

State of Service Delivery in Ethiopian Primary Schools: Findings from the Ethiopia Education Service Delivery Indicator Survey

Wendmsyamregne Mekasha Zike

The World Bank Office, Addis Ababa, Federal Democratic Republic of Ethiopia

wendm@post.harvard.edu

Bereket Kelemu Ayele

Ministry of Education, Education Management Information Systems and Information Communication Technology

Directorate, Federal Democratic Republic of Ethiopia

Disclosure: This report is prepared based on survey conducted in May 2014 in Ethiopian primary schools. The role of the authors included designing survey methodology, supervising data collection processes, conducting analysis as well as producing the final report. The findings, interpretations, and conclusions expressed in this report do not necessarily reflect the views of the organizations that the authors work for.

Abstract

In May 2014, a service delivery indicator (SDI) survey was conducted on the Ethiopian primary education service delivery system. The objective of the survey was to assess the quality of service delivery in primary education, with particular focus on assessing the availability and quality of facility infrastructure and other inputs, and explore level of effort and knowledge of frontline service providers (i.e. teachers). The overall aim of the survey was to provide information to public and stakeholders on the status, challenges, and way forwards of availing quality basic education services to citizens.

The methodology included primary data collection on school infrastructure, teacher characteristics, effort, and knowledge in English language and Mathematics, and student achievements from 347 randomly selected and nationally representative schools across the country.

The purpose of this report is limited only to reporting the state of service delivery in primary schools in Ethiopia, and as such, does not argue to advance specific policy alternatives. The results of the survey showed that most schools lack access to electricity. Only half of urban schools and 11 percent of rural schools have connectivity to electricity grid. Water supply is also found to be a challenge for almost half of the schools. With regard to pedagogical centers, science laboratory, and teacher lounge class, a significant proportion of schools lack these facilities. The study showed that overall, rural primary schools fare worse in all infrastructure related indicators compared to their urban counterparts.

In terms of school inputs, the study showed that the observed student-teacher ratio is higher in urban areas (69%) compared with rural schools (46%). Moreover, although national level data on student-textbook ratio affirms that the country has reached the target

ratio of unity, the class observed information shows only 58 percent of schools are found to have confirmed the unity ratio.

With regard to teacher effort and knowledge, the study revealed that 14 percent of urban school teachers and 10 percent of rural school teachers are found to be absent from school on the day of unannounced visit. Regarding teacher knowledge, it was found that Ethiopian primary school teachers fare better in mathematics knowledge, with around 90 percent of teachers getting the pass mark. The study revealed, however, that Ethiopian primary school teachers have challenges on English language skills as only 44 percent of all teachers got the passing mark on the standard English literacy test.

Key Words

Ethiopia SDI, Teacher Absenteeism, school infrastructure

Strategic Context: Improving Quality of Services for Better Outcomes

Since 2006, through the three phases of the *Protection of Basic Services (PBS)* projects, development partners (DPs) have been supporting the Government of Ethiopia (GoE) in the financing of the decentralized delivery of basic services, with the objective of expanding access and improving quality of basic services in education, health and other sectors. Through the years, the PBS project supported financing of basic services at decentralized levels, which in turn, has helped the Government of Ethiopia (GOE) make substantial strides in reaching several of the Millennium Development Goals (MDGs) as well as its own targets set out in the *Growth and Transformation Plan (GTP)* (Khan, Faguet, Mekasha, & Gaukler, 2014). In the education sector, for instance, the primary school net enrollment rate has increased from around 68.5 percent in 2005 to 92.6 percent in 2014; Gender parity index for primary 1-8 has improved from 0.81 in 2005 to 0.91 in 2014, whereas school completion rate for grade 5 has improved from 57.4 percent in 2005 to 69.5 percent in 2014 (MoE, 2006; 2014).

These improvements in output and outcome of education service provision indicators are impressive. At the same time, they largely reflect only one dimension of the objectives of additional funding for these services, which is improved access. This initial focus on access is understandable given the challenging service delivery environment at the start of the millennium. Moving forward, there is growing emphasis on addressing other dimensions of service delivery which are critical to its effectiveness in improving development outcomes.

Improvement in access and quality of primary education has been one of the central focus areas of development for Ethiopia in the past decades. Specifically, since 2006, significant achievements have been made in expanding access to primary education services for local communities through decentralized service delivery mechanisms. The Promoting Basic Service (PBS) project and the General Education Quality Improvement Project (GEQIP) are among the key projects that support expansion and improvements in quality of education services at decentralized levels (World Bank, 2012; MoE, 2008).

The education sector is a major beneficiary of PBS. It continues to claim a large share of total government expenditures on basic services, and within the sector, recurrent costs are typically the largest share of expenditures (Qaiser, et al, 2014). In EFY 2014, more than half of the sector's budget

was allocated to recurrent expenditure covering costs for frontline service providers' (teachers') salaries, operations and maintenance at sub-national level. Currently, there are more than 400,000 school teachers in the country, out of which around 85 percent are primary school teachers (MoE, 2014).

However, expansion of education service delivery through increased number of schools and teachers is not all that matters for better outcomes. Research in other countries shows that quality of services including teacher effort and knowledge inevitably affects educational outcomes too (Urquiola, 2006; Van der Berg, 2008; Tan, Julia, & Gerard, 1999; and Suryahadi, Rogers, Suryadarma, & Sumarto, 2006). Moreover, in an environment where recurrent costs claim the lion's share of expenditure, it is obvious that significant staff inefficiencies cause heavy budgetary costs.

In Ethiopia, as is the case for many developing countries, whilst substantial attention has been given to increasing inputs such as staffing and infrastructure for provision of basic services at local levels, limited attention has been placed on assessing the behavior and performance of the frontline service providers, especially teachers, and availability and quality of other inputs such as textbooks, class, and quality of school infrastructure. Moreover, relatively little is known about how these inputs affect student learning outcomes (Glewwe, Hanushek, Humpage, & Ravina, 2011).

Hence, the government of Ethiopia and its development partners undertook this Service Delivery Indicator Survey in the education sector, which focuses on quantitative measurement of the quality of services supported through the provision of basic services programs (PBS I, II, and III). The service delivery indicator survey aims to improve understanding of the steps in the results chain linking service delivery financing to outcomes. The survey has been undertaken as part of the Monitoring and Evaluation activity of PBS. This document presents the results of the first education service delivery indicator survey conducted in May 2014.

Background

The Service Delivery Indicators (SDI) surveys provide a set of metrics to benchmark the performance of service provision units in education and health sectors (i.e schools and health facilities). The survey has been under implementation in some African countries including Kenya, Tanzania, Uganda, and Nigeria. For a complete list of countries that SDI survey is being conducted, please refer to (www.worldbank.org/SDI).

The objective of the survey is to track progress of quality of service delivery over time within and across countries. Its overall aim is to provide a comparable and robust information about the status of quality of service delivery for policy makers and to the wider public. The perspective adopted by the survey is that of citizens accessing a service from the frontline provider. Hence, the focus of analysis is the frontline service providers that includes staffs, infrastructure, and accountability systems around service provision.

The SDI survey differs from other perception based surveys that track performance of service quality in that, instead of using citizens' perceptions to assess performance, the SDI assembles objective and quantitative information from a survey of frontline service delivery units, using modules from the Public Expenditure Tracking Survey (PETS), Quantitative Service Delivery Survey (QSDS), Staff Absence Survey (SAS), as well as related standard instruments employed to routinely assess delivery systems at service sites (for a review these tools, please see Amin, Das, and Goldsteing (2008)). Ultimately, the goal of this effort is to help policymakers, citizens, service

providers, donors, and other stakeholders enhance the quality of services and improve development outcomes for citizens.

Significance of SDI Survey in Ethiopia

The SDI survey data complements the quantitative monitoring data that are being collected routinely through administrative systems on output and outcome indicators such as access to schools, school enrollment and completion rates. While such information is readily available from the education management information system, the SDI surveys complement by generating unique information to objectively measure quality of service delivery at local levels by collecting data on quality related indicators from schools, service providers (teachers), and beneficiaries. Specifically, the SDI survey employs a robust methodology in assessing the behavior and competence of frontline service providers in terms of their effort and ability that would affect service delivery outcomes. Furthermore, the standard methodology that is followed helps compare status of service delivery among African countries so that lessons learned and best practices can be documented and adopted.

The survey also helps to reflect on the relationships between quality of service delivery with student learning outcomes. In the facilities that the survey was conducted, teachers' knowledge and effort is correlated with students learning ability outcomes. Such information is difficult to obtain from the routine administrative data being collected every year from schools.

Moreover, as the key aspect of the survey is generating information on objectively verifiable quality of service indicators, it complements perceptions-based data collected through qualitative instruments.

