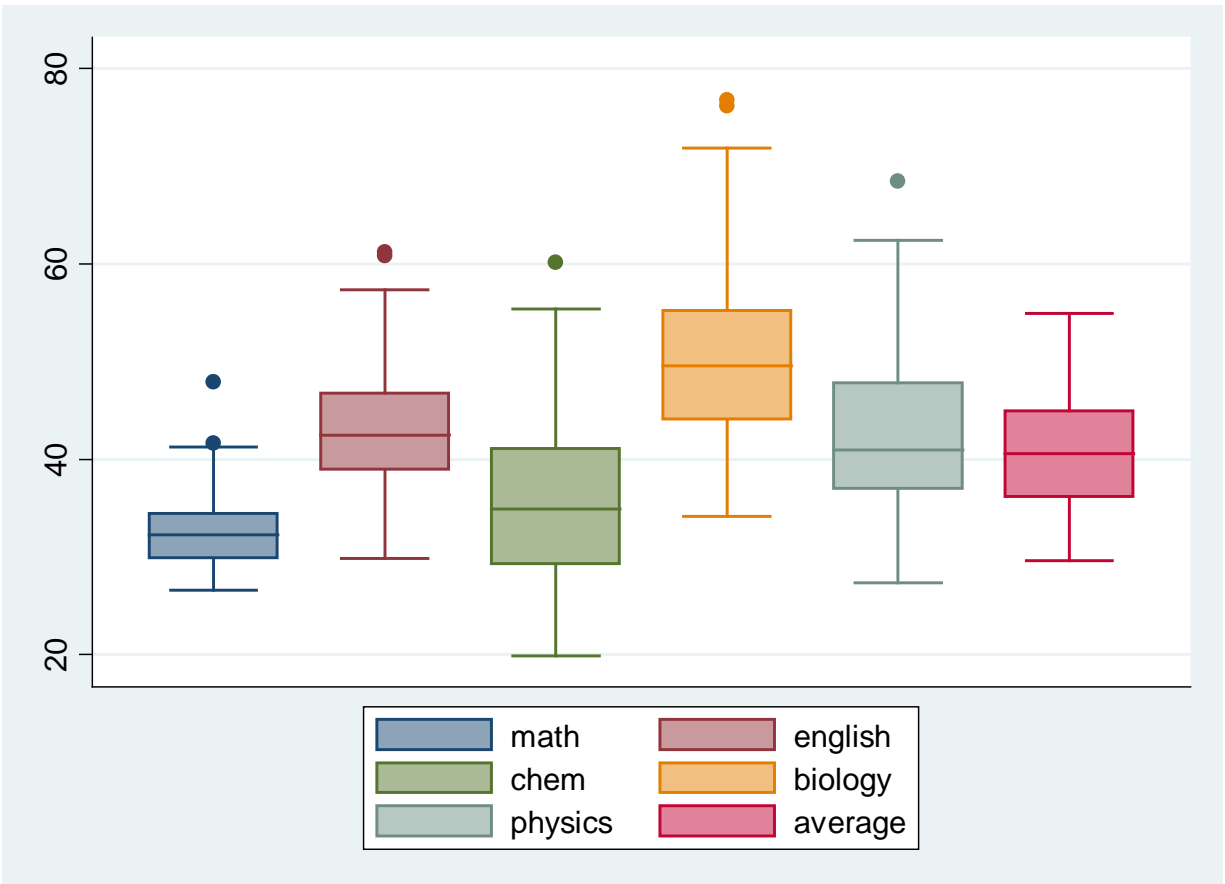


## Learning Assessment of Grades 4 and 7 Students in Bolosso Sore and Damot Gale in Wolaita Zone



Addis Ababa

January 2011

# Table of Contents

<b>Table of Contents .....</b>	<b>i</b>
<b>List of Tables .....</b>	<b>ii</b>
<b>List of Figures.....</b>	<b>iii</b>
<b>1 Introduction .....</b>	<b>1</b>
1.1 Background.....	1
1.2 Objectives .....	3
<b>2 Methodology.....</b>	<b>4</b>
2.1 Sampling .....	4
2.2 Instrumentation .....	4
2.3 Data Collection and Organization.....	4
2.4 Data Analysis .....	4
<b>3 Findings and Discussion Grade 7 .....</b>	<b>5</b>
3.1 Summary Descriptive Statistics .....	5
3.2 Standardized scaled scores.....	8
3.3 Performance at Varying Levels of Standards.....	10
3.4 Achievement Across Subgroups .....	13
3.4.1 Achievement by Sex .....	13
3.4.2 Achievement by Woreda.....	14
3.4.3 Achievement by School .....	16
<b>4 Findings and Discussion Grade 4.....</b>	<b>20</b>
4.1 Summary Descriptive Statistics .....	20
4.2 Standardized scaled scores.....	23
4.3 Performance at Varying Levels of Standards.....	25
4.4 Achievement Across Subgroups .....	28
4.4.1 Achievement by Sex .....	28
4.4.2 Achievement by Woreda.....	29
4.4.3 Achievement by School .....	30
<b>5 Summary, Conclusions.....</b>	<b>35</b>
5.1 Summary .....	35
5.2 Conclusions.....	38
<b>References .....</b>	<b>39</b>

## List of Tables

Table 1. Summary Descriptive Statistics G7 2010 .....	5
Table 2. Correlations Between the Five Subjects G7 2010.....	6
Table 3. Correlations Between the Five Subjects G7 2007.....	6
Table 4. Percentile Scores at Five Key Marker Points by Subject G7 2010 .....	7
Table 5. Percentile Scores at Five Key Marker Points by Subject G7 2007 .....	8
Table 6. Summary Statistics Based on Scaled Scores G7 2010 .....	9
Table 7. Percentile Scores at Five Key Marker Points by Subject Based on Scaled Scores G7 2010..	9
Table 8. Summary Statistics Based on Scaled Scores G7 2007 .....	10
Table 9. Percentile Scores at Five Key Marker Points by Subject Based on Scaled Scores G7 2007	10
Table 10. Proficiency Levels by Subject G7 2010.....	11
Table 11. Proficiency Levels by Subject G7 2007.....	12
Table 12. Independent Sample t-test by Gender G7 2010.....	13
Table 13. Independent Sample t-test by Gender G7 2007.....	14
Table 14. Independent Sample t-test by Woreda G7 2010.....	15
Table 15. Independent Sample t-test by Woreda G7 2007.....	15
Table 16. Mean Scores by School for Bolosso Sore G7 2010.....	16
Table 17. Mean Scores by School for Bolosso G7 2007 .....	17
Table 18. Mean Scores by School for Damot Gale G7 2010.....	18
Table 19. Mean Scores by School for Damot G7 2007 .....	19
Table 20. Summary Descriptive Statistics G4 .....	20
Table 21. Correlations Between the Five Subjects G4 2010.....	21
Table 22. Correlations Between the Five Subjects G4 2007.....	21
Table 23. Percentile Scores at Five Key Marker Points by Subject G4 2010 .....	22
Table 24. Percentile Scores at Five Key Marker Points by Subject G4 2007 .....	23
Table 25. Summary Statistics Based on Scaled Scores G4 2010.....	23
Table 26. Summary Statistics Based on Scaled Scores G4 2007.....	24
Table 27. Percentile Scores at Five Key Marker points by subject based on scaled scores G4 2010	25
Table 28. Percentile scores at Five Key Marker Points by Subject Based on Scaled Scores G4 2007 .....	25
Table 29. Proficiency Levels by Subject G4 2010.....	26
Table 30. Proficiency Levels by Subject G4 2007.....	27
Table 31. Independent Sample t-test by Gender G4 2010.....	28

<b>Table 32. Independent Sample t-test by Gender G4 2007.....</b>	<b>29</b>
<b>Table 33. Independent Sample t-test by Woreda G4 2010.....</b>	<b>29</b>
<b>Table 34. Independent Sample t-test by Woreda G4 2007.....</b>	<b>30</b>
<b>Table 35. Mean Scores by School for Bolosso Sore G4 2010.....</b>	<b>31</b>
<b>Table 36. Mean Scores by School for Bolosso Sore G4 2007.....</b>	<b>32</b>
<b>Table 37. Mean Scores by School for Damot Gale G4 2010.....</b>	<b>33</b>
<b>Table 38. Mean Scores by School for Damot Gale G7 2007.....</b>	<b>34</b>

## **List of Figures**

<b>Figure 1. Percentile Scores at Five Key Marker Points by Subject G7 2010.....</b>	<b>7</b>
<b>Figure 2. Percentile Scores at Five Key Marker Points by Subject G7 2007.....</b>	<b>8</b>
<b>Figure 3. Proficiency Levels Based on Scaled Scores by Subject G7 2010 .....</b>	<b>11</b>
<b>Figure 4. Proficiency Levels Based on Scaled Scores by Subject G7 2007 .....</b>	<b>12</b>
<b>Figure 5. Percentile Scores at Five Key Marker Points by Subject G4 2010.....</b>	<b>22</b>
<b>Figure 6. Percentile Scores at Five Key Marker Points by Subject G4 2007.....</b>	<b>23</b>
<b>Figure 7. Proficiency Levels Based on Scaled Scores by Subject G4 2010 .....</b>	<b>26</b>
<b>Figure 8. Proficiency Levels Based on Scaled Scores by Subject G4 2007 .....</b>	<b>27</b>

# 1 Introduction

Link Community Development (LCD) through Woreda School Improvement Project is working in Wolaita Zone and its objective is better basic education delivery in the Zone through enhanced access to school performance data for parents and local communities, increased stakeholder demand for improvements, and more responsive and effective delivery by the system.

LCD is currently operating in the Southern Nations, Nationalities and Peoples Regional State (SNNPRS) in south west Ethiopia. The Project is the Woreda School Improvement Project. Phase one of the projects is being implemented in Damot Gale and Bolosso Sore woredas of Wolaita Zone. One of the main project outputs is annual data collection and administering learner tests in the project schools. In line with this two annual assessments were conducted in three subjects at Grades Four and Seven. The tests were administered in 2007 and 2010 Academic Years. This report presents the outputs of the statistical analyses based on the test scores.

## 1.1 Background

Test scores provide one important measure of how well the curriculum is being learned, and help to indicate achievement at the main exit points of the school system. Teachers, schools and national governments have long gathered information on pupils' performance. Teachers and schools use assessment data to monitor pupil progress, identify pupils with difficulties (and suggest appropriate responses), and even to motivate pupil learning. Although these types of assessment are quite varied in form and function, they are used primarily to provide information on individual performance. National governments may also assess educational outcomes (what has been learned) through examinations. Learning assessments allow the objective measurement of performance at system-level. Although there are many benefits to such type of data, some are of particular relevance. Greaney and Kellaghan (1996) identified eight main uses for such data: *informing policy, monitoring standards, identifying correlates of achievement, introducing realistic standards, promoting accountability, increasing public awareness, directing teachers' efforts and raising pupil achievement, and informing political debate.*

Concern for educational change and improving its quality has been the focus of educational planners for years. However, the World Declaration on Education for All (EFA) in Jomtien, Thailand (1990) is considered to have uncovered much of the dire necessity of learning assessment. The Education for All declaration gave not only fresh impetus to issues related to assessment but also made clear that there has to be a new form of assessment: system assessment, or national assessment, in order to determine whether children were acquiring the essential knowledge, reasoning ability, skills, and values that schools have promised to deliver. In other words, the basis for learning assessment is a response to both the desirable learning behavior to take place and ensuring schools' accountability to their stakeholders (the state, the parents, etc) (Kellaghan and Greaney, 2004).

