manager, KAPE
66. Ms. Ouk Sothira	Education Specialist, SDPP-KAPE
67. Mr. Chea Tha	Early Warning System Manager, SDPP-KAPE
68. Mr. Kuoy Pharin	Community Engagement Officer, SDPP-KAPE
69. Chhoeung Sina	Computer Lab Manager, SDPP-KAPE
70. Ms. Kong Sonthara	Project Manager, TRAC Plus, World Education
71. Mr. Eng Sok	Deputy Project Manager, TRAC Plus, World Education
72. Mr. Javier Sola	Program Manager, Open Institute
73. Mr. Chin Chanveasna	Director, NGO Education Partnership (NEP)
74. Mr. Prashant Verma	Country Director, Child Fund-Australia
75. Mr. San Sothearo	Education Specialist, Child Fund-Australia
76. Olivia Byler	Global Literacy Program Associate Director, Room to Read
77. Mr. Hor Sokhak	Literacy Director, Room to Read
78. Ms. Claire Wyatt	Global Literacy Program Manager, Room to Read
Private Sector	

Name	Position
79. Mr. Sum Vannak	Publishing Manager, Thunthean Seksa (TTS)
80. Mr. Keo Ket	Android App Developer, CamMob
81. Mr. Mao Hieng	Android and iOS Developer, CamMob
82. Mr. Hean Thouch	Software Developer, CamAnt

Annex J: Participant List Policy Dialogue Workshop

I. ថ្នាក់ដឹកនាំក្រសួង/MoEYS leadership – 5 persons

ឯកឧត្តមបណ្ឌិត ហង់ ជួន ណារ៉ុន	រដ្ឋមន្ត្រីក្រសួងអប់រំ យុវជន និងកីឡា
ឯកឧត្តម ណាត ប៊ុនរឿន	រដ្ឋលេខាធិការ
ឯកឧត្តម ហ៊ាង ស៊ីណា	អនុរដ្ឋលេខាធិការ
ឯកឧត្តម លឹម សុធា	អគ្គនាយកគោលនយោបាយ និងផែនការ
ឯកឧត្តម ពុត សាមិត្ត	អគ្គនាយកអប់រំ

II. នាយកដ្ឋានជំនាញ/MoEYS technical departments – 14 persons

លោក លាង សេងហាក់	ប្រធាននាយកដ្ឋានបណ្តុះបណ្តាល និងវិក្រឹតការ
មន្ត្រីជំនាញ	នាយកដ្ឋានបណ្តុះបណ្តាល និងវិក្រឹតការ
លោក អេង គឹមលី	ប្រធាននាយកដ្ឋានអភិវឌ្ឍកម្មវិធីសិក្សា
មន្ត្រីជំនាញ	នាយកដ្ឋានអភិវឌ្ឍកម្មវិធីសិក្សា
លោក អ៊ុង ជិនណា	ប្រធាននាយកដ្ឋានធានាគុណភាពអប់រំ
មន្ត្រីជំនាញ	នាយកដ្ឋានធានាគុណភាពអប់រំ
លោក ចាន់ សុភា	ប្រធាននាយកដ្ឋានបឋមសិក្សា
មន្ត្រីជំនាញ	នាយកដ្ឋានបឋមសិក្សា
លោក ប្រាក់ កុសល	ប្រធាននាយកដ្ឋានអប់រំកុមារភូច
លោក សួង សារ៉ាត	ប្រធាននាយកដ្ឋានព័ត៌មាន និងកិច្ចការអាស៊ាន
លោក សុខ ថា	ប្រធានការិ. នាយកដ្ឋានព័ត៌មាន និងកិច្ចការអាស៊ាន
នាយកដ្ឋានផែនការ	
នាយកដ្ឋានគោលនយោបាយ	
លោក ឈីញ ស៊ីថា	សមាជិកក្រុមប្រឹក្សាស្រាវជ្រាវរអប់រំ

III. ដៃគូអភិវឌ្ឍន៍/Development Partners – 10 persons

Ms. Lynn Dudley	Education Specialist, World Bank
Mr. Chea Huot	Education Officer, UNICEF
Ms. Erika Boak	Chief of Education, UNICEF
Mr. Sophea Mar	Senior Social Sector Officer, Asian Development Bank
Gianpietro Bordignon	Representative and Country Director, World Food Program
Kong Kannitha	National Program Officer (Education), World Food Program
Mr. Santhosh Khatri	Education Specialist, UNESCO
Corinne Boulet	Attache Education, Health and Social Development, European Union
Beng Simeth	World Bank
Pech Thyda	JICA