Finally, by providing consistent and accurate information on the quality of services, it serves ordinary citizens, stakeholders, and policy makers to assess how service providers are performing and take corrective action accordingly. As such, it will shift the focus of service delivery monitoring from inputs and access based outcomes to improving the underlying systems that help improve quality outcomes through efficient use of inputs.

Objectives of the Current Education SDI Survey

The overall aim of the Ethiopia Education Service Delivery Indicator (SDI) Survey is to measure the quality of services delivered by subnational levels as experienced by citizen at local levels using robust, standardized, and objectively verifiable set of indicators. It specifically looks into constraints associated with service delivery and the behaviors of frontline providers, both of which have a direct effect on the quality of services citizens are able to access. Within this effort of objectively measuring the quality of education service delivery at facility levels using standardized methods and tools, the current Ethiopia Education SDI Survey has the following two inter-related specific objective;

1. Assess the ability and efforts of frontline service providers, and
2. Assess the quality of school infrastructure.

Scope and Limitations of the Survey

The scope of the current education SDI survey focuses on **primary schools** (grades 1-8 for infrastructure and grade four for teachers and student knowledge assessment). The primary reason of limiting the selection of students and teachers to grade four was that in the Ethiopian primary school division, the first cycle of primary education, which ends at grade four, is expected to enable students learn basic English and computational skills. The Ethiopian national learning assessment also conducts tests to grade four students. The second cycle, which runs from grade five to eight, aims at advancing this basic knowledge and preparing pupils to high school learning. The purpose of this survey was to assess school facilities from primary schools (both first and second cycle), while limiting the student and teacher assessment to first cycle of primary education. The survey collected nationally representative estimates of key characteristics of the quality of services provided by these facilities. The current survey did not collect regional level statistically representative data and hence outputs of the survey may not have relevance to analyze each region's unique situation. Furthermore, in contrast to other SDI surveys conducted in Africa, the Ethiopia Education SDI has not analyzed data collected on the amount of funding reaching to schools through the school grant or through any other mechanism. Furthermore, even if the data collected on the current survey can help in advancing arguments on specific policy alternative, the purpose of this report is limited only to reporting the state of service delivery in primary schools in Ethiopia, and as such, does not argue to advance specific policy issues.

Methodology

Analytical underpinning

Service delivery is thought of as a function of key inputs, what frontline service providers know (ability) and what service provider do (effort). On this basis, the facility survey focused on three dimensions: i) the availability of key inputs and infrastructure for effective service provision, ii)

Box 1. Service delivery production function

Consider a service delivery production function, f , which maps physical inputs, x , the effort put in by the service provider e , as well as his/her type (or knowledge), θ , to deliver quality services into individual level outcomes, y . The effort variable e could be thought of as multidimensional and thus include effort (broadly defined) of other actors in the service delivery system. We can think of type as the characteristic (knowledge) of the individuals who select into specific task. Of course, as noted above, outcomes of this production process are not just affected by the service delivery unit, but also by the actions and behaviors of households, which we denote by ε . We can therefore write

$$y = f(x, e, \theta) + \varepsilon.$$

To assess the quality of services provided, one should ideally measure $f(x, e, \theta)$. Of course, it is notoriously difficult to measure all the arguments that enter the production, and would involve a huge data collection effort. A more feasible approach is therefore to focus instead on proxies of the arguments which, to a first-order approximation, have the largest effects.

Source: Martin & Pimhidzai (2013).

service providers' (teachers') ability and effort, and iii) outcomes related to student learning ability by fielding standardized test of literacy and numeracy.

Conceptual Framework for Analyzing Accountability Mechanism in Service Provision

According to the World Development Report (2004), service delivery outcomes are reinforced by the short and long routes of accountability. These accountability mechanisms describe the relationships between policymakers, service providers, and citizens (Figure 1). Generally, the conceptual framework helps to analyze the effect of strong accountability systems in enhancing performance of service providers.

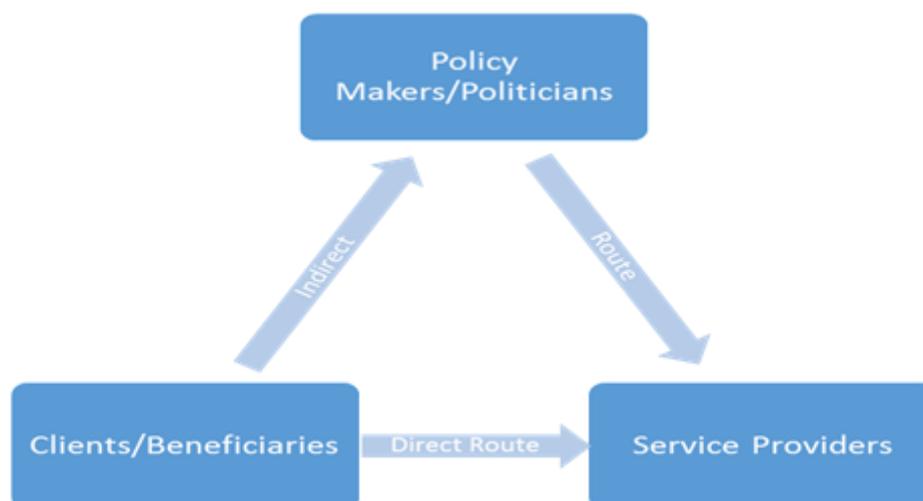


Figure 1: Accountability relationships between citizens and providers (short route) and between citizens and providers through the state mechanism (long route). Source: adapted from World Bank, 2003.

The accountability framework summarizes the two ways in which citizens may seek to hold service providers accountable for performance. The relationship that empowered citizens hold service providers directly accountable for their actions is described as the *short route* or the *direct route*. When citizens are less empowered to directly hold providers accountable, they may use their voice and politics in their role as citizens to hold the state accountable, and the state may, in turn, exercise its legitimate power to affect the behavior of providers in favor of citizens' demand. This combination of accountability through which citizens affect the behavior of the providers indirectly through the state mechanism is described as *long route* or *indirect route* of accountability.

Education outcomes are the result of the interaction between various actors in the multi-step service delivery system, and depend on the characteristics and behavior of individuals and households. While delivery of quality education is contingent foremost on what happens in the classroom environment, a combination of several basic elements have to be present in order for quality services to be produced and accessed by frontline service providers, which depend on the overall service delivery system and supply chain. Adequate financing, infrastructure, human resources, material, and equipment need to be made available, while the institutions and governance structure provide incentives for the service providers to perform well. The content of the education SDI survey is designed in accordance with the aforementioned analytical and accountability mechanisms.

Survey Content

The content of the survey is tailored to serve (1) the needs of PBS monitoring of quality of education service delivery at local levels and (2) compare the context of service delivery in Ethiopia with similar country contexts for lessons learning and benchmarking. It draws upon the wealth of

experience with carrying out these types of surveys in developing countries. That experience has formed the basis for “model” questionnaires designed to collect core indicators of the quality of service delivery in primary schools. The survey instrument benefited from such international best-practice questionnaires, tools, and methods, with adjusting contents to suit the Ethiopian education service delivery context. During the design and implementation process, many rounds of consultation and training were conducted in order that the tools reflect Ethiopian context and relevant government office staffs enhance their understanding of the tools with the aim of sustaining such a practice of measuring quality of services within the national system. Summary of the contents of the current education SDI survey is provided in Table 1.

Table 1: Summary of Contents of Ethiopia Education SDI Survey

| |
|--|
| School Inputs and Infrastructure |
| Infrastructure (classroom, electricity, water, sanitation) |
| Children per classroom |
| Student/teacher ratio |
| Textbooks per student |
| Teachers’ Effort and Knowledge |
| Absence rate (Absence from School and absence from class) |
| Share of teachers with minimum knowledge (English language, pedagogy, and mathematics) |
| Student Learning Achievement Outcome |
| Literacy and numeracy scores |

Design

Following international experience in implementing similar surveys and with particular relevance to the stated objectives, the survey was designed in five modules, consisting of self-reported (through announced visit) to obtain characteristics of the school infrastructure, students, and teachers, followed by unannounced visit to measure the absenteeism rates. These were complemented by the class room observation that captured teachers’ activity within the class room. In addition, test modules were prepared to assess teachers’ subject matter knowledge on English language, Pedagogy, and Mathematics and students learning outcomes. Summary of the modules administered are presented in Table 2.