Kellaghan and Greaney (2001) also revealed that one of the most influential statements of concern for learning outcomes is contained in the declaration adopted by the World Conference on Education for All. It emphasizes that the provision of basic education for all was meaningful only if children could acquire useful behavioural skills and values. To this end, Article 4 of the World Declaration on Education for All (1990) stated that focus of basic education should be “on actual learning acquisition and outcome, rather than exclusively upon enrolment, continued participation in organized programmes and completion of certification requirements”. Similarly, after a 10-year follow-up to Jomtien declaration, the Dakar Conference (2000) stressed the importance of having “a clear definition and accurate assessment of learning outcomes (knowledge, skills, attitudes, and values)” as governments need to ensure basic education of quality for all, for their citizens (UNESCO, 2000).

The focus on learning has been progressively shifting from input to outcomes in view of learning achievement. Past educational reforms mainly used to emphasize educational structure, curriculum and teacher training, in a view to realize quality. But this trend began to give way to issues related to the improvement of learning achievement, school effectiveness, management and accountability. Consequently, decentralization, school-based management and learning assessment became the area of focus in the efforts related to educational reforms of the 1990s. In the view of Kellaghan and Greaney (2001), global economic competition has resulted in the critical importance of quality human resources, and the demand for new competencies in the

modern information society. All of these demands have therefore, made the educational system, schools, and individual students to be under increasing pressure to perform and work hard. In short, assessing students' learning achievements has instigated due attention and a necessary focus to be made for the former.

The emergence of learning assessment is believed to come up with an objective appraisal system of a given education system before arriving at sound judgment. It is also important to note that one of the modern assessment procedures focus on outcomes. Kellaghan and Greaney argue that unlike past assessments which focus on inputs (e.g. physical facilities, curriculum materials, books, and teacher training) to determine the quality of education, this is no longer the case. Today, the dominant question posed by many stakeholders, including policymakers, has become on the outcomes of education: whether students are acquiring the desired knowledge, skills, behavior, and attitudes. As a result, policymakers or educational managers need information that would be necessary to reach informed judgment as related to the adequacy of student achievements obtained in the system. They may also need baseline data on student achievement against which to measure progress or excellence being registered in the educational program. In the meantime, teachers may need similar information on the achievement of their students in order to make some form of comparisons and assess their own professional effectiveness.

## **1.2 Objectives**

The main purpose of the study was to determine the achievement levels of the students at Grades 4 and 7 at different periods using selected subjects. Based on this, the specific objectives of the study were to:

1. Describe the achievement levels of Grade 4 students in 2007 and 2010.
2. Describe the achievement levels of Grade 7 students in 2007 and 2010.
3. Compare the results of the two periods and discuss the progress (if any).
4. Compare the achievement scores across subgroups (sex, school, woreda).

## **2 Methodology**

### **2.1 Sampling**

This learning assessment was conducted in Bolosso Sore and Damot Gale woredas of Wolaita Zone. All the students at Grades 4 and 7 in schools where LCD is operating were included in the study.

### **2.2 Instrumentation**

The main tools for data collecting were the achievement tests. In Grade 4, the subjects tested were mathematics, English and science. In Grade 7 in addition to mathematics and English, biology, chemistry and physics were administered linearly.

### **2.3 Data Collection and Organization**

The achievement tests were corrected manually and the scores were captured using MS Excel. The data were later organized and merged using MS Excel 2010 and SPSS 19.

### **2.4 Data Analysis**

Descriptive summary statistics to summarize central tendencies and dispersion were computed to each subject and to the average score. Correlation and statistical tests of significance were computed to detect relationships and differences. Standardized scale scores were generated for the purpose of making comparisons between the tested subjects. Proficiency levels were determined based on the scaled scores. SPSS 19 was used for analysis and charts were generated using MS Excel 2010.

### 3 Findings and Discussion Grade 7

This part presents the findings and discusses the result focusing on the assessment conducted during 2007 and 2010. Initially the overall achievement outcomes using descriptive statistics for each subject's mean score and their average are presented. Based on subgroups comparisons were made.

#### 3.1 Summary Descriptive Statistics

The summary descriptive statistics for Grade 7 shows that the mean score for each subject was found below the passing mark set by the MoE (Table 1). The mean score for mathematics (32.8%) was the least and 12 points lower than the average score (40.8%). Looking at the standard deviation the widest variation is in biology (8.6%) and the least is in mathematics. The distributions of the scores for all subjects are positively skewed. Indicating that only very few students were able to score highest scores. The average score is slightly positively skewed indicating the scores are more or less normally distributed. The only subject with mean score slightly above 50% is biology.

**Table 1. Summary Descriptive Statistics G7 2010**

Subject	2010				2007			
	N	Mean	Std. Deviation	Skewness	N	Mean	Std. Deviation	Skewness
Mathematics	4296	32.8	3.68	.660	4074	32.1	6.40	1.257
English	4296	42.8	6.19	.373	4074	24.4	7.66	.428
Biology	4296	51.0	8.60	.888	4074	40.6	11.08	.607
Chemistry	4296	35.4	7.78	.438	4074	47.7	7.12	.092
Physics	4296	42.1	7.82	.546	4074	39.3	8.22	.759
<b>Average</b>	<b>4296</b>	<b>40.8</b>	<b>5.96</b>	<b>.349</b>	4074	<b>36.9</b>	<b>7.12</b>	<b>.503</b>

When the scores are compared with the baseline data collected in 2007, gains are observed that range from 0.7% in mathematics to 18.8% in English. The average score was found higher by 3.9%.

Table 2 below shows Person Product Moment correlation between the tested subjects plus the average score. There exist positive relationship in all cases and the correlations were statistically significant at  $p < .01$ . This shows that students performing well in one subject did the same in the others. Chemistry showed the strongest correlation (.925) with the average score indicating that those who did well in chemistry performed better overall. The correlation between mathematics (.544) and the average score was the least.

**Table 2. Correlations Between the Five Subjects G7 2010**

	Mathematics	English	Biology	Chemistry	Physics
English	.544**				
Biology	.519**	.666**			
Chemistry	.636**	.786**	.762**		
Physics	.550**	.771**	.733**	.770**	
Average	.696**	.874**	.882**	.925**	.903**

\*\* Correlation is significant at the 0.01 level (2-tailed).

Table 3 below shows Person Product Moment correlation between the tested subjects plus the average score in the baseline data. There exist positive relationship in all cases and the correlations were statistically significant at  $p < .01$ . Biology showed the strongest correlation (.954) with the average score indicating that those who did well in biology performed better overall. The correlation between mathematics and the average score (.728) was the least.

**Table 3. Correlations Between the Five Subjects G7 2007**

	Mathematics	English	Biology	Chemistry	Physics
English	.589**				
Biology	.635**	.872**			
Chemistry	.550**	.760**	.843**		
Physics	.506**	.782**	.825**	.770**	
Average	.728**	.912**	.954**	.895**	.886**

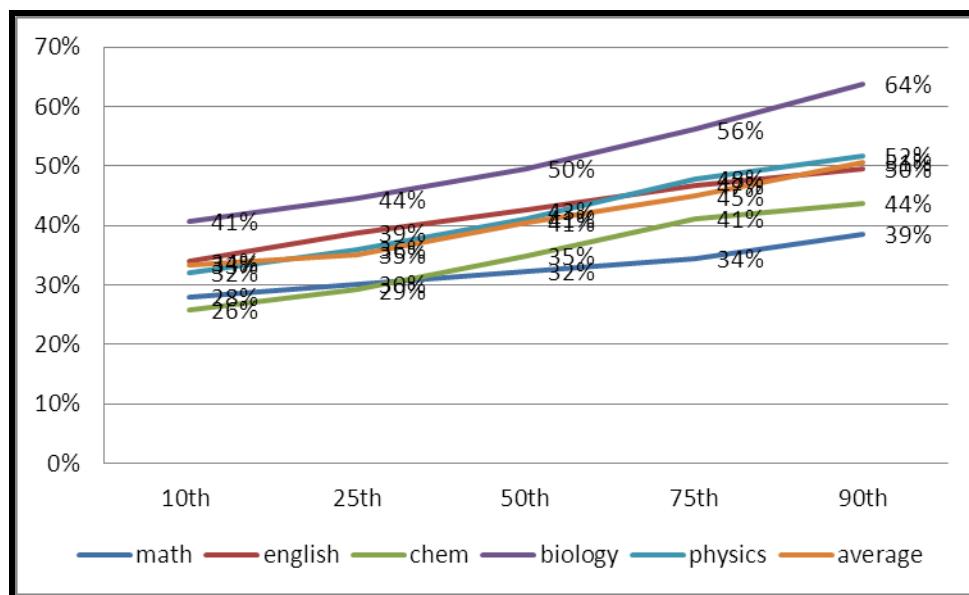
\*\* Correlation is significant at the 0.01 level (2-tailed).

Table 4 and Figure 1 below show the range of achievements in the five subjects and the average scores at Grade 7. The table indicates scores achieved at five key marker points: 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> and 90<sup>th</sup> percentile ranks. Performance at the 10<sup>th</sup> percentile may be taken as indicative of the standard among low achievers, while performance at the 90<sup>th</sup> percentile can be taken as indicative of high achievers. Pupils at the 90<sup>th</sup> percentile achieved a score of 51% in the average.

This means only 10% of the candidates scored 51% and above. On the other hand, pupil at 10<sup>th</sup> percentile scored only 33% and this means 10% of the examinee scored at or below 33%. In mathematics 50% of the students scored less than 32% and only 10% were able to score 39% and above. It was only in biology the median score (or 50<sup>th</sup> percentile) equals 50%. The scores at the 10<sup>th</sup> percentile show that the most difficult subject for the low achievers was chemistry followed by mathematics. On the other hand the 90<sup>th</sup> percentile shows that the most difficult subject for the high achievers was mathematics followed by chemistry. For both low and high achievers mathematics was found the most difficult subject.