IV. អង្គការសង្គមស៊ីវិល/Civil Societies – 15 persons

Mr. Keo Sarath	Education Adviser, Save the Children International
Mr. Henk VanBeers	Director of Program Development & Quality, Save the Children
Ms. Huot Socheatha	Chief Editor, SIPAR
Ms. Jessica Hein Zeiman	ICT Strategic Initiative Manager, DAI
Mr. Jan Noorlander	Education Program Director, CARE
Ms. Kong Sonthara	Project Manager, TRAC Plus, World Education
Mr. Javier Sola	Program Manager, Open Institute
Mr. Chin Chanveasna	Director, NGO Education Partnership (NEP)
Mr. Prashant Verma	Country Director, Child Fund-Australia
Mr. Hor Sokhak	Literacy Director, Room to Read
Ms. Claire Wyatt	Global Literacy Officer, Room to Read
Sao Vanna	Executive Director, KAPE

Hok Sithi	SIPAR
Jason Evan	World Vision
Seng Tony	Microsoft

V. ថ្នាក់រាជធានី ខេត្ត

ខេត្តសៀមរាប/Siem Reap province – 7 persons

លោក អ៊ុង សិរីឌី	ប្រធានមន្ទីរអប់រំ យុវជន និងកីឡា
លោក រស ប៊ុនថន	ប្រធានការិ.អប់រំ យុវជន និងកីឡាស្រុកជីក្រែង
លោក ស៊ូ សារ៉ាត់	ប្រធានការិ.អប់រំ យុវជន និងកីឡាស្រុកជីក្រែង
លោក លាវ ឱរ៉ា	នាយកសាលាគរុកោសល្យ និងវិក្រឹតការខេត្ត
លោក ប៊ុន ត្រីន	នាយកបឋមសិក្សាហ៊ុនសែនគំរូ ស្រុកជីក្រែង
លោក អេង ប៊ុនចាន់	នាយកបឋមសិក្សាស្ពានត្មោត ស្រុកជីក្រែង
លោក រដ្ឋ សូភី	នាយកបឋមសិក្សាគោកថ្មី ស្រុកពួក

ខេត្តកំពង់ចាម/Kompong Cham province – 8 persons

លោក នួន សុខុម	អនុប្រធានមន្ទីរអប់រំ យុវជន និងកីឡា
លោក ជា សុខចំរើន	ប្រធានការិ.បឋមសិក្សា
លោក ហួត ម៉េងហុង	ប្រធានការិ.អប់រំ យុវជន និងកីឡាស្រុកកំពង់សៀម
លោក ព្រំ ប៊ូរ៉ាត	នាយកសាលាគរុកោសល្យ និងវិក្រឹតការខេត្ត
លោក ជាល់ សុវណ្ណ	នាយកអនុវិទ្យាល័យហ៊ុនសែនអនុវត្តន៍ ក្រុងកំពង់ចាម
លោកស្រី សន សុម៉ាលី	នាយិការងបឋមសិក្សាហ៊ុនសែនអនុវត្តន៍ ក្រុងកំពង់ចាម
លោក បេង ហេង	នាយិកាបឋមសិក្សាហ៊ុនសែនអនុវត្តន៍ ក្រុងកំពង់ចាម
លោក ណាង ឈុនលីម	នាយកបឋមសិក្សាវត្តអង្គរ ស្រុកកំពង់សៀម

ខេត្តព្រៃវែង/Prey Veng province – 4 persons

លោក ជា នាង	នាយកបឋមសិក្សាព្រះឈរ ស្រុកកំពង់ត្របែក
លោក ជ្រាក់ សារី	នាយកបឋមសិក្សាព្រៃស្លា ស្រុកពារាំង
លោក ស៊ុន វាសនា	នាយកបឋមសិក្សាស្រមែកគោ ស្រុកពារាំង
លោក ញឹម គីម	នាយករងបឋមសិក្សាព្រះឈរ ស្រុកកំពង់ត្របែក

ខេត្តស្វាយរៀង/Svay Rieng province – 6 persons

លោក យស់ សារ៉ាត់	ប្រធានមន្ទីរអប់រំ យុវជន និងកីឡា
លោក ហាស ម៉ុងគេរ៉ា	ប្រធានការិ.បឋមសិក្សា
លោកស្រី ប៉ែន ចន្ថា	ប្រធានការិ.អប់រំ យុវជន និងកីឡាស្រុកស្វាយជ្រុំ
លោក តូច សារ៉ូត	អនុប្រធានការិ.អប់រំ យុវជន និងកីឡាស្រុកស្វាយជ្រុំ
លោក សៅ ស៊ីថា	នាយកសាលាគរុកោសល្យ និងវិក្រឹតការខេត្ត
លោក អន សុផាន	នាយករងបឋមសិក្សាក្រាលគោ ស្រុកស្វាយជ្រុំ

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