Table 2: Modules of the Survey

| Modules | Description |
|--|--|
| Module 1: Administered to the principal, head teacher or most senior teacher in the school | Self-reported and administrative data on school characteristics, students, and teachers. |
| Module 2: Administered to randomly selected teachers to a maximum of 10 teachers from module 1 list. | An unannounced visit about a week after the initial survey to measure the absence rates |
| Module 3: Classroom Observations | Based on 2 observed lessons for grade 4 in either English or mathematics. Each observation lasts for 40 minutes. |
| Module 4: Test of teachers | Test of all (a maximum of 10) grade 3-4 teachers in Mathematics language and pedagogy to measure teachers' knowledge. |
| Module 5: Test of grade 4 children | A test in mathematics and language administered one-on-one to 20 randomly selected grade 4 students to measure learning achievement. |

Sampling

Precise calculation of the sample size required for a desired level of accuracy in estimating national averages requires some prior knowledge of how much the key characteristics of the survey units (primary schools) vary across the country. In the absence of such data, we have made some preliminary calculations based on similar Quantitative Service Delivery Survey (QSDS) conducted in developing countries. It is suggested that a minimum sample of roughly 300 primary schools should yield an acceptable level of accuracy. This calculation is based on the assumption that the sampling will be conducted in a two-stage process, clustered by woreda. A woreda is the smallest budget holding political administration in Ethiopian decentralized governance structure, which is known as "district" elsewhere. As such, the sampling constituted first randomly sampling some woredas, and then sampling facilities within those woredas. This clustering is more cost-effective than a simple random sampling technique. Initially, a total of 300 schools (first randomly selecting 100 woredas stratified by regions and selecting 3 facilities from each woreda) were thought sufficient for the study. However, taking into account large variation that exist between Ethiopian schools on infrastructure conditions, our final calculations suggested an optimal multi-stage scheme of randomly sampling 350 schools, out of which 347 school questionnaires were responded to. The sampling frame for the infrastructure analysis consisted of all schools at the national level. The final sample size was determined assuming a maximum possible variation of school infrastructure at the national level and estimating the proportion of schools with water facilities with a margin of error of 5% and with 80% power, which suggested that sample size for the infrastructure related assessment should be at least 330 schools. The final sample size was then further distributed to regions using probability proportionate to size method and blocked by urban rural settings, as shown in Table 3 .

The current education SDI survey was designed to produce results with national representativeness and with sufficient precision. The data collection covered all administrative regions of Ethiopia (nine regions and two city administrations). As described above, the first unit of analysis—schools—were selected by using a multi-stage stratified proportionate to size probability random sampling

techniques, using the national school list as a sampling frame (i.e 30,534 schools). To this end, the survey selected 140 woredas, from which 347 (222 from rural and 125 from urban) schools were selected. Out of these schools, 3361 students were included for student achievement test (module 5) and 837 teachers were selected for teacher knowledge assessment (module 4). While all teachers took pedagogical knowledge assessment, only 488 and 454 teachers took English and Mathematics tests respectively. The selection of students and teachers followed a random assignment (in cases where the number of teachers in the school is more than the required number to administer the test). A summary of sampled schools, students, and teachers are provided in table 3.

Table 3: Sample Sizes of Schools and Students by Urban and Rural

| Sample of the study | Total | Rural (% share of total) | Urban (% share of total) |
|------------------------|-------|--------------------------|--------------------------|
| Schools | 347 | 222 (64%) | 125 (36%) |
| Students | 3,361 | 2,349 (69%) | 1,002 (31%) |
| Teachers (Pedagogy) | 837 | 577 (69%) | 260 (31%) |
| Teachers (Mathematics) | 488 | 342 (70%) | 146 (30%) |
| Teachers (English) | 454 | 309 (68%) | 145 (32%) |

In line with the national proportions of urban and rural schools, about 36 percent of the sampled schools were from urban areas while the remaining 64 percent are from rural areas. A total of 3,361 students were included of which 69 percent were from rural areas and 31 percent were from urban areas. Furthermore, in designing a survey of national coverage of this kind, it is important to identify “out-of-scope” woredas—those woredas that pose a security risk during data collection or are too difficult to reach.

The proportion of schools in each region, including proportion of private and public schools in the region, was also considered in the final determination of schools at each woreda. First schools were stratified as rural and urban based on their location and private and public based on their ownership. The sample size from each region was, therefore, apportioned to each of these strata in such a way that a pre-specified level of precision can be obtained for each stratum estimate. The proportions and sample size for each of the regions are summarized in Table 4.

Table 4: Sample Distribution across Regions and City Administrations

| Regions | Total Number of Schools | PPS Distribution | Urban | | Rural |
|--------------------|-------------------------|------------------|--------|---------|-------|
| | | | Public | Private | |
| Tigray | 2,017 | 23 | 7 | 1 | 15 |
| Afar | 539 | 6 | 1 | 1 | 4 |
| Amhara | 7,493 | 86 | 30 | 1 | 55 |
| Oromia | 12,060 | 140 | 44 | 5 | 91 |
| Somali | 1,091 | 13 | 4 | 1 | 8 |
| Benishangul- Gumuz | 497 | 6 | 2 | - | 4 |
| SNNP | 5,685 | 66 | 21 | 2 | 43 |
| Gambella | 237 | 3 | 1 | 0 | 2 |
| Harari | 70 | 1 | 0 | 0 | 1 |
| Addis Ababa | 745 | 9 | 3 | 1 | 5 |
| Dire Dewa | 100 | 1 | 0 | 0 | 1 |
| Total | 30,534 | 347 | 113 | 12 | 222 |

Survey Implementation

Having designed the survey methodology and determined the sample size with a team of staffs from Ministry of Education (MoE), the actual data collection was conducted with a private research firm based in Addis Ababa, Ethiopia. While the recruitment of the firm was handled by Ministry of Finance and Economic Development (MoFED), all the technical evaluation and guidance was supported by the MoE.

The actual data collection from the selected schools were conducted in two rounds of visits. The first visit, which was announced, collected data on school characteristics, students, and teachers by interviewing the principal or school director. It also collected data on teacher knowledge through direct testing of teachers using the standardized module. Moreover, to measure an estimate of the national level teacher absence rate (an indication of teacher effort), physical observations were made to know whether or not teachers are present in the school and classrooms (this was conducted during the second visit). Further, the first visit was used to collect data on student learning achievements through direct testing of sampled students. The second visit was conducted unannounced and formed the basis for information related to teacher absence. Following standard methodologies on assessing staff absence rates, as explained in Rogers and Kozoil (2012), data for teachers absence rates were collected by conducting unannounced visits to the randomly selected schools and thereafter physically verifying whether the teacher is in the school or not.

Selection of Survey Respondents

School principals, vice principals, or head teachers were approached to collect information on school infrastructure and teachers statistics during the first visit. Moreover, for teacher knowledge assessments, all grade 4 Mathematics and English teachers in the selected schools were selected when the total number of teachers is found to be less than 10. Otherwise, 30 percent of all grade 4 mathematics and English teachers (selected randomly from the list of grade 4 mathematics and English teachers) were administered all the tests. On the other hand, to administer student's test, a minimum of 20 grade four students were selected randomly from the class. In schools where there are more than one grade 4 section, a simple random selection of sections were conducted to determine the class that the students will be selected. Observation of English language and Mathematics lesson were made in these selected sections. As explained in scope of the study section, in line with the purpose of the survey, data was collected on school facilities from primary schools (both first and second cycle), while limiting the pupil and teacher tests to grade four teachers and pupils only.

Data Sources and Collection techniques

To collect the required data in accordance with the modules, both quantitative and qualitative data collection techniques were employed. Primary quantitative data pertaining to school infrastructure and student and teachers characteristics were collected from the sampled schools using structured and semi-structured questionnaires.

Secondary data was also collected from relevant documents at federal, regional and school levels. The secondary data mainly relates to information such as the number of woredas, number of schools in woredas, number of students in a class, and the total number of teachers in the school disaggregated by the subject they teach.

The survey instruments employed to collect the data included key informant interview, test, class room observation, and document review.

Desk Review: The desk review consisted of compiling and reviewing various source documents at school and regional office levels. These included student rosters, teachers list, and yearly school statistical books.

Observation: Direct observation of school infrastructure and teaching techniques helped to assess teaching activities, classroom conditions, school facilities, and types and qualities of school infrastructure. Specific areas that were observed included teachers' time on task, teachers' activity, classroom environment, school hygiene, and school facilities. The data collection was aided by a predetermined check list that was prepared and tested before employing into the actual survey.

Key informant: In depth discussions were also held with school heads (headmasters), and senior staffs such as head teachers, deputy head teachers, senior teachers, teachers, and students. The discussions were assisted by an interview conducted using a semi-structured questionnaire. The interviews were around the general profile of the school, pupils statistics, list of teachers and their profile (gender, term of employment, and position held), school governance, availability and location of school facilities and school governance. The information collected through key informant interview helped to inform the selection of sections and teachers for the tests.