**Table 4. Percentile Scores at Five Key Marker Points by Subject G7 2010**

Percentile	Mathematics	English	Chemistry	Biology	Physics	Average
10 <sup>th</sup>	28%	34%	26%	41%	32%	33%
25 <sup>th</sup>	30%	39%	29%	44%	36%	35%
50 <sup>th</sup>	32%	43%	35%	50%	41%	41%
75 <sup>th</sup>	34%	47%	41%	56%	48%	45%
90 <sup>th</sup>	39%	50%	44%	64%	52%	51%



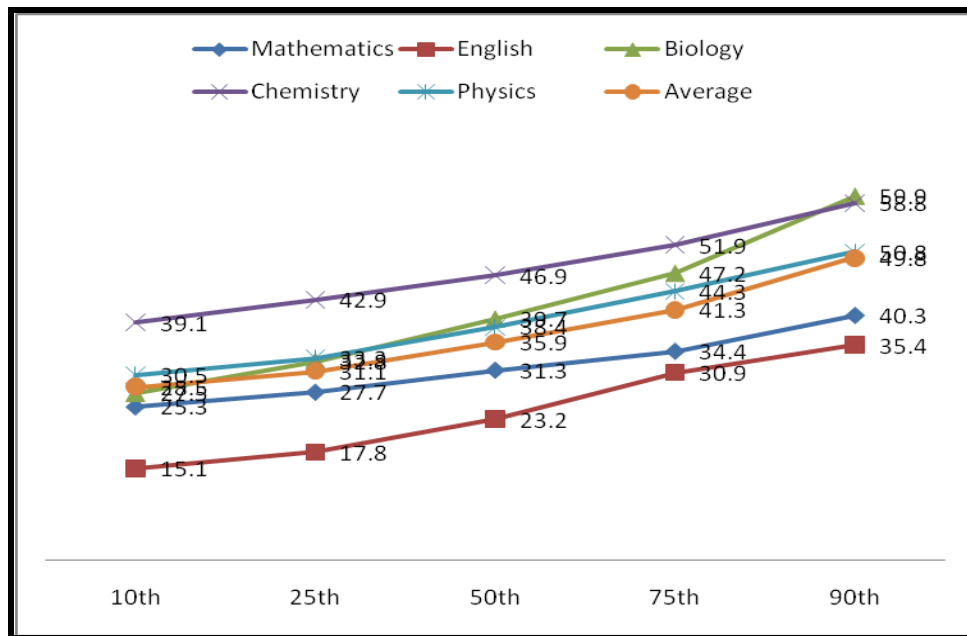
**Figure 1. Percentile Scores at Five Key Marker Points by Subject G7 2010**

Table 5 and Figure 2 below show the range of achievements in the five subjects and the average scores at Grade 7 in 2007. Pupils at the 90<sup>th</sup> percentile achieved a score of 49.8% in the average. This means only 10% of the candidates scored 49.8% and above. On the other hand, pupil at 10<sup>th</sup>

percentile scored only 28.5% and this means 10% of the examinee scored at or below 28.5%. In mathematics 50% of the students scored less than 31.3% and only 10% were able to score 40.3% and above. The scores at the 10<sup>th</sup> percentile show that the most difficult subject for the low achievers was English followed by mathematics. On the other hand, the 90<sup>th</sup> percentile shows that the most difficult subject for the high achievers was English followed by mathematics. For both low and high achievers English was the most difficult subject.

**Table 5. Percentile Scores at Five Key Marker Points by Subject G7 2007**

Percentiles	Mathematics	English	Biology	Chemistry	Physics	Average
10 <sup>th</sup>	25.3	15.1	27.5	39.1	30.5	28.5
25 <sup>th</sup>	27.7	17.8	32.8	42.9	33.3	31.1
50 <sup>th</sup>	31.3	23.2	39.7	46.9	38.4	35.9
75 <sup>th</sup>	34.4	30.9	47.2	51.9	44.3	41.3
90 <sup>th</sup>	40.3	35.4	59.9	58.8	50.8	49.8



**Figure 2. Percentile Scores at Five Key Marker Points by Subject G7 2007**

### 3.2 Standardized scaled scores

In this part the range of achievement scores based on standardized scaled scores is presented. For all subjects the mean score was set at 250 and the standard deviation at 50 arbitrarily. This is

especially important to compare the score of one subject with the other plus to make comparisons across time.

**Table 6. Summary Statistics Based on Scaled Scores G7 2010**

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Skewness</b>
Mathematics	4296	165.61	454.90	250.0	50.0	.660
English	4296	145.51	398.42	250.0	50.0	.373
Biology	4296	152.02	399.37	250.0	50.0	.888
Chemistry	4296	150.46	409.36	250.0	50.0	.438
Physics	4296	155.91	418.59	250.0	50.0	.546
<b>Average</b>	<b>4296</b>	<b>156.37</b>	<b>368.33</b>	<b>250.0</b>	<b>50.0</b>	<b>.349</b>

Table 6 shows the summary descriptive statistics based on the standardized scale scores for Grade 7. The minimum score ranges from 145.5 (English) to 165.6 (mathematics) while the maximum scores are in the ranges of 398.4 (English) to 454.9 (mathematics).

Pupils who scored at the 10<sup>th</sup> percentile achieved a score of 188.2 in the average score, which is 1.44 standard deviations less than the mean. The corresponding score for pupils at the 90<sup>th</sup> percentile is 331.9 that is 1.63 standard deviations greater than the mean. The scaled score at the 50<sup>th</sup> percentile (247.8) is close to the scaled mean score (250) indicating the score is normally distributed (Table 7).

**Table 7. Percentile Scores at Five Key Marker Points by Subject Based on Scaled Scores G7 2010**

<b>Percentile</b>	<b>Mathematics</b>	<b>English</b>	<b>Biology</b>	<b>Chemistry</b>	<b>Physics</b>	<b>Average</b>
10 <sup>th</sup>	185.6	178.2	189.7	189.1	186.5	188.2
25 <sup>th</sup>	213.3	218.1	212.0	210.2	211.3	202.2
50 <sup>th</sup>	243.8	248.1	241.3	246.5	243.8	247.8
75 <sup>th</sup>	273.0	282.4	279.6	286.9	286.9	284.4
90 <sup>th</sup>	328.0	304.3	324.7	303.7	312.0	331.9

Table 8 shows the summary descriptive statistics based on the standardized scale scores in 2007. The minimum score ranges from 134.9 (physics) to 173.8 (English) while the maximum scores are in the ranges of 351.1 (chemistry) to 407.6 (mathematics).

**Table 8. Summary Statistics Based on Scaled Scores G7 2007**

	N	Minimum	Maximum	Mean	Std. Deviation
Mathematics	4074	167.1	407.6	250.0	50.0
English	4074	173.8	362.8	250.0	50.0
Biology	4074	160.7	367.9	250.0	50.0
Chemistry	4074	135.5	351.1	250.0	50.0
Physics	4074	134.9	388.5	250.0	50.0
Average	4074	168.6	354.4	250.0	50.0

Pupils who scored at the 10<sup>th</sup> percentile achieved a score of 190.9 in the average score, which is 1.18 standard deviations less than the mean. The corresponding score for pupils at the 90<sup>th</sup> percentile is 331.9 that is 1.64 standard deviations greater than the mean. The scaled score at the 50<sup>th</sup> percentile (243.1) is close to the scaled mean score (250) indicating the score is normally distributed (Table 9).

**Table 9. Percentile Scores at Five Key Marker Points by Subject Based on Scaled Scores G7 2007**

Percentiles	Mathematics	English	Biology	Chemistry	Physics	Average
10 <sup>th</sup>	196.9	189.0	190.9	189.5	196.4	190.9
25 <sup>th</sup>	215.6	206.6	214.6	215.9	213.7	209.2
50 <sup>th</sup>	243.6	242.0	245.9	244.3	244.5	243.1
75 <sup>th</sup>	267.9	292.0	279.8	279.5	280.5	280.5
90 <sup>th</sup>	313.8	321.8	337.0	328.0	319.9	340.7

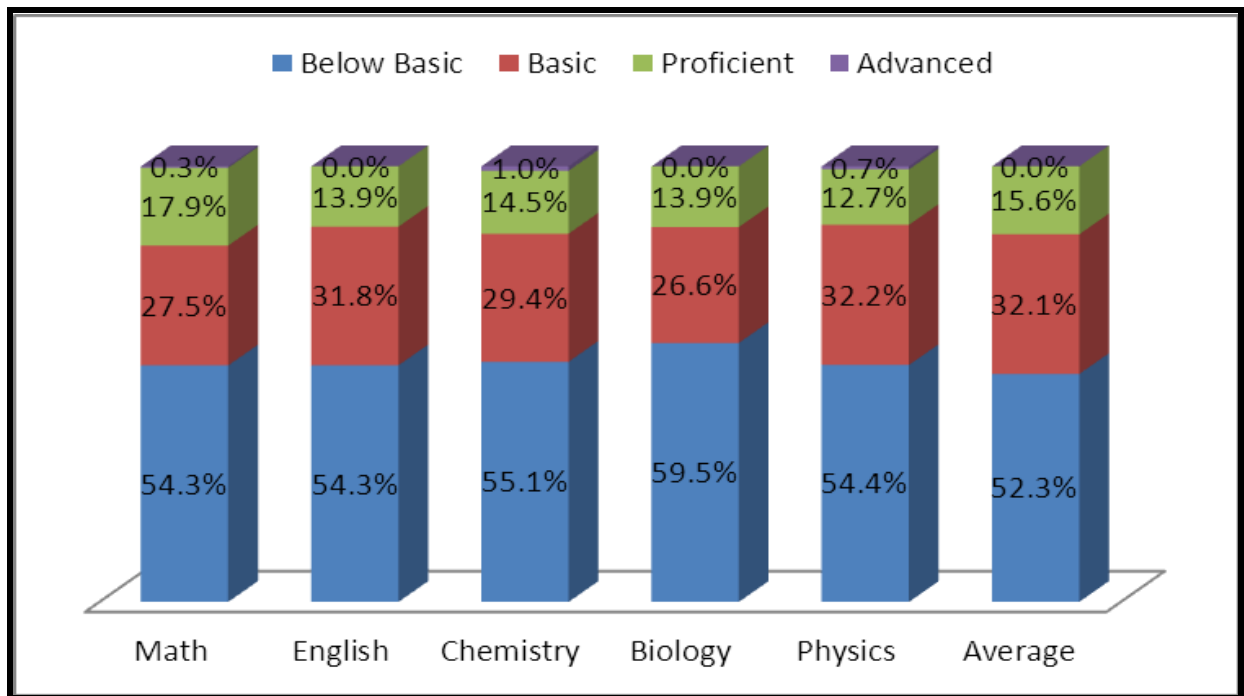
### 3.3 Performance at Varying Levels of Standards

In order to understand the distribution of scores, the continuum of student's achievement is divided into four levels as '*Below Basic*', '*Basic*', '*Proficient*' and '*Advanced*' and the proportion achieving at each level at Grade 7 is presented below in Table 10 and Table 11. The classification is based on the scaled scores where '*Advanced*' is greater than 2 standard deviation from the mean '*Proficient*' is between 1 and 2 standard deviations above the mean, '*Basic*' is within 1 standard deviation above the mean and '*Below Basic*' is less than the mean score.

**Table 10. Proficiency Levels by Subject G7 2010**

Proficiency	Math	English	Chemistry	Biology	Physics	Average
Below Basic	54.3%	54.3%	55.1%	59.5%	54.4%	52.3%
Basic	27.5%	31.8%	29.4%	26.6%	32.2%	32.1%
Proficient	17.9%	13.9%	14.5%	13.9%	12.7%	15.6%
Advanced	0.3%	0.0%	1.0%	0.0%	0.7%	0.0%

Table 10 above and Figure 3 below show that based on the average score 15.6% of the students are categorized as *Proficient*, 32.1% as *Basic* and 52.3% as *Below Basic*.