Testing: Tests were administered among selected teachers and students. The teachers' test consisted of three parts: English, Mathematics, and Pedagogy. The tests were administered among teachers of grade 4 students with the intention of examining whether teachers themselves have the basic

reading, writing and arithmetic skills. The objective of the tests were to assess the minimum knowledge required from a teacher in a primary school.

In addition to assessing the minimum knowledge, the extent to which teachers demonstrate mastery of skills and knowledge were examined. Initially, the content of the tests were developed using previous SDI tests conducted in Kenya and Senegal. However, in consultation with the MoE, the final tests have been reviewed and edited for consistency and matching with the Ethiopian context before administering to the teachers. The tests were administered in groups, but teachers worked on the exams individually.

Similarly, the student test consisted of three parts: English, Mathematics and verbal reasoning. Pupils in grade 4 were tested and the test comprised materials from grades 1, 2 and 3.

The content of the test was designed to assess basic reading, writing and arithmetic as these are the enabling skills without which students cannot advance further. The test was administered as a one-to-one test with enumerators reading out instructions to students in their mother tongue.

Survey Administration

The survey teams were made up of five members. The enumerators were selected on the basis of their educational background (all have at least first degree in science or social science fields) and previous experience on a similar survey. Beyond their qualifications, enumerators were recruited considering their communication skills in English as well as ability to communicate with the local languages they were assigned to.

Training of Enumerators: Enumerators were provided with intensive training on the content and implementation of the survey, with practical field sessions handled together with the questionnaire testing and piloting phase. All members of the survey team received a 15-day training workshop at the central level (i.e Addis Ababa) on how to manage the data collection process, field editing techniques and how to fill in all of the instruments appropriately. An overview of the school SDI survey was provided and the survey instruments were reviewed thoroughly. The content of the training materials included general description and objective of the survey, methodology, the role of regional survey coordinators, supervisors and enumerators, the sample selection process, and rules to be followed in carrying out the interviews, testing, and observation.

Field Supervision and quality control: Enumerators were supervised by field supervisors, who are senior teachers and with better qualification (mostly with graduate level educational background). Supervisors accompanied enumerators during data collection and ensured quality and adherence to the survey protocols. All field staff reported their activities to their superiors using a standard progress report form. Completed questionnaire/forms were delivered from enumerators to supervisors on a daily basis. Supervisors, in turn, delivered refined and final, completed questionnaires to the central office of the survey consultant, after which the consulting firm submitted all filled forms to the MoE in hard and soft copy.

Results and Discussions

This section presents the findings of the Education SDI survey implemented in May 2014 as per the protocol described above. The report provides results at the national level disaggregated by urban and rural locations.

School Infrastructure

This indicator assesses availability and functioning of school infrastructure such as electricity, toilets for both girls and boys, science laboratories, pedagogical centers, and teacher lounge. Such types of infrastructure were selected during the consultation processes with the federal Ministry of Education (MoE) and the regional Bureau of Education. Results of the assessment are presented in Table 5.

Table 5: School Infrastructure

| | All | Urban | Rural |
|---|-------|-------|-------|
| Electricity | 24.3% | 50% | 11% |
| Water facility | 53% | 63% | 35% |
| Availability of Toilets for pupils | 93% | 96% | 91% |
| Segregation of toilets for Boys and Girls | 89% | 94% | 87% |
| Clean toilets | 70% | 87% | 60% |
| Pedagogical Center | 61% | 75% | 53% |
| Science laboratory | 40% | 55% | 32% |
| Staff lounge | 36% | 49% | 28% |

Electricity: The results show that most schools lack access to electricity. At national level, less than a quarter of all primary schools have access to electricity. The problem gets worse when one looks into rural schools, where only 11 percent of the schools have electricity connectivity.

Water Services: access to water service is also found to be a challenge for most schools, as the result show, on average, only 53 percent of all schools have a functioning water sources. The results vary substantially by location. While 63 percent of urban schools have access to water facilities, whereas only 35 percent of rural primary schools have some form of water sources. As availability of water facility adversely impacts students' ability to attend schooling, supply side investments as well as demand side awareness raising activities are both extremely important.

Toilets: It is found that the overwhelming majority of schools have some form of toilets for pupils (96% for urban and 91% for rural), out of which the majority have separate toilet facilities for girls and boys, though the result varies substantially by urban and rural location. However, the challenge seems to be maintaining good quality of these toilets as only 70 percent of these toilets are found to be clean or of good quality. These results again vary substantially by urban and rural, where only 60 percent of rural schools have good quality/clean toilets while 87 percent of urban schools do.

Pedagogical Centers: Pedagogical centers are centers where teachers prepare and store teaching aids. The teaching aids, particularly in primary schools, are used for demonstration purposes. Teachers borrow teaching-aids for conducting instructions as per the lessons and return to the center afterwards. As noted in Table 5 , almost half of rural primary and a quarter of urban schools

have no pedagogical centers, adversely impacting students learning ability and understanding of concepts in these schools.

Science Laboratories: School laboratories are essential facilities in the teaching-learning process of science subjects. However, only 32 percent of the rural primary schools and 55 percent of urban schools are found to have science laboratories. While in both cases the proportion of schools with science laboratories are less, the case that only a third of rural primary schools have science laboratories poses serious challenge in ensuring quality of learning science subjects in the majority of rural schools.

Staff lounge: Access to staff lounge in schools is important in making the school environment attractive to teachers. However, in this study it is found that most schools have no staff lounge at all. It is particularly worrying that only 28 percent of the rural schools have some form of staff lounge.

Teachers, Classrooms, and Text books: as part of the assessment of school inputs, student-teacher ratio, student-class room ratio, and textbook-student ratio have been assessed. The results are as shown in table 6 below.

Table 6: Student-Teacher Ratio, Student-Textbook Ratio, and Student-Section Ratio by location

| | <i>Total</i> | <i>Urban</i> | <i>Rural</i> |
|----------------------------------|--------------|--------------|--------------|
| Student-teacher ratio | 54.5* | 69 | 46 |
| Student-section ratio (observed) | 36.6 | 36.6 | 36.7 |
| Student-section ratio (Roaster) | 42.6 | 45.2 | 41.3 |
| Student-textbook ratio | 1.3:1 | NA | NA |

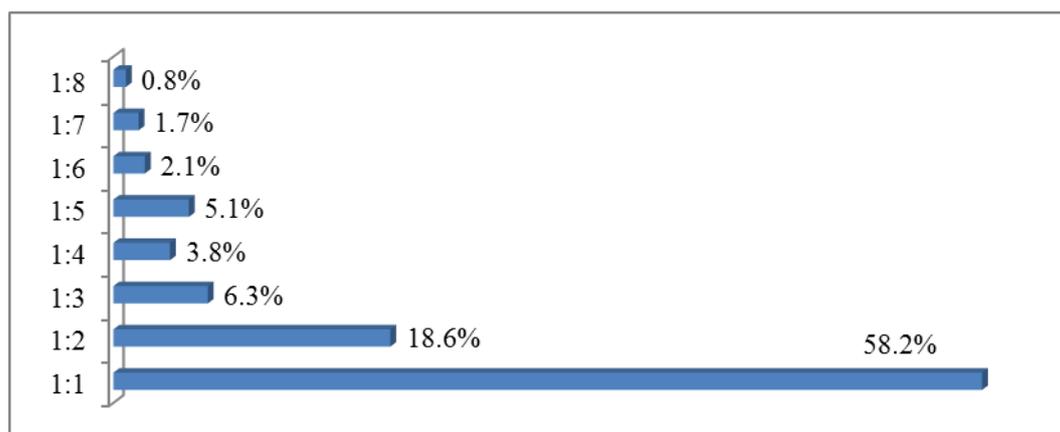
*: Total reflect weighted average. Significant difference observed between urban and rural student-teacher ratio at $p < 0.001$

Student-teacher ratio: The national weighted average for the student-teacher ratio is 54.5:1, and it is found that there exists substantial difference between urban schools (69:1) and rural schools (46:1). The observed national figure is also found to be higher than what is reported under EMIS, which is 49:1 (EMIS 2014).

Student-Section ratio: Data obtained from student roster (list of student in each section) shows that the national student-section ratio is around 42.6:1 with no significant difference between urban and rural. The observed data also shows similar results that the country has achieved the national target of 40 student per teacher earlier than planned. However, while the results at national level seems impressive, significant regional variation exist on the indicator (EMIS 2014).

Student-Textbook ratio: the national average for the student textbook ratio is found to be 1.3:1, a bit lower than the target value of 1:1. Results of the survey also suggest substantial variation between schools. In 58.2 percent of the schools assessed, it is found that the ratio is 1:1, while in 18.6 percent of the schools two students found to be sharing a book. The distribution of student text book ratio is illustrated in the Figure 2.

Figure 2: Distribution of Student-Text Ratio



The results may not show the unavailability of textbooks at woreda or regional levels as data were collected within the class and students may not come with all their books.

Teachers Effort and Knowledge

In this section, the results of teacher effort and knowledge are presented. For this survey, teacher effort was measured by teacher absence from school and teacher absence from class. Teachers' knowledge, on the other hand, was measured by the results obtained on scores of tests administered to assess teachers' minimum knowledge on Mathematics, English, and Pedagogy. The results of both indicators are presented below.

Teacher Effort

Absence from school: Absence from school is defined in this study as the share of teachers who are absent from the school premises during a given day (i.e the day of the unannounced visit to the school). To measure absence rate, in each school, ten teachers were randomly selected from the list of all teachers obtained during the first visit. In cases where the number of teachers on the list is less than ten, all teachers were selected for absence verification. The whereabouts of those selected teachers was then verified in a second unannounced visit. Teacher absence rate is then calculated as the share (of a maximum of 10 teachers) who could not be found on the school premises during the unannounced visit verification. Results of the teacher absence rate is shown in Table 7 below.

Table 7: Teacher Absence from School and Class

| | <i>Total</i> | <i>Urban</i> | <i>Rural</i> |
|---------------------|--------------|--------------|--------------|
| Absence from School | 12% | 14.1% | 10.1% |
| Absence from Class | 27.7% | 18% | 34% |

As shown in Table 7, absence from school is relatively low at national level, compared to other African countries. However, absence rate is not uniform across urban and rural schools. While teacher absence rate in urban areas is 14 percent, the result for rural areas is found to be significantly lower, with almost one-in-ten teachers found absent from the school in the day that enumerators conducted unannounced visit to the school.

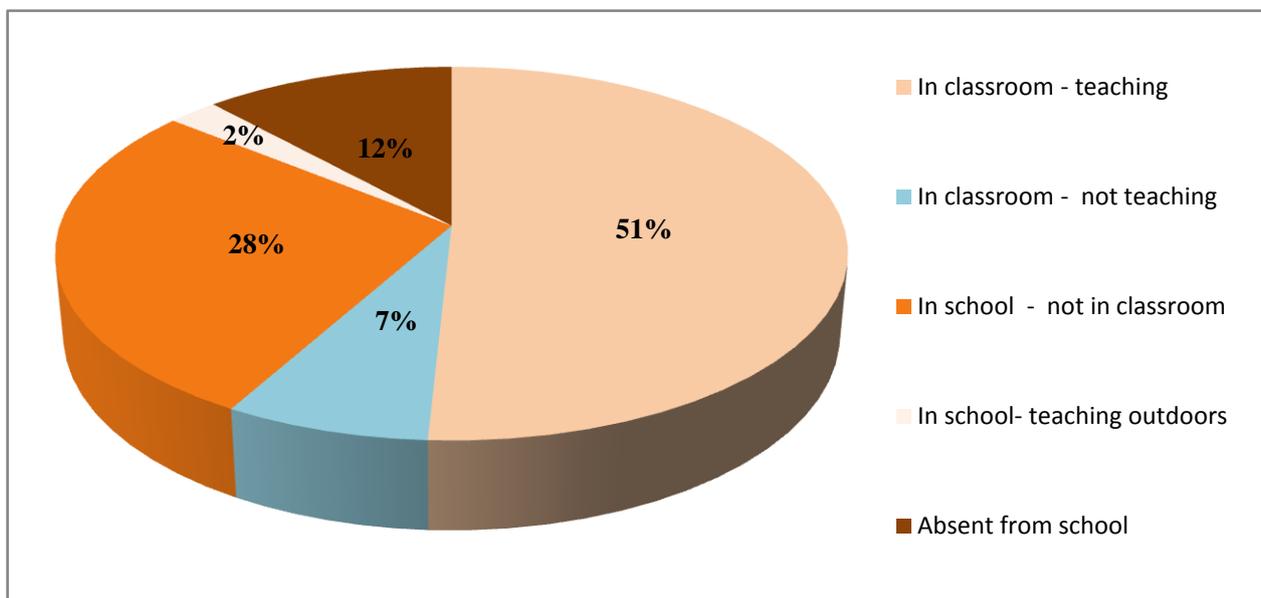
Absence from Class: this indicator assesses whether a teacher who is in school is actually in the classroom teaching students. It is the case that, even when teachers are in school, they may not

necessarily be found in the classroom. To take account of this, the study assessed whether a teacher is on the school premises, but not found inside a classroom. The results show that about 27.7 percent of teachers, which is more than 1 in 4 teachers, were found outside the classroom during the day of the unannounced visit. The results differ substantially by urban and rural locations, where 18 percent of urban teachers and 34 percent of rural teachers were found absent from class (Table 7).

Teachers in classroom but not teaching: this indicator further assess what the teacher is actually doing even when she/he is present in the class. Almost 7 percent of the teachers who were present in class were found not engaged in the normal teaching-learning process, as verified from their lesson plans.

Teaching outdoors: On few occasions (or in few cases), teachers were found not in classrooms but teaching outdoors. The results show that around 2 percent of teachers were found teaching outdoors.

Figure 3. Teacher Absence from Schools and Classrooms



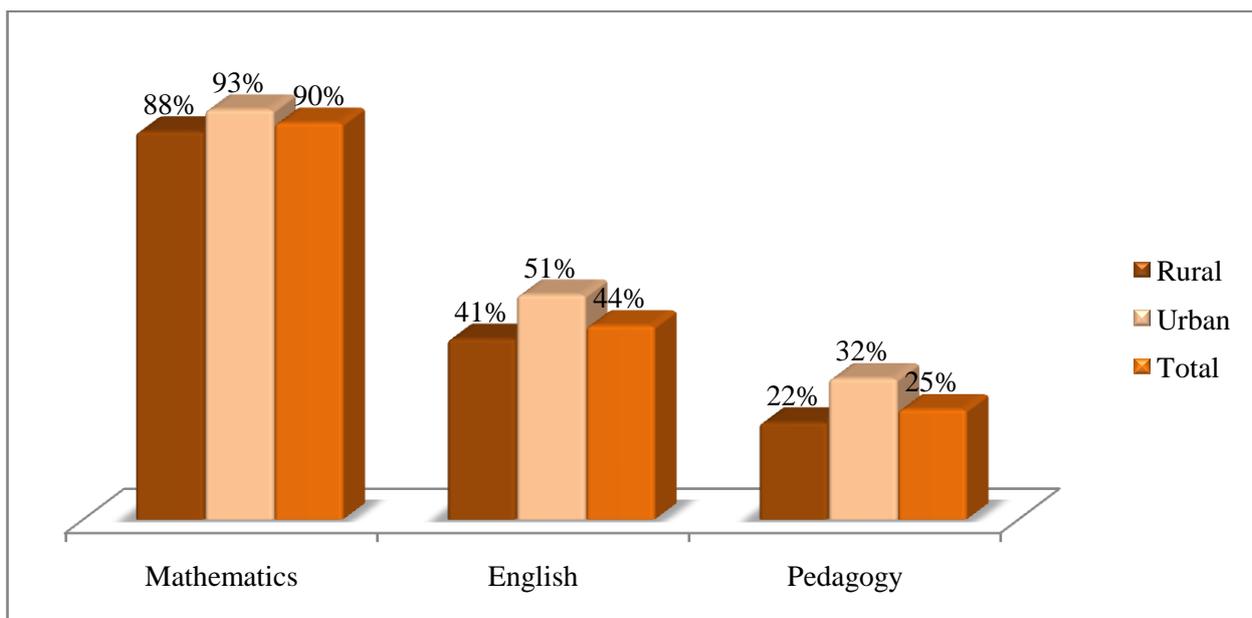
Overall, more than half of the teachers were found to have been in classroom teaching students. Such a results is encouraging compared to other countries with similar backgrounds (see section on country comparison). Although the national weighted average of teacher absence rate are found to be lower, it is important to note that the figure may vary by location and region.

Teacher Knowledge

Having more teachers spending their time on teaching students, however, may not be enough if teachers' competence is inadequate. To assess this issue, tests of literacy, numeracy and pedagogical knowledge were administered to grade four teachers. Although the tests were, by and large, similar to tests conducted in other African countries context such as Kenya and Uganda, some modifications were made in order that it reflects the Ethiopian context. While the numeracy test was administered to 488 Mathematics teachers, the literacy test was administered to 454 English teachers. The pedagogical knowledge test was administered to both types of teachers, (i.e 837 English or Mathematics teachers).