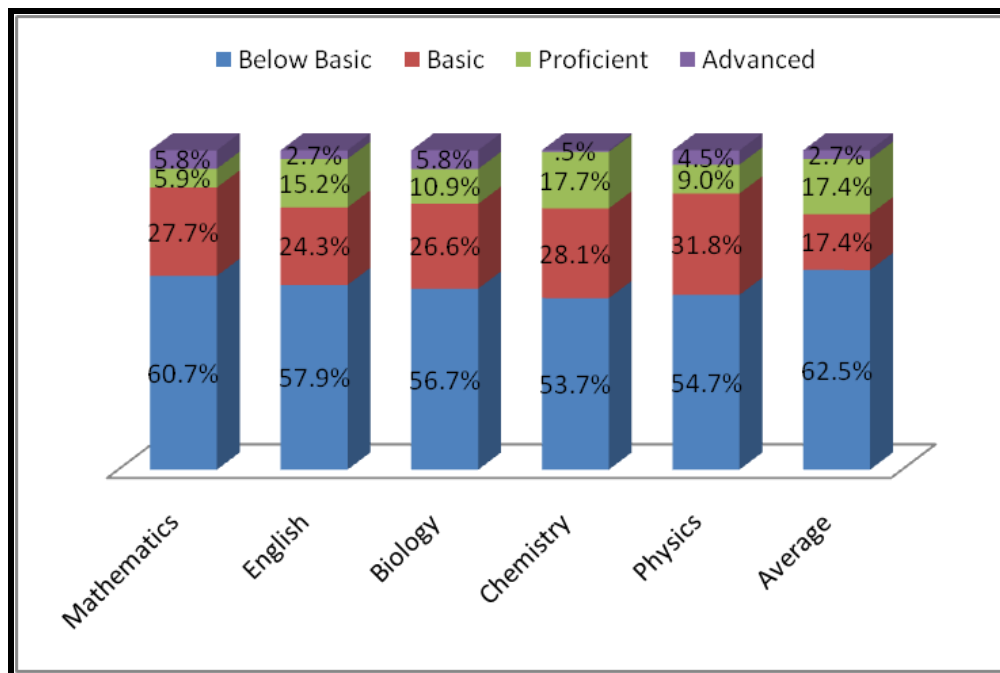


**Figure 3. Proficiency Levels Based on Scaled Scores by Subject G7 2010**

Table 11 and Figure 4 below show that based on the average score 2.7% of the students are categorized as *Advanced*, 17.4% as *Proficient*, 17.4% as *Basic* and 52.3% as *Below Basic*.

**Table 11. Proficiency Levels by Subject G7 2007**

	<b>Below Basic</b>	<b>Basic</b>	<b>Proficient</b>	<b>Advanced</b>
Mathematics	60.7%	27.7%	5.9%	5.8%
English	57.9%	24.3%	15.2%	2.7%
Biology	56.7%	26.6%	10.9%	5.8%
Chemistry	53.7%	28.1%	17.7%	0.5%
Physics	54.7%	31.8%	9.0%	4.5%
<b>Average</b>	<b>62.5%</b>	<b>17.4%</b>	<b>17.4%</b>	<b>2.7%</b>



**Figure 4. Proficiency Levels Based on Scaled Scores by Subject G7 2007**

### 3.4 Achievement Across Subgroups

This part deals with comparisons of mean achievement scores across subgroups, which includes gender, *woreda*, and schools.

#### 3.4.1 Achievement by Sex

Independent sample t-test analysis was carried out in order to see whether a statistically significant mean differences exist between boys and girls. In Grade 7, boys achieved mean scores that were higher by 6.2% in the average score and 4.4% to 7.2% in the five subjects than girls (Table 12). The differences were statistically significant in all cases at  $p < .001$ . The mean difference in mathematics was the least indicating the subject is difficult for both groups.

**Table 12. Independent Sample t-test by Gender G7 2010**

Subject	Gender	N	Mean	Std. Deviation	Mean Difference	t	df	Sig.
Mathematics	M	2257	34.9	3.29	4.4	49.34	4294	.000
	F	2039	30.5	2.48				
English	M	2257	45.8	4.68	6.3	38.43	4294	.000
	F	2039	39.5	5.99				
Biology	M	2257	53.9	7.85	6.0	24.18	4294	.000
	F	2039	47.9	8.31				
Chemistry	M	2257	38.7	6.81	7.1	33.57	4294	.000
	F	2039	31.6	7.04				
Physics	M	2257	45.5	5.95	7.2	34.23	4294	.000
	F	2039	38.3	7.88				
Average	M	2257	43.8	4.75	6.2	39.85	4294	.000
	F	2039	37.6	5.45				

In the baseline data too boys achieved mean scores that were higher by 6.9% in the average score and 3.1% to 10.1% in the five subjects than girls (Table 13). The differences were statistically significant in all cases at  $p < .001$ . The mean difference in mathematics was the least indicating the subject is difficult to both groups.

**Table 13. Independent Sample t-test by Gender G7 2007**

	Gender	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	t	df	Sig. (2-tailed)
Mathematics	M	2225	33.5	5.61	.119	3.1	15.95	4072	.000
	F	1849	30.4	6.85	.159				
English	M	2225	28.1	7.25	.154	8.2	39.91	4072	.000
	F	1849	20.0	5.45	.127				
Biology	M	2225	45.2	10.12	.215	10.1	32.57	4072	.000
	F	1849	35.1	9.56	.222				
Chemistry	M	2225	50.9	5.99	.127	6.9	35.39	4072	.000
	F	1849	43.9	6.50	.151				
Physics	M	2225	42.7	7.16	.152	7.5	32.34	4072	.000
	F	1849	35.2	7.53	.175				
<b>Average</b>	<b>M</b>	<b>2225</b>	<b>40.1</b>	<b>6.30</b>	<b>.134</b>	<b>6.9</b>	<b>35.45</b>	<b>4072</b>	<b>.000</b>
	<b>F</b>	<b>1849</b>	<b>33.1</b>	<b>6.13</b>	<b>.143</b>				

### 3.4.2 Achievement by Woreda

Independent sample t-test was carried out in order to see whether a statistically significant mean differences exist between Bolosso Sore and Damot Gale. The mean difference in the average score was found very small in favor of Bolosso Sore. In mathematics Damot Gale performed better than Bolosso Sore. Table 14 shows that in all other subjects Bolosso Sore performed better but the mean differences were very small except for biology which is 2%.

**Table 14. Independent Sample t-test by Woreda G7 2010**

Subject	Woreda	N	Mean	Std. Deviation	Mean Difference	t	df	Sig. (2-tailed)
Mathematics	Bolosso Sore	2043	32.3	3.45	-.9107	-8.173	4294	.000
	Damot Gale	2253	33.2	3.81				
English	Bolosso Sore	2043	42.8	7.51	.0944	.499	4294	.618
	Damot Gale	2253	42.7	4.69				
Biology	Bolosso Sore	2043	52.1	9.33	2.04	7.810	4294	.000
	Damot Gale	2253	50.1	7.76				
Chemistry	Bolosso Sore	2043	35.7	7.69	.5494	2.314	4294	.021
	Damot Gale	2253	35.1	7.84				
Physics	Bolosso Sore	2043	42.2	7.99	.1988	.832	4294	.405
	Damot Gale	2253	42.0	7.66				
<b>Average</b>	<b>Bolosso Sore</b>	<b>2043</b>	<b>41.021</b>	<b>6.31</b>	<b>.3942</b>	<b>2.165</b>	<b>4294</b>	<b>.030</b>
	<b>Damot Gale</b>	<b>2253</b>	<b>40.627</b>	<b>5.62</b>				

In the baseline data the mean difference in the average score was 4.7% in favor of Bolosso Sore. Table 15 shows that in all the subjects Bolosso Sore performed better and the differences were statistically significant.

**Table 15. Independent Sample t-test by Woreda G7 2007**

	Woreda	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)	Mean Difference
Mathematics	Bolosso Sore	2029	34.5	7.31	.16	24.86	4072	.000	4.6
	Damot Gale	2045	29.8	4.21	.09				
English	Bolosso Sore	2029	26.1	7.91	.18	13.90	4072	.000	3.3
	Damot Gale	2045	22.8	7.05	.16				
Biology	Bolosso Sore	2029	43.9	12.33	.27	19.85	4072	.000	6.6
	Damot Gale	2045	37.3	8.51	.19				
Chemistry	Bolosso Sore	2029	50.4	7.18	.16	25.51	4072	.000	5.3
	Damot Gale	2045	45.1	6.00	.13				
Physics	Bolosso Sore	2029	41.7	8.64	.19	19.09	4072	.000	4.7
	Damot Gale	2045	37.0	7.02	.16				
<b>Average</b>	<b>Bolosso Sore</b>	<b>2029</b>	<b>39.3</b>	<b>7.59</b>	<b>.17</b>	<b>22.33</b>	<b>4072</b>	<b>.000</b>	<b>4.7</b>
	<b>Damot Gale</b>	<b>2045</b>	<b>34.6</b>	<b>5.72</b>	<b>.13</b>				

### 3.4.3 Achievement by School

Table 16 shows mean scores by school for Grade 7 in Bolosso Sore. The average score of the five subjects ranges from 34.1% to 52%. The highest achieving three schools scored from 50.5% to 52%. All the other schools scored below 50%. The lowest achieving three schools scored from 34.1% to 35.8%.

**Table 16. Mean Scores by School for Bolosso Sore G7 2010**

School	Mathematics	English	Biology	Chemistry	Physics	Average
Afama Mino	35.0	58.7	64.5	47.5	54.1	52.0
Hembecho	33.9	46.4	73.2	43.4	57.3	50.9
Admancho	35.9	50.0	71.9	51.3	43.5	50.5
Korke Doge	32.1	47.8	62.7	44.5	55.3	48.5
Sore Homba	30.0	58.0	52.6	41.5	48.6	46.1
Weybo	34.5	46.9	52.9	41.3	46.5	44.4
Dache Gofera	33.1	44.9	51.1	42.0	41.7	42.6
Legama	32.9	41.0	49.9	32.2	48.1	40.8
Gurumo Koisha	36.4	41.6	49.7	33.8	41.0	40.5
Dangara Selata	33.4	41.1	53.2	32.5	36.6	39.3
Afama Bancha	30.4	41.9	50.5	34.9	38.5	39.2
Gara Godo	31.1	42.0	45.0	30.7	37.7	37.3
Chama Hembecho	30.1	38.2	47.3	31.2	38.9	37.1
Gido Homba	30.3	38.2	46.4	31.6	36.0	36.5
Dola	29.1	37.9	48.5	29.6	35.8	36.2
Yukara	31.5	39.4	42.2	32.5	34.3	36.0
Tiyo Hembecho	32.6	37.0	44.8	29.4	35.2	35.8
Basa Gofera	30.2	38.0	39.5	31.3	36.0	35.0
Achura	29.0	33.0	46.4	26.3	35.6	34.1
<b>Total</b>	<b>32.3</b>	<b>42.8</b>	<b>52.1</b>	<b>35.7</b>	<b>42.2</b>	<b>41.0</b>

Table 17 shows mean scores by school for Bolosso Sore in 2007. The average score of the five subjects ranges from 30.4% to 49.9%. The highest achieving three schools scored from 48.6% to 49.9%. The lowest achieving three schools scored from 30.4% to 31.7%.