Minimum Knowledge: While it is a matter of debate regarding what constitutes “‘minimum’ knowledge” for a grade four teacher, in this study it was suggested that a score of 50 percent and above indicate Teachers with Minimum Knowledge. In the basic knowledge test, 21 questions were prepared from grade four curriculum on the language test, 20 questions were asked from grade four mathematics curriculum and 19 items were prepared to measure the pedagogical knowledge and skill of teachers based on what they were trained in during pre-service education. The share of teachers with minimum content knowledge is calculated on the basis of tests administered to grade 4 mathematics and English teachers of the 2013 and 2014 cohort. The results of test scores is presented in Figure 4 below.

Figure 4: Teachers with Minimum Knowledge (with Test Scores 50% and above)



As shown in the table, the majority of teachers (90%) that took the mathematics test scored 50% or better. However, the test scores are lower in English and Pedagogical tests. On average, 44 percent of teachers scored the passing mark (i.e 50%) in English tests while only 25 percent of all teachers scored the passing mark on Pedagogy.

Location and minimum knowledge scores: Urban school teachers have slightly but consistently outperformed rural teachers in all test scores, as depicted in Table 8.

Table 8: Mean Scores of Teachers' English, Mathematics, and Pedagogical Tests

| Tests | Location | N | Mean | Std. Deviation | Std. Error Mean |
|-------------------------|----------|-----|-------|----------------|-----------------|
| English (out of 21) | Rural | 329 | 9.9 | 4.08 | .225 |
| | Urban | 159 | 10.9 | 3.90 | .309 |
| Mathematics (Out of 20) | Rural | 274 | 13.41 | 3.98 | .241 |
| | Urban | 146 | 14.4 | 3.82 | .316 |
| Pedagogy (Out of 19) | Rural | 550 | 5.0 | 5.33 | .227 |
| | Urban | 287 | 6.2 | 5.68 | .336 |

As Table 8 shows, the mean scores of teachers in English, Mathematics and Pedagogical knowledge tests are slightly different by urban and rural location. The total numbers of items in each test are comparable. However, the mean scores of mathematics test is by far better than the mean scores of English and pedagogical knowledge tests. Particularly, teachers' pedagogical knowledge mean scores were found to be the lowest. One can note that without a solid pedagogical knowledge, teachers will be challenged to effectively impart their knowledge to students.

Teachers with mastery of knowledge: Mastery of knowledge on Mathematics, English, and Pedagogy was examined on the basis of the share of teachers who correctly answered at least 80 percent of the questions for each tests. The results are shown in Table 9.

Table 9: Teachers with Mastery of Knowledge (Scored 80% and above)

| Tests | Location | % teachers who scored above 80% | Mean | Std. Deviation | Std. Error Mean |
|-------------------------|----------|---------------------------------------|------|----------------|-----------------|
| | | | | | |
| English (out of 21) | Rural | 6% | 18.1 | .911 | .209 |
| | Urban | 8% | 17.7 | .630 | .175 |
| Mathematics (Out of 20) | Rural | 35% | 17.1 | 1.045 | .107 |
| | Urban | 48% | 17.4 | 1.110 | .133 |
| Pedagogy (Out of 19) | Rural | 5% | 16.8 | 1.079 | .204 |
| | Urban | 8% | 16.3 | .619 | .129 |

The results show that only 6 percent and 8 percent of teachers from rural and urban schools, respectively, scored a minimum score of 80 percent on English language test. Similarly, very low scores have been registered on pedagogical test scores for urban and rural school teachers alike. The situation is better in mathematics as 35 percent of rural school teachers and 48 percent of urban school teachers scored 80 percent or above.

Correlations between Teacher Indicators and Student Achievements

In the current Education SDI study, efforts were made to examine relationships between some of the teacher related indicators with student learning outcomes. Student learning outcome data was gathered from each school through English and Mathematics tests administered to assess students' literacy and numeracy learning levels. The average test scores were then computed for each school and matched with the school's teacher effort and knowledge level indicators (i.e average of the teachers score in absenteeism and minimum knowledge). In this way, it was checked whether the schools' score for student achievement level and teachers effort and knowledge indicators are in some ways related to each other. Caution has to be made here, however, that these are just correlations that may not show causality. Nevertheless, the focus on Service Delivery Indicators survey makes more sense if the indicators somehow shed light on how to improve student learning outcomes. Hence, it is found interesting and compelling to examine how the teacher related indicators correlate with student educational achievements. Results of these correlations are presented in Figures 5, 6, 7, and 8.

Figure 5: Correlation between Teacher Absenteeism and Student English Score

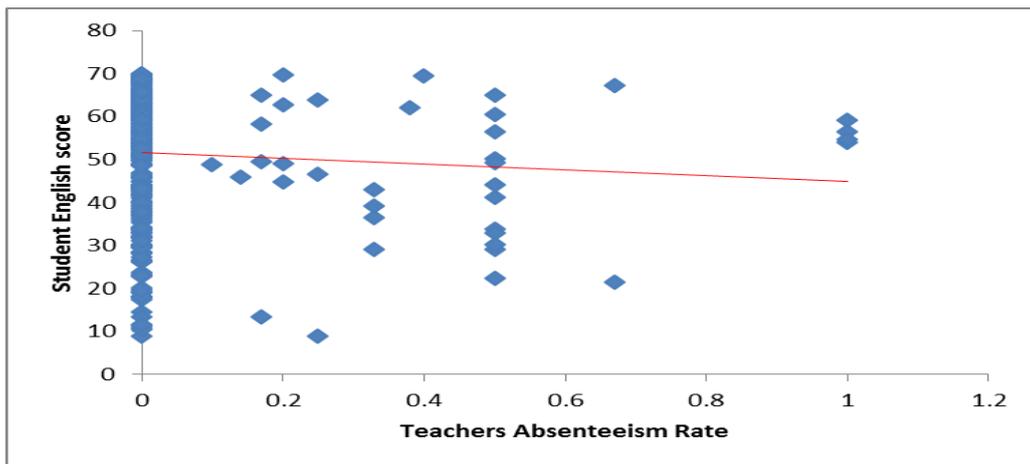


Figure 6: Correlation between Teacher English Score and Student English Score

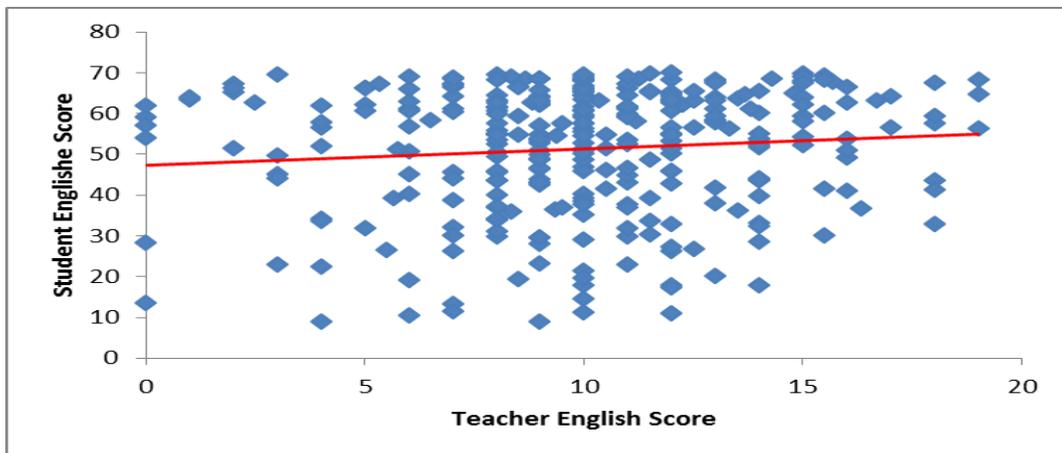


Figure 7: Correlation between Teacher Absenteeism and Student Mathematics Score

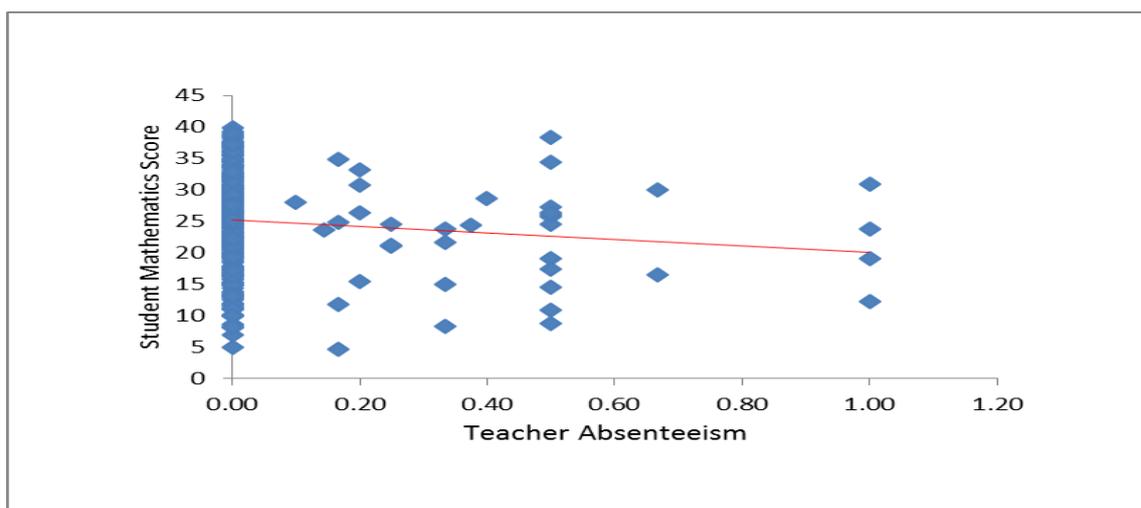
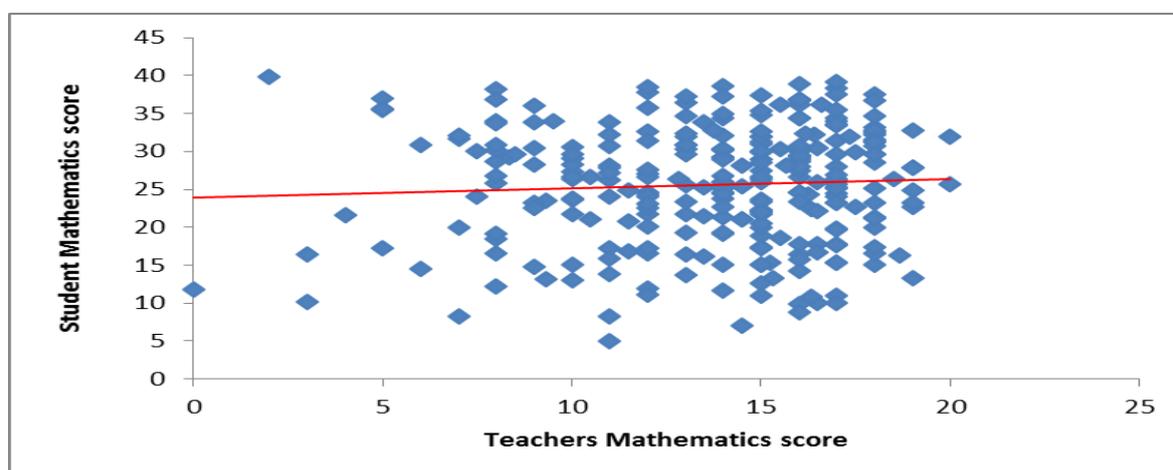


Figure 8: Correlation between Teacher Mathematics Score and Student Mathematics Score



The figures depict existence of correlations between student achievement indicators and teachers' effort and knowledge indicators, with all the correlations having the expected sign. Higher absence rates are negatively correlated with student test scores, whereas higher teacher subject knowledge on English and Mathematics are positively correlated with student achievements on those subjects, though the correlations themselves are not so strong (Table 10).

Table 10: Correlation Coefficients of selected teacher related indicators with student achievements

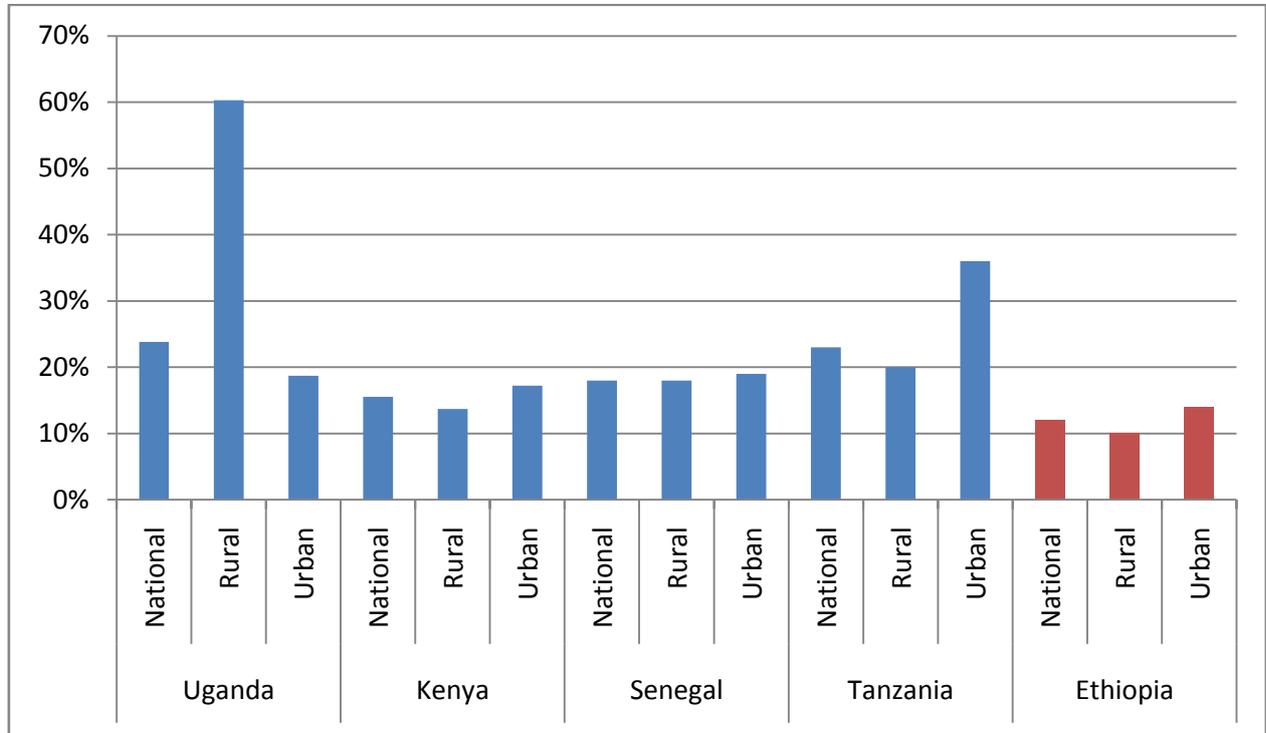
| | Teacher Absenteeism | Teacher Mathematics Score | Teacher English Score |
|---------------------------|---------------------|---------------------------|-----------------------|
| Student English Score | -0.0729 | --- | 0.1005 |
| Student Mathematics Score | -0.0829 | 0.0580 | --- |

Country Comparison

This Ethiopia Education Service Delivery Indicator Survey used the same instrument and methodology as that of Kenya, Uganda, Tanzania and Senegal, and hence the results are fully comparable with these countries. In all cases, Teacher Absenteeism was conducted with exactly the

same methodology of visiting schools twice (first informed visit and second unannounced visit). Furthermore, for Kenya, Uganda, and Ethiopia Teachers and students were assessed with the exact same questions on the assessments. Figure 9 below provides results of teacher absence rates by country.

Figure 9: Teacher Absence Rate from School by Country

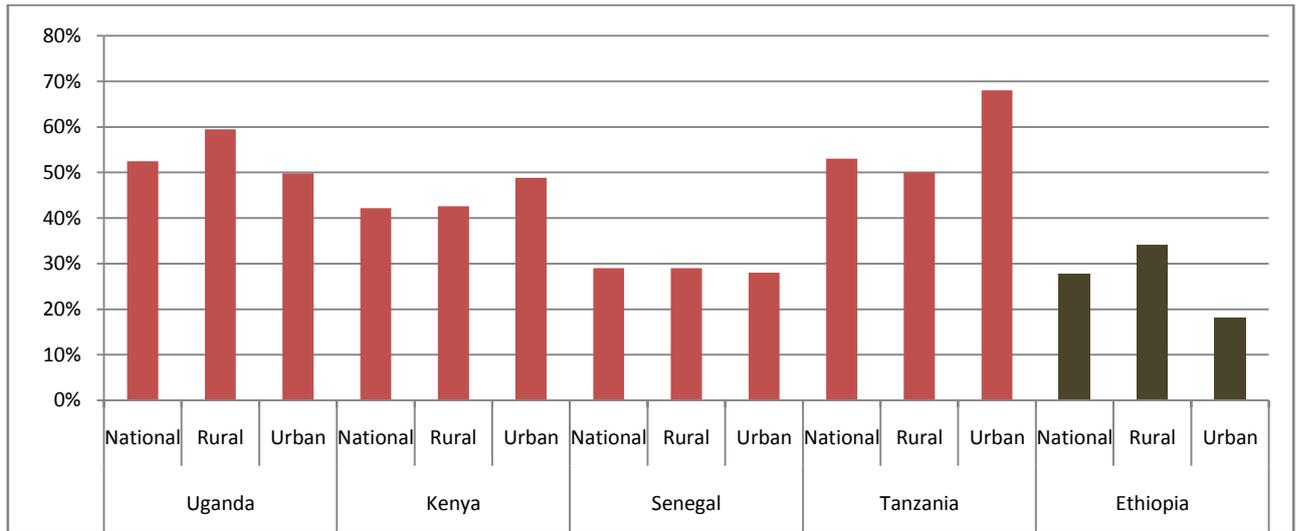


Source: World Bank SDI survey reports (www.worldbank.org/SDI). Authors' own results for Ethiopia

As can be inferred from Figure 9, on teacher absenteeism rates from school, Ethiopia outperformed those African countries where SDI surveys were conducted in prior years, with national rates of 11 percent. This is almost half of what was registered for Tanzania and Uganda.