**Table 17. Mean Scores by School for Bolosso G7 2007**

<b>School</b>	<b>Mathematics</b>	<b>English</b>	<b>Biology</b>	<b>Chemistry</b>	<b>Physics</b>	<b>Average</b>
Hembecho	34.1	34.2	59.9	59.5	61.6	49.9
Afama Bancha	39.9	37.2	60.7	59.8	47.6	49.0
Weybo	50.6	32.3	60.4	55.9	44.0	48.6
Gara Godo	32.4	27.2	45.0	54.4	45.6	40.9
Chama Hembecho	29.1	30.1	45.8	50.5	42.4	39.6
Gido Homba	33.1	27.3	41.8	51.4	42.0	39.1
Gurumo Koisha	32.2	27.9	40.8	49.6	42.3	38.6
Sore Homba	31.0	19.3	43.7	52.0	41.4	37.5
Dangara Selata	28.7	23.6	45.5	51.7	37.3	37.4
Yukara	31.5	29.7	37.7	45.8	38.3	36.6
Basa Gofera	45.8	19.8	31.4	37.3	37.8	34.4
Achura	38.5	20.4	28.0	43.5	37.2	33.5
Admancho	30.1	23.2	34.2	44.1	32.0	32.7
Dache Gofera	27.5	19.6	33.9	41.7	35.8	31.7
Dola	28.2	15.2	33.1	44.4	33.7	30.9
Legama	27.8	16.8	31.2	43.2	32.8	30.4
<b>Total</b>	<b>34.5</b>	<b>26.1</b>	<b>43.9</b>	<b>50.4</b>	<b>41.7</b>	<b>39.3</b>

Table 18 shows mean scores by school for Grade 7 in Damot Gale. The average score of the five subjects ranges from 33.3% to 51.8%. The highest achieving three schools scored from 46.7% to 51.8%. Only one school was found with an average score greater than 50%. All the other schools scored below 50%. The lowest achieving three schools scored from 33.3% to 36.9%.

**Table 18. Mean Scores by School for Damot Gale G7 2010**

School	Mathematics	English	Chemistry	Biology	Physics	Average
Harto Kontola	34.1	50.4	49.5	60.4	64.7	51.8
Wegera	39.8	48.3	40.0	67.9	50.4	49.3
Wandara	37.2	43.4	47.2	59.0	46.9	46.7
Buge	33.6	46.8	42.4	57.0	46.5	45.3
Zegere	31.2	42.6	34.1	52.6	44.2	40.9
Bala Koisha	29.9	42.3	33.8	57.0	40.6	40.7
Gacheno	33.2	43.9	32.1	52.9	41.5	40.7
Damot Ofa	30.3	43.9	36.7	48.2	43.7	40.6
Ade Cherake	32.2	46.3	35.6	44.5	43.7	40.5
Konasa	35.2	41.1	31.5	50.6	42.5	40.2
Harto Burkito	32.5	42.7	37.1	48.2	39.9	40.1
Sha Sha Gale	36.0	39.2	41.3	47.1	37.1	40.1
Ade Ofa	34.6	42.7	35.1	40.1	44.2	39.3
Damot Mokonisa	35.6	41.2	30.6	43.1	41.0	38.3
Mokonisa Woige	31.0	40.0	31.7	46.6	41.6	38.2
Obe Jage	30.6	43.2	31.1	46.9	37.1	37.8
Woshe Gale	31.2	43.0	31.3	43.7	39.8	37.8
Sibaye	34.2	38.0	32.0	44.5	35.8	36.9
Aro Wegera	32.3	39.8	28.0	44.5	39.0	36.7
Ade Damot	29.9	37.5	22.7	44.0	32.6	33.3
<b>Total</b>	<b>33.2</b>	<b>42.7</b>	<b>35.1</b>	<b>50.1</b>	<b>42.0</b>	<b>40.6</b>

Table 19 shows mean scores by school for Damot Gale in 2007. The average score of the five subjects ranges from 28.4% to 43.5%. The highest achieving three schools scored from 41.6% to 43.5%. There was no school with an average score of greater than 50%. The lowest achieving eight schools scored from 28.4% to 32.7%.

**Table 19. Mean Scores by School for Damot G7 2007**

School	Mathematics	English	Biology	Chemistry	Physics	Average
Wandara	36.5	29.7	52.6	51.6	47.1	43.5
Woshe Gale	35.3	34.9	50.4	49.8	40.8	42.3
Sibaye	36.2	33.7	47.0	46.5	44.4	41.6
Sha Sha Gale	32.7	22.8	46.6	51.6	48.6	40.5
Zegere	33.3	26.5	41.3	54.4	39.5	39.0
Harto Burkito	30.7	28.9	37.4	46.8	38.2	36.4
Obe Jage	28.5	24.7	41.9	45.1	39.6	36.0
Wegera	30.8	21.4	33.9	50.7	41.3	35.6
Harto Kontola	29.2	26.2	38.7	42.7	37.6	34.9
Gacheno	31.4	20.4	30.9	47.7	33.8	34.4
Konasa	27.4	20.8	37.3	43.9	33.9	32.7
Bala Koisha	27.2	22.5	36.7	39.5	36.1	32.4
Ade Ofa	29.9	19.2	33.2	44.7	33.2	32.0
Aro Wegera	29.1	20.8	35.6	41.6	31.5	31.7
Buge	26.0	23.0	34.4	42.1	33.0	31.7
Mokonisa Woige	29.5	18.1	31.1	40.7	39.1	31.7
Ade Damot	25.3	15.2	32.9	45.3	32.3	30.2
Ade Cherake	25.7	15.9	31.7	37.0	31.8	28.4
<b>Total</b>	<b>29.8</b>	<b>22.8</b>	<b>37.3</b>	<b>45.1</b>	<b>37.0</b>	<b>34.6</b>

## 4 Findings and Discussion Grade 4

This part presents the findings and discusses the result focusing on the assessment conducted during 2007 and 2010. Initially the overall achievement outcomes using descriptive statistics for each subject's mean score and their average are presented. Based on subgroups comparisons will be made.

### 4.1 Summary Descriptive Statistics

The summary descriptive statistics for Grade 4 shows that the mean score for each subject was found below the passing mark set by the MoE (Table 20). The mean score for English (40.6%) was the least and 5.4 points lower than the average score (46%). Looking at the standard deviation the widest variation is in English (8.28%) and the least is in mathematics (6.66%). The distributions of the scores for all subjects are positively skewed. Indicating that only very few students were able to score highest scores. The English score is highly skewed indicating that only very few students got highest scores.

**Table 20. Summary Descriptive Statistics G4**

Subject	2010				2007		
	N	Mean	Std. Deviation	Skewness	Mean	Std. Deviation	Skewness
Mathematics	6504	49.6	6.66	.697	47.5	5.17	.163
English	6504	40.6	8.28	1.325	44.6	7.46	.518
Science	6504	47.8	8.04	.747	43.8	5.37	.130
Average	6504	46.0	7.27	.937	45.3	5.52	.255

Table 21 below shows Pearson Product Moment correlation between the tested subjects plus the average score. There exist positive relationship in all cases and the correlations were statistically significant at  $p < .01$ . This shows that students performing well in one subject did the same in the others. Science showed the strongest correlation (.969) with the average score indicating that those who did well in science performed better overall. The correlation between mathematics (.793) and the average score was the least.

**Table 21. Correlations Between the Five Subjects G4 2010**

Subject	Mathematics	English	Science
English	.793**		
Science	.891**	.866**	
Average	.935**	.941**	.969**

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 22 below shows Pearson Product Moment correlation between the tested subjects plus the average score. There exist positive relationship in all cases and the correlations were statistically significant at  $p < .01$ . This shows that students performing well in one subject did the same in the others. English showed the strongest correlation (.940) with the average score indicating that those who did well in science performed better overall. The correlation between science (.900) and the average score was the least.

**Table 22. Correlations Between the Five Subjects G4 2007**

	Mathematics	English	Science
English	.788**		
Science	.761**	.750**	
Average	.914**	.940**	.900**

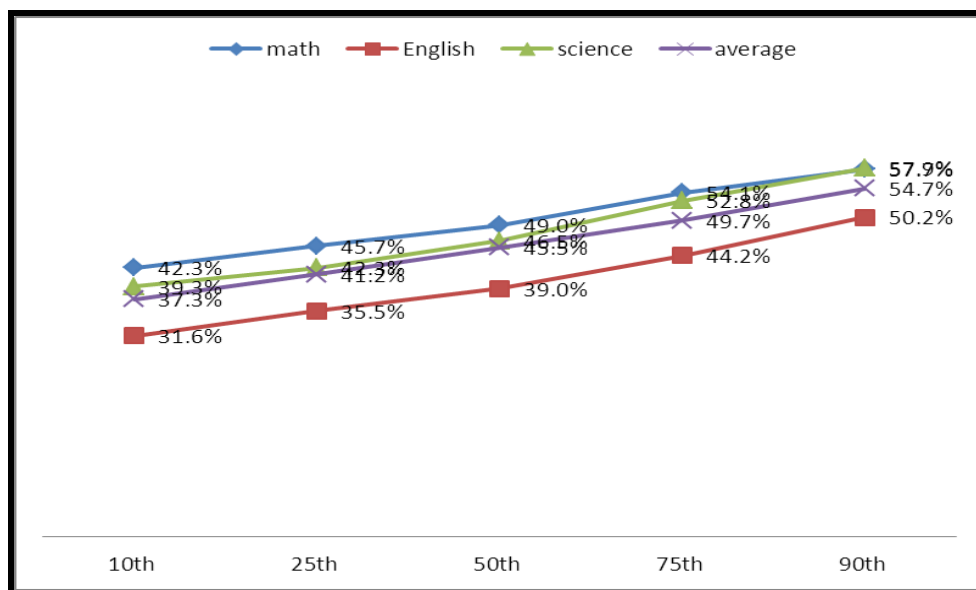
\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 23 and Figure 5 below show the range of achievements in the three subjects and the average scores at Grade 4. The table indicates scores achieved at five key marker points: 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> and 90<sup>th</sup> percentile ranks. Performance at the 10<sup>th</sup> percentile may be taken as indicative of the standard among low achievers, while performance at the 90<sup>th</sup> percentile can be taken as indicative of high achievers. Pupils at the 90<sup>th</sup> percentile achieved a score of 54.7% in the average. This means only 10% of the candidates scored 54.7% and above. On the other hand, pupil at 10<sup>th</sup> percentile scored only 37.3% and this means 10% of the examinee scored at or below 37.3%. In English 50% of the students scored less than 39% and only 10% were able to score 50.2% and above. In mathematics the median score (or 50<sup>th</sup> percentile) equals 49%. The scores at the 10<sup>th</sup> percentile show that the most difficult subject for the low achievers was

English. In the same way English is also the most difficult subject for the high achievers. Mathematics was relatively easier for the low achievers.

**Table 23. Percentile Scores at Five Key Marker Points by Subject G4 2010**

Percentiles	Mathematics	English	Science	Average
10th	42.3%	31.6%	39.3%	37.3%
25th	45.7%	35.5%	42.3%	41.2%
50th	49.0%	39.0%	46.5%	45.5%
75th	54.1%	44.2%	52.8%	49.7%
90th	57.7%	50.2%	57.9%	54.7%

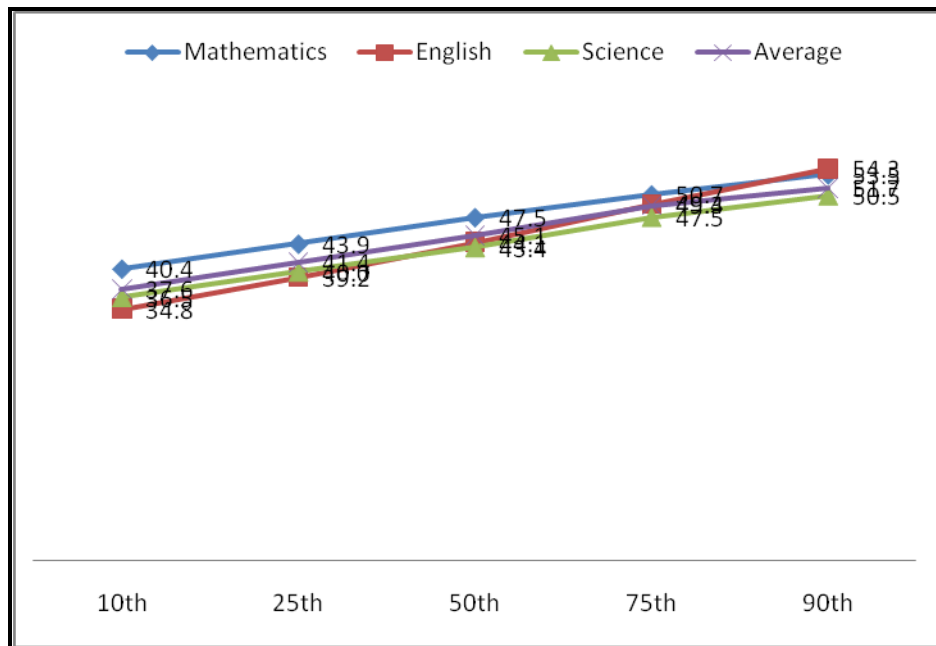


**Figure 5. Percentile Scores at Five Key Marker Points by Subject G4 2010**

Table 24 and Figure 6 below show the range of achievements in the three subjects and the average scores at Grade 4. Pupils at the 90<sup>th</sup> percentile achieved a score of 51.7% in the average. This means only 10% of the candidates scored 51.7% and above. On the other hand, pupil at 10<sup>th</sup> percentile scored only 37.6% and this means 10% of the examinee scored at or below 37.6%. In English 50% of the students scored less than 44.1% and only 10% were able to score 54.3% and above. In mathematics the median score (or 50<sup>th</sup> percentile) equals 50.7%. The scores at the 10<sup>th</sup> percentile show that the most difficult subject for the low achievers was English. Science is the most difficult subject for the high achievers. Mathematics was relatively easier for the low achievers.

**Table 24. Percentile Scores at Five Key Marker Points by Subject G4 2007**

Percentiles	Mathematics	English	Science	Average
10 <sup>th</sup>	40.4	34.8	36.5	37.6
25 <sup>th</sup>	43.9	39.2	40.0	41.4
50 <sup>th</sup>	47.5	44.1	43.4	45.1
75 <sup>th</sup>	50.7	49.4	47.5	49.3
90 <sup>th</sup>	53.5	54.3	50.5	51.7



**Figure 6. Percentile Scores at Five Key Marker Points by Subject G4 2007**

#### 4.2 Standardized scaled scores

In this part the range of achievement scores based on standardized scaled scores is presented. For all subjects the mean score was set at 250 and the standard deviation at 50 arbitrarily. This is especially important to compare the score of one subject with the other plus to make comparisons across time.

Table 25 shows the summary descriptive statistics based on the standardized scale scores for Grade 4. The minimum score ranges from 142.3 (mathematics) to 160.7 (English) while the maximum scores are in the ranges of 416.5 (science) to 470.1 (English).

**Table 25. Summary Statistics Based on Scaled Scores G4 2010**

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
Mathematics	6504	142.3	443.7	250	50	0.697
English	6504	160.7	470.1	250	50	1.325
Science	6504	157.1	416.5	250	50	0.747
<b>Average</b>	<b>6504</b>	<b>164.1</b>	<b>435.5</b>	<b>250</b>	<b>50</b>	<b>0.937</b>

Table 26 shows the summary descriptive statistics based on the standardized scale scores for Grade 4. The minimum score ranges from 114.5 (mathematics) to 159.8 (English) while the maximum scores are in the ranges of 381.9 (science) to 403.3 (mathematics).

**Table 26. Summary Statistics Based on Scaled Scores G4 2007**

	N	Minimum	Maximum	Mean	Std. Deviation
Mathematics	7046	114.5	403.3	250.0	50.0
English	7046	159.8	389.1	250.0	50.0
Science	7046	148.0	381.9	250.0	50.0
<b>Average</b>	<b>7046</b>	<b>152.2</b>	<b>389.5</b>	<b>250.0</b>	<b>50.0</b>

Table 27 shows the range of achievement scores based on the scaled scores of Grade 4; for all subjects the mean score was set at 250 and the standard deviation at 50 arbitrarily. This is especially important to compare the score of one subject with the other plus to make comparisons with similar studies in the future. Pupils who scored at the 10<sup>th</sup> percentile achieved a score of 195.5 in the average score, which 1.09 standard deviations less than the mean. The corresponding score for pupils at the 90<sup>th</sup> percentile is 309.9 that is 1.19 standard deviations greater than the mean. The scaled score at the 50<sup>th</sup> percentile (246.6) is close to the scaled mean score (250) indicating the score is normally distributed.

**Table 27. Percentile Scores at Five Key Marker points by subject based on scaled scores G4 2010**

Percentiles	Mathematics	English	Science	Average
10 <sup>th</sup>	195.5	195.5	197.5	190.4
25 <sup>th</sup>	220.7	218.8	216.0	217.1
50 <sup>th</sup>	245.5	240.2	242.2	246.6
75 <sup>th</sup>	283.7	271.7	281.3	275.4
90 <sup>th</sup>	311.1	307.9	312.9	309.9

Table 28 shows that pupils who scored at the 10<sup>th</sup> percentile achieved a score of 180.4 in the average score, which is 1.39 standard deviations less than the mean. The corresponding score for pupils at the 90<sup>th</sup> percentile is 307.6 that is 1.15 standard deviations greater than the mean. The scaled score at the 50<sup>th</sup> percentile (248.3) is close to the scaled mean score (250) indicating the score is normally distributed.

**Table 28. Percentile scores at Five Key Marker Points by Subject Based on Scaled Scores G4 2007**

Percentiles	Mathematics	English	Science	Average
10 <sup>th</sup>	181.4	184.0	181.8	180.4
25 <sup>th</sup>	214.9	213.3	214.8	214.5
50 <sup>th</sup>	250.6	246.4	246.1	248.3
75 <sup>th</sup>	281.2	281.6	285.0	285.8
90 <sup>th</sup>	308.0	314.7	312.7	307.6

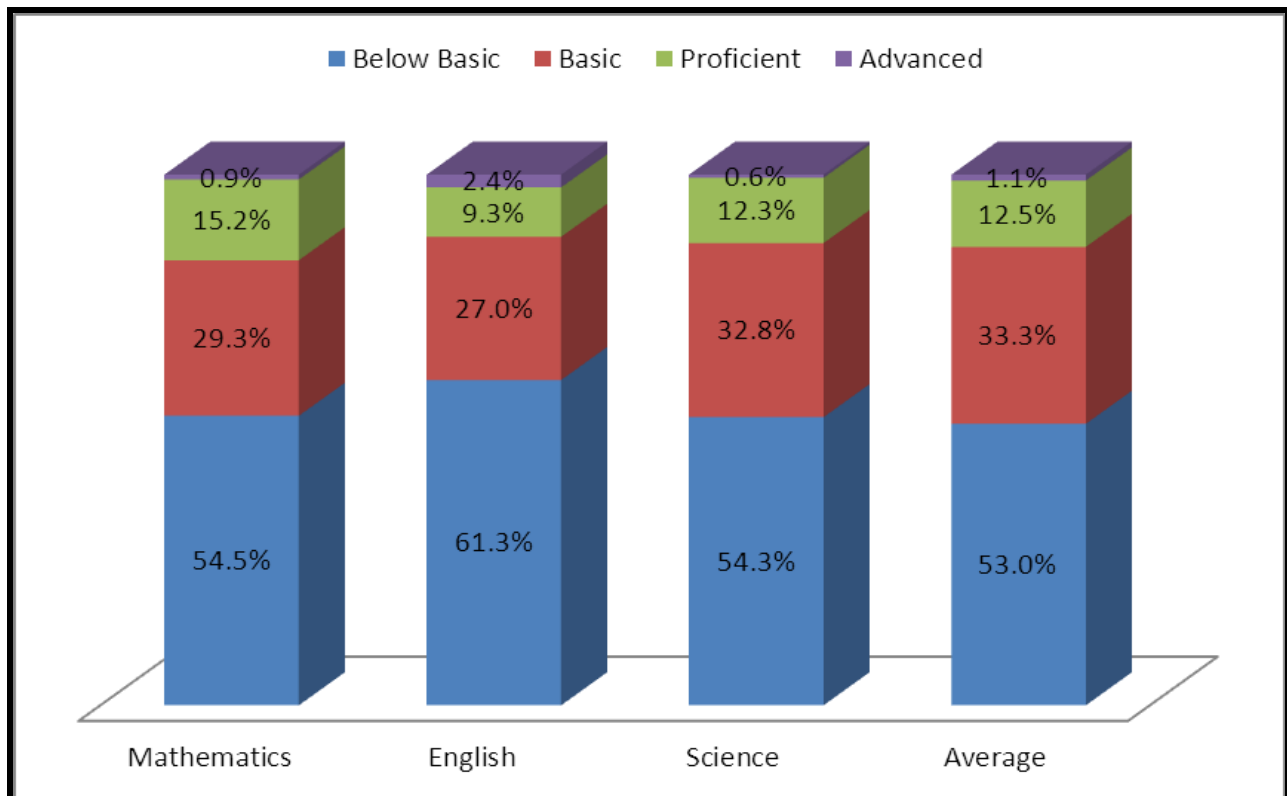
### 4.3 Performance at Varying Levels of Standards

In order to understand the distribution of scores, the continuum of student's achievement is divided into four levels as '*Below Basic*', '*Basic*', '*Proficient*' and '*Advanced*' and the proportion achieving at each level at Grade 7 is presented below in Table 11. The classification is based on the scaled scores where '*Advanced*' is greater than 2 standard deviation from the mean '*Proficient*' is between 1 and 2 standard deviations above the mean, '*Basic*' is within 1 standard deviation above the mean and '*Below Basic*' is less than the mean score.

Table 29 and Figure 7 below show that based on the average score 1.1% categorized as *Advanced*, 12.5% *Proficient*, 33.3% as *Basic* and 53% as *Below Basic*.