Similar results have been found on the indicator related to teacher absenteeism from classroom (Figure 10)

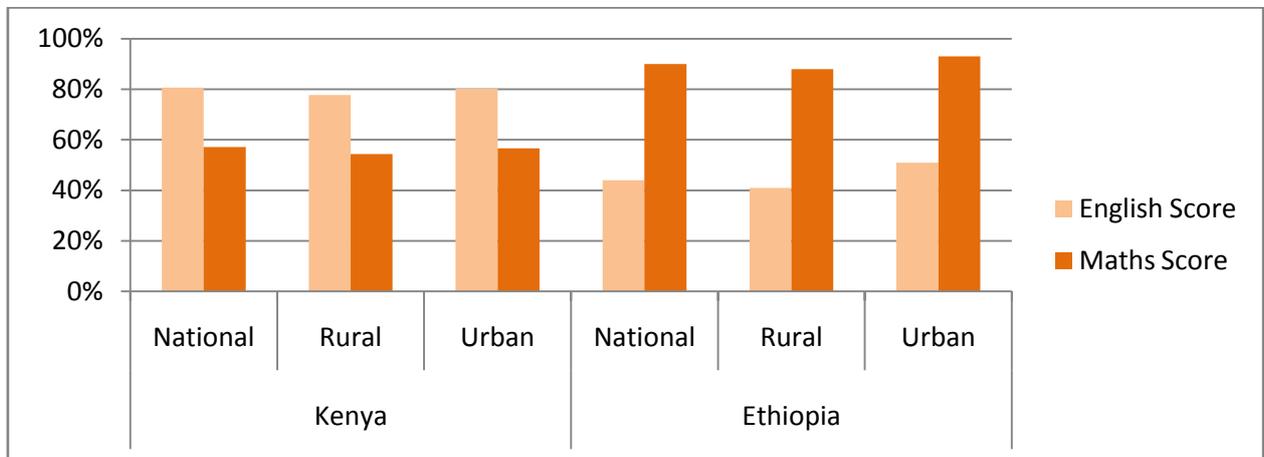
Figure 10: Teacher Absence from Classroom by Country



Source: World Bank SDI survey reports (www.worldbank.org/SDI). Authors' own results for Ethiopia

Ethiopia's performance on absence rates looks much better compared to other African countries. Similarly, Ethiopian teachers' knowledge in mathematics subject seems better than their counterparts in Kenya. However, Ethiopian teachers fare worse in literacy skills as measured by the English test scores. Figure 11 below compares teachers' knowledge assessment for Ethiopia and Kenya.

Figure 11: Comparison of Kenyan and Ethiopian Teacher's Test Score in English



Source: World Bank SDI survey reports (www.worldbank.org/SDI). Authors' own results for Ethiopia

Overall, the country comparison reveals that, Ethiopian Education SDI survey shows much better outcomes on key indicators that measure teacher effort and knowledge. Absence rates, both from school and classroom, are found to be lower compared to several African country situations. Moreover, Ethiopian teachers' mathematics knowledge, as depicted by higher scores on comparable tests, seems to be substantially better off compared to their Kenyan counterparts. However, comparison with the same country on English language score reveals that Ethiopian teachers are by far worse off on English language test scores, an indication that government needs to step-up improvements in literacy skills of elementary school teachers.

Conclusion and Implications for the Ethiopian Education System

As evidenced in the current Ethiopia Education SDI survey, results on availability of school infrastructure is mixed. While the majority of the schools have some form of toilets, out of which are segregations for girls and boys, more than half of urban schools and around ninety percent of rural schools are found to have no electricity connection. Moreover, more than two-third of rural schools and a third of urban primary schools are found to be without water facility. Demand side activities such as awareness creations on the benefits related to enhancing school drinking water provision coupled with supply side funding assistance to school water services may help schools ensure drinking water access to students.

Similarly, most rural schools have no science and pedagogical centers, potentially limiting their ability to transfer knowledge and concepts for pupils. The picture for urban schools is no different from the rural on availability of science laboratory. Most schools in Ethiopia also lack staff lounge, limiting teachers' interest to stay in the school vicinity during and beyond their normal duties. School infrastructure investments beyond just availing classes is important. Regional education bureaus may consider enhancing investments on school infrastructure that boost quality of student learning such as science and pedagogical centers and improving school environment for teacher attractions.

With regard to text books, the survey results reveals that the national ratio is different from unity. Only 58 percent of the schools visited have one book for one student. Data from the Education Management Information System (MoE, 2014), however, suggest that the ratio of student-textbook is around unity. Discussions with regional bureaus reveal that while there are enough books printed and available at regional capitals, distribution of these books to woreda and school levels are cited as a critical challenge. Hence, solving distribution problems at regional and woreda levels should be a priority action on the part of regional bureaus and woreda offices. Moreover, it is the case that in schools where the ratio is unity, students may not bring their text books into the classroom regularly due to its voluminous and weight, particularly so as they travel long distance with all subject books to and from their schools. Actions and encouragements by the subject teacher with this regard may solve the problem effectively.

However, availing text books in the class, while necessary, is not a sufficient condition to improve student learning outcomes. Some studies show weak correlation between using textbooks alone and student outcome (Glewwe, Kremer, & Moulin, 2009; and Tan, 1997). Ensuring that textbooks are prepared in ways that assist all students, not just the best student, has been noted as extremely important in enhancing utilization of textbooks for improving student learning outcomes (Glewwe, et al, 2009; Glewwe and Kremer, 2006). Another important consideration is the use of workbooks in the teaching learning process. In a study conducted by Tan (1997) on Philippines primary schools, for instance, it was shown that workbooks, in addition to textbooks, are found to significantly improve student learning abilities.

With regard to teacher effort and knowledge, Ethiopia seems to be better off compared to other African countries. Teacher absence rate (both from school and from classroom) is fair at the national level. However, the results varied by location as urban schools have more teacher absence rates compared to rural schools. This may further suggest that absenteeism may have different characteristics in each of the regions, requiring further study with regional representative data.

Although teacher absence rates for the country is low, Ethiopia needs to step-up measures that would further control teacher absence even beyond the current levels. The education sector

continues to claim a large share of total government expenditures, and within the sector, recurrent costs are typically the largest share of expenditure. An absenteeism rate of around 12 percent brings about heavy burden on the entire education system in Ethiopia given the huge amount of resources going to staff salaries.

As discussed in Banerjee and Duflo (2006), there are a number of proven strategies that reduce provider absence rate significantly. For the Ethiopian context, strengthening existing accountability mechanism in ways that empower beneficiaries in the processes of delivery of services is extremely important. Harnessing existing Parents-Teachers Association (PTA) in all schools is one key strategy that will increase teacher effort and motivation. Particularly in areas where there exist a desire and incentive for social approval, endorsement and praises from such social committee is instrumental in reducing absence rates, as discussed in Besley and Ghatak (2007) and Chaudhury, et al, (2006). Moreover, information campaign to enhance the demand side of education service delivery, designing appropriate incentive and disincentives structures for teacher performance exclusively linked with absence and student outcomes are some of the generic strategies that would work if implemented within the decentralized systems context.

With regard to teachers' knowledge, once again Ethiopian primary teachers fare better on mathematics knowledge. However, unless this is supported by communication and pedagogical skills, it may be difficult for teachers to impart what they know to their students. As evidenced from the current SDI survey, Ethiopian primary school teachers were found to be weak in areas of English language and pedagogical skills, requiring scaling up of existing programs that aim to enhance teachers' skills on language and pedagogy.

Most importantly, the second round of the SDI survey (or any future similar study for that matter) needs to explore the situation at sub-national levels, and generate data that support further causality analysis so that feasible policy action may be recommended with relevance to each of the decentralized or subnational administrations.

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