**Table 29. Proficiency Levels by Subject G4 2010**

<b>Proficiency</b>	<b>Mathematics</b>	<b>English</b>	<b>Science</b>	<b>Average</b>
Below Basic	54.5%	61.3%	54.3%	53.0%
Basic	29.3%	27.0%	32.8%	33.3%
Proficient	15.2%	9.3%	12.3%	12.5%
Advanced	0.9%	2.4%	0.6%	1.1%

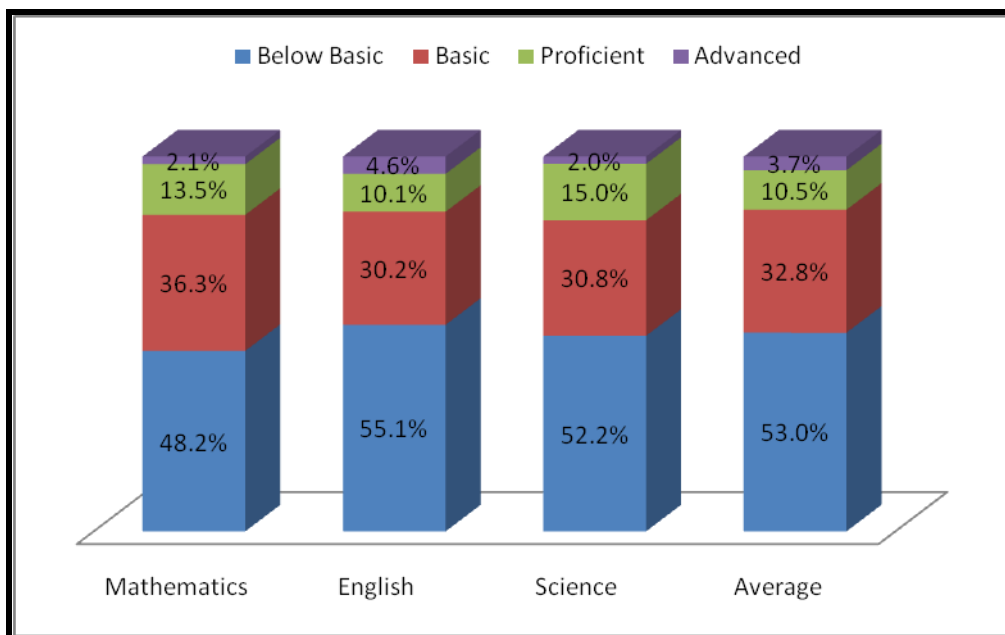


**Figure 7. Proficiency Levels Based on Scaled Scores by Subject G4 2010**

Table 30 and Figure 8 below show that based on the average score 3.7% of the students are categorized as *Advanced*, 10.5% *Proficient*, 32.8% as *Basic* and 53% as *Below Basic*.

**Table 30. Proficiency Levels by Subject G4 2007**

Proficiency	Mathematics	English	Science	Average
Below Basic	48.2%	55.1%	52.2%	53.0%
Basic	36.3%	30.2%	30.8%	32.8%
Proficient	13.5%	10.1%	15.0%	10.5%
Advanced	2.1%	4.6%	2.0%	3.7%



**Figure 8. Proficiency Levels Based on Scaled Scores by Subject G4 2007**

#### 4.4 Achievement Across Subgroups

This part deals with comparisons of mean achievement scores across subgroups, which includes gender, *woreda*, and schools.

##### 4.4.1 Achievement by Sex

Independent sample t-test was conducted in order to see whether statistically significant mean differences exist between boys and girls. In Grade 4, boys achieved mean scores that were higher by 6.1% in the average score and 4.8% to 7% in the three subjects than girls (Table 31). The differences were statistically significant in all cases at  $p < .001$ . In English the mean difference was relatively low indicating the subject is difficult for both groups.

**Table 31. Independent Sample t-test by Gender G4 2010**

	Gender	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)	Mean Difference
Mathematics	M	3258	52.9	5.85	45.67	6502	.000	6.6
	F	3246	46.3	5.74				
English	M	3258	43.0	7.27	24.47	6502	.000	4.8
	F	3246	38.2	8.52				
Science	M	3258	51.3	7.17	38.75	6502	.000	7.0
	F	3246	44.3	7.33				
Average	M	3258	49.1	6.36	37.36	6502	.000	6.1
	F	3246	42.9	6.83				

Independent sample t-test was conducted in order to see whether statistically significant mean differences exist between boys and girls. In Grade 4, boys achieved mean scores that were higher by 4% in the average score and 3.8% to 4.3% in the three subjects than girls (Table 32). The differences were statistically significant in all cases at  $p < .001$ .

**Table 32. Independent Sample t-test by Gender G4 2007**

	Gender	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)	Mean Difference
Mathematics	M	3528	49.7	4.63	.08	38.8	7044	.000	4.3
	F	3518	45.3	4.75	.08				
English	M	3528	46.5	7.49	.13	21.8	7044	.000	3.8
	F	3518	42.8	6.95	.12				
Science	M	3528	45.7	5.15	.09	31.9	7044	.000	3.8
	F	3518	41.9	4.88	.08				
Average	M	3528	47.3	5.36	.09	32.3	7044	.000	4.0
	F	3518	43.3	4.94	.08				

#### 4.4.2 Achievement by Woreda

Independent sample t-test was conducted in order to see whether statistically significant mean differences exist between Bolosso Sore and Damot Gale. At Grade 4, in all subjects Damot Gale performed better than Bolosso Sore and the mean differences were statistically significant in all cases. The highest mean difference was observed in English which is 2.6% (Table 33). The mean differences in the mathematics and science were very small and practically not significant.

**Table 33. Independent Sample t-test by Woreda G4 2010**

Subject	Woreda	N	Mean	Std. Deviation	Mean Difference	t	df	Sig. (2-tailed)
Mathematics	Bolosso Sore	3576	49.3	5.58	-0.7	-3.958	6502	0
	Damot Gale	2928	50.0	7.76				
English	Bolosso Sore	3576	39.5	7.50	-2.6	-12.766	6502	0
	Damot Gale	2928	42.1	8.93				
Science	Bolosso Sore	3576	47.4	6.95	-0.8	-4.053	6502	0
	Damot Gale	2928	48.2	9.18				
Average	Bolosso Sore	3576	45.4	6.24	-1.4	-7.518	6502	0
	Damot Gale	2928	46.8	8.30				

In 2007 at Grade 4, in all subjects Bolosso Sore performed better than Damot Gale and the mean differences were statistically significant in all cases. The highest mean difference was observed in English which is 5.5% (Table 34).

**Table 34. Independent Sample t-test by Woreda G4 2007**

Subject	Woreda	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)	Mean Difference
Mathematics	Bolosso Sore	3802	48.9	5.06	26.7	7044	.000	3.1
	Damot Gale	3244	45.8	4.76				
English	Bolosso Sore	3802	47.2	7.42	33.5	7044	.000	5.5
	Damot Gale	3244	41.7	6.31				
Science	Bolosso Sore	3802	45.3	5.22	26.9	7044	.000	3.3
	Damot Gale	3244	42.0	4.98				
Average	<b>Bolosso Sore</b>	<b>3802</b>	<b>47.1</b>	<b>5.47</b>	<b>32.4</b>	<b>7044</b>	<b>.000</b>	<b>4.0</b>
	<b>Damot Gale</b>	<b>3244</b>	<b>43.2</b>	<b>4.75</b>				

#### 4.4.3 Achievement by School

Table 35 shows mean scores by school for Grade 4 in Bolosso Sore. The average score of the three subjects ranges from 37% to 62.2%. The highest achieving six schools scored from 50.2% to 62.2%. The remaining schools all scored below 50%. The lowest achieving three schools scored from 37% to 38.3%.

**Table 35. Mean Scores by School for Bolosso Sore G4 2010**

<b>Rank</b>	<b>School</b>	<b>Mathematics</b>	<b>English</b>	<b>Science</b>	<b>Average</b>
1	Mage Tiyo	57.1	64.0	65.5	62.2
2	Afama Mino	55.8	59.6	60.6	58.7
3	Dangara Madelcho	52.8	43.7	57.1	51.2
4	Korke Doge	53.6	45.1	54.9	51.2
5	Weybo	51.7	49.5	51.0	50.7
6	Tadisa	55.0	41.3	54.4	50.2
7	Chama Hembecho	51.9	40.6	50.4	47.6
8	Gurumo Koisha	51.9	40.8	48.7	47.1
9	Hembecho	50.9	39.9	49.9	46.9
10	Tiyo Hembecho	49.9	41.9	47.4	46.4
11	Dubo	51.8	40.6	46.4	46.2
12	Dola	49.7	36.9	48.3	45.0
13	Gido Homba	50.3	39.6	44.8	44.9
14	Wormuma	50.6	35.6	48.4	44.9
15	Admancho	49.3	37.4	47.5	44.7
16	Achura	48.4	40.9	43.2	44.1
17	Dangara Selata	49.2	35.4	46.0	43.5
18	Sore Homba	46.7	37.6	45.6	43.3
19	Hajo Selata	47.8	36.4	43.2	42.4
20	Yukara	46.8	36.7	43.7	42.4
21	Afama Bancha	46.3	36.6	43.0	42.0
22	Dache Gofera	43.1	34.3	47.2	41.5
23	Legama	47.2	30.3	37.5	38.3
24	Gara Godo	40.0	32.7	41.1	37.9
25	Basa Gofera	41.9	31.5	37.6	37.0
	<b>Total</b>	<b>49.3</b>	<b>39.5</b>	<b>47.4</b>	<b>45.4</b>

Table 36 shows mean scores by school for Grade 4 in Bolosso Sore. The average score of the three subjects ranges from 39.5% to 59.1%. The highest achieving five schools scored from 50.5% to 59.1%. The remaining schools all scored below 50%. The lowest achieving three schools scored from 39.5% to 40.7%.

**Table 36. Mean Scores by School for Bolosso Sore G4 2007**

Rank	School	Mathematics	English	Science	Average
1	Tadisa	62.5	61.0	53.7	59.1
2	Weybo	53.9	64.5	53.0	57.1
3	Himbecho	53.1	55.0	55.2	54.4
4	Gido Homba	52.5	50.8	48.9	50.7
5	Wormuma	56.5	52.7	42.4	50.5
6	Chama Hembecho	48.1	50.0	46.3	48.1
7	Afama Mino	50.6	50.9	42.5	48.0
8	Dubo	53.2	47.2	42.8	47.7
9	Dangara Madelcho	50.9	41.0	50.3	47.4
10	Korke Doge	46.2	51.6	44.4	47.4
11	Admancho	49.9	47.2	44.7	47.3
12	Gara Godo	49.7	46.8	44.4	47.0
13	Afama Bancha	47.5	45.0	48.0	46.8
14	Sore Homba	48.0	45.7	46.4	46.7
15	Dache Gofera	48.6	44.3	46.4	46.4
16	Dangara Selata	46.5	46.3	45.8	46.2
17	Metala Hembecho	47.3	45.1	46.0	46.2
18	Basa Gofera	47.9	45.1	42.8	45.2
19	Hajo Selata	46.4	43.6	41.8	44.0
20	Dola	45.9	40.4	40.2	42.2
21	Yukara	44.1	38.8	40.2	41.0
22	Gurumo Koisha	44.1	38.4	39.7	40.7
23	Legama	43.0	37.5	41.0	40.5
24	Achura	43.9	37.8	36.9	39.5
	<b>Total</b>	<b>48.9</b>	<b>47.2</b>	<b>45.3</b>	<b>47.1</b>

Table 37 shows mean scores by school for Grade 4 in Damot Gale. The average score of the three subjects ranges from 37% to 69.1%. The highest achieving five schools scored from 65.3% to 69.1%. The remaining schools five of them scored above 50%. The lowest achieving four schools scored from 37% to 39.9%.

**Table 37. Mean Scores by School for Damot Gale G4 2010**

<b>Rank</b>	<b>School</b>	<b>Mathematics</b>	<b>English</b>	<b>Science</b>	<b>Average</b>
1	Damota	71.5	63.3	72.5	69.1
2	Wandara Gale	71.2	67.1	66.0	68.1
3	Zamine Sibaye	59.6	70.6	71.4	67.2
4	Ade Koisha	67.0	59.7	69.4	65.4
5	Damot Bolosso	59.3	66.6	70.0	65.3
6	Harto Kontola	55.6	49.8	56.7	54.0
7	Damot Mokonisa	59.0	45.0	55.8	53.2
8	Chocha	58.5	44.7	55.9	53.0
9	Shakesho Shone	52.4	45.7	53.8	50.6
10	Buge	52.1	48.1	49.8	50.0
11	Obe Jage	53.2	42.0	51.5	48.9
12	Sha Sha Gale	54.4	39.3	51.8	48.5
13	Ade Ofa	50.2	41.5	52.4	48.0
14	Wandara	48.1	41.8	45.1	45.0
15	Wegera	48.9	39.5	45.2	44.6
16	Konasa	47.5	39.2	45.7	44.2
17	Bale Koisha	46.2	37.8	48.0	44.0
18	Gacheno	45.7	39.9	45.3	43.7
19	Mokonisa Woige	47.9	40.9	41.8	43.5
20	Harto Burkito	48.7	37.0	43.2	43.0
21	Aro Wegera	43.3	36.8	47.8	42.6
22	Damot Ofa	46.5	37.3	43.9	42.6
23	Zegere	43.0	38.9	42.1	41.3
24	Woshe Gale	43.1	36.7	39.8	39.9
25	Sibaye	44.2	33.9	38.0	38.7
26	Ade Damot	43.1	30.4	40.4	38.0
27	Ade cherake	40.5	33.2	37.3	37.0
	<b>Total</b>	<b>50.0</b>	<b>42.1</b>	<b>48.2</b>	<b>46.8</b>

Table 38 shows mean scores by school for Grade 4 in Damot Gale. The average score of the three subjects ranges from 35.2% to 49.8%. All the schools were scoring below 50%. The lowest achieving three schools scored from 35.2% to 37.2%.

**Table 38. Mean Scores by School for Damot Gale G7 2007**

<b>Rank</b>	<b>School</b>	<b>Mathematics</b>	<b>English</b>	<b>Science</b>	<b>Average</b>
1	Aro Wegera	51.5	57.1	40.9	49.8
2	Konasa	49.6	49.6	49.1	49.4
3	Obe Jage	50.9	45.5	48.8	48.4
4	Damot Ofa	49.6	47.6	45.8	47.7
5	Wandara	47.1	46.9	46.3	46.8
6	Harto Burkito	49.3	43.3	46.6	46.4
7	Harto Kontola	48.0	46.7	44.5	46.4
8	Buge	47.7	44.1	47.2	46.3
9	Woshe Gale	46.5	45.9	40.3	44.2
10	Ade Ofa	47.7	41.0	42.7	43.8
11	Damot Mokonisa	47.7	41.3	40.7	43.3
12	Sibaye	49.1	39.9	39.4	42.8
13	Sha Sha Gale	46.5	39.2	42.3	42.7
14	Zegere	42.5	38.7	42.3	41.2
15	Wegera	41.4	39.3	42.0	40.9
16	Ade Cherake	43.1	35.3	39.8	39.4
17	Mokonisa Woige	41.2	37.3	37.0	38.5
18	Ade Damot	38.8	37.4	35.4	37.2
19	Bala Koisha	41.4	31.7	35.3	36.2
20	Gacheno	39.0	32.6	34.1	35.2
	<b>Total</b>	<b>45.8</b>	<b>41.7</b>	<b>42.0</b>	<b>43.2</b>

## **5 Summary and Conclusions**

### **5.1 Summary**

The assessments were carried out during the 2007 and 2010 Academic Years at Grades 4 and 7 in all the schools of Damot Gale and Bolosso Sore woredas. The subjects tested were mathematics, English, science, biology, chemistry, and physics. A total of 6000 students at Grade 4 and 4000 students at Grade 7 took the tests. The 2007 test scores were taken as baseline data to make comparisons in subsequent years.

Based on the 2010 data the mean score for each subject was found below the passing mark set by the MoE (50%) for both Grade 4 and 7. In Grade 7, the mean score for mathematics (32.8%) was the least and 12 points lower than the average score (40.8%). Looking at the standard deviation the widest variation is in biology (8.6%) and the least is in mathematics. The distributions of the scores for all subjects are positively skewed. Indicating that only very few students were able to score highest scores. The average score is slightly positively skewed indicating the scores are more or less normally distributed. The only subject with mean score slightly above 50% is biology. When compared with the baseline data collected in 2007, gains are observed that range from 0.7% in mathematics to 18.8% in English. The average score was found higher by 3.9%. In Grade 4, the mean score for English (40.6%) was the least and 5.4 points lower than the average score (46%). Looking at the standard deviation the widest variation is in English (8.28%) and the least is in mathematics (6.66%). The distributions of the scores for all subjects are positively skewed. The English score was found highly skewed.

There exist positive relationship between the tested subjects and the correlations were statistically significant in all cases. This shows that students performing well in one subject did the same in the others. In Grade 7, Chemistry showed the strongest correlation (.925) with the average score indicating that those who did well in chemistry performed better overall. The correlation between mathematics (.544) and the average score was the least. In Grade 4 Environmental Science showed the strongest correlation (.969) with the average score. The correlation between mathematics (.793) and the average score was the least.

In the baseline data too there exist positive relationship between the tested subjects in all cases and the correlations were statistically significant at  $p < .01$ . Biology showed the strongest correlation (.954) with the average score indicating that those who did well in biology performed better overall. The correlation between mathematics and the average score (.728) was the least. In Grade 4, English showed the strongest correlation (.940).

The range of achievements in the five subjects and the average scores at Grade 7 show that only 10% of the candidates scored 51% and above. On the other hand at the bottom 10% of the examinee scored 33% and below. In mathematics 50% of the students scored less than 32% and only 10% were able to score 39% and above. It was only in biology the median score (or 50<sup>th</sup> percentile) equals 50%. In Grade 4, 10% of the examinee achieved a score of 54.7% and above in the average, and the bottom 10% scored at or below 37.3%. In English 50% of the students scored less than 39% and only 10% were able to score 50.2% and above. In mathematics the median score (or 50<sup>th</sup> percentile) equals 49%. The scores at the 10<sup>th</sup> percentile show that the most difficult subject for the low achievers was English. In the same way English is also the most difficult subject for the high achievers. Mathematics was relatively easier for the low achievers.

The range of achievements in the five subjects and the average scores at Grade 7 in 2007 show that pupils at the 90<sup>th</sup> percentile achieved a score of 49.8% in the average. This means only 10% of the candidates scored 49.8% and above. On the other hand, pupil at 10<sup>th</sup> percentile scored only 28.5% and this means 10% of the examinee scored at or below 28.5%. In mathematics 50% of the students scored less than 31.3% and only 10% were able to score 40.3% and above. The scores at the 10<sup>th</sup> percentile show that the most difficult subject for the low achievers was English followed by mathematics. On the other hand, the 90<sup>th</sup> percentile shows that the most difficult subject for the high achievers was English followed by mathematics. For both low and high achievers English was the most difficult subject. In Grade 4, only 10% of the candidates scored 51.7% and above and the bottom 10% scored at or below 37.6%. In English 50% of the students scored less than 44.1% and only 10% were able to score 54.3% and above. In mathematics the median score (or 50<sup>th</sup> percentile) equals 50.7%. The scores at the 10<sup>th</sup> percentile show that the most difficult subject for the low achievers was English. Science is the most difficult subject for the high achievers. Mathematics was relatively easier for the low achievers.

Looking at comparisons across subgroups, in Grade 7, boys achieved mean scores that were higher by 7.3% in the average score and 4.4% to 7.1% in the five subjects than girls. The mean difference in mathematics was the least indicating the subject was difficult for both groups. In the baseline data too boys achieved mean scores that were higher by 6.9% in the average score and 3.1% to 10.1% in the five subjects than girls. The mean difference in mathematics was the least indicating the subject was difficult to both groups. In Grade 4, boys achieved mean scores that were higher by 6.1% in the average score and 4.8% to 7% in the three subjects than girls. In English the mean difference was relatively low indicating the subject was difficult for both groups. In the baseline also, boys achieved mean scores that were higher by 4% in the average score and 3.8% to 4.3% in the three subjects than girls.

The mean difference in the average score was compared between the two *woredas* and the mean difference was very small in favor of Bolosso Sore. In mathematics Damot Gale performed better than Bolosso Sore. In all other subjects Bolosso Sore performed better but the mean differences were very small except for biology which is 2%. In the baseline data the mean difference in the average score was 4.7% in favor of Bolosso Sore. In all the subjects Bolosso Sore performed better and the differences were statistically significant. In Grade 4, in all subjects Damot Gale performed better than Bolosso Sore. The highest mean difference was observed in English which is 2.6%. The mean differences in the mathematics and science were very small and practically not significant.

Looking at the mean scores by school for Grade 7 in Bolosso Sore, the average score of the five subjects ranges from 34.1% to 52%. The highest achieving three schools scored from 50.5% to 52%. All the other schools scored below 50%. The lowest achieving three schools scored from 34.1% to 35.8%. In 2007 the average score of the five subjects were in the range of 30.4% to 49.9%. The highest achieving three schools scored from 48.6% to 49.9%. The lowest achieving three schools scored from 30.4% to 31.7%. In Grade 4, the average score of the three subjects ranges from 37% to 62.2%. The highest achieving six schools scored from 50.2% to 62.2%. The remaining schools all scored below 50%. The lowest achieving three schools scored from 37% to 38.3%.

In Damot Gale, the mean scores of the five subjects ranges from 33.3% to 51.8%. The highest achieving three schools scored from 46.7% to 51.8%. Only one school was found with an average score greater than 50%. In 2007, the mean scores of the five subjects ranges from 28.4% to 43.5%. The highest achieving three schools scored from 41.6% to 43.5%. There was no school with an average score of greater than 50%. The lowest achieving eight schools scored from 28.4% to 32.7%. In Grade 4, the average score of the three subjects ranges from 37% to 69.1%. The highest achieving five schools scored from 65.3% to 69.1%. From the remaining schools five of them scored 50% and above. The lowest achieving four schools scored from 37% to 39.9%.

## **5.2 Conclusions**

Based on the baseline and the 2010 data from Grades 4 and 7:

- there is a gain in the achievement scores in both grades,
- the achievement scores in all the subjects were found below the expected in both grades.
- boys performed better than girls, and
- there exist wide variations in the scores within the school and between the schools.

## References

- Kellaghan, T and Greaney, V. (2001). *Using Assessment to Improve the Quality of Education*, Paris: UNESCO, IIEP
- Kellaghan, T and Greaney, V. (2004). *Assessing student learning in Africa*, Washington D.C: The World Bank
- Kellaghan, T. (1992). *Examination Systems in Africa: Between Internationalization and Indigenization*. In M.A Eckstein and H.J. Noah (eds.), *Examinations: Comparative and International Studies*, Oxford: Pergamon
- Kellaghan, T. and Greaney, V. (2001). *The globalization of assessment in the 20<sup>th</sup> Century*. In *Assessments in Education*, 8, pp. 87-102
- UNESCO (2000). *The Dakar Framework for Action. Education for All: Meeting Our collective commitments*. Text adopted by World Education Forum, Dakar Senegal, 26-28, Paris: UNESCO
- UNESCO (2004). *Education for All: Is the World on Track?* EFA Global Monitoring Report, Paris: UNESCO
- World Conference on Education for All (1990). *World Declaration on Education for All*. Adopted by the World Conference on Education for All: Meeting Basic Learning Needs, New York: UNDP/ UNESCO? UNICEF/ World Bank