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Analysis of Kenya's expenditure in education, future sector cost scenarios and benefits of curriculum reform

Final report

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ASAL	Arid and semi-arid lands
BECF	Basic Education Curriculum Framework
BOM	Board of management
CBET	Competence Based Education and Training
CEMASTEA	Centre for Mathematics, Science and Technology
CUE	Commission for University Education
DFID	Department for International Development
ECDE	Early Childhood Development and Education
EDPG	Education Development Partners Group
EFA	Education for All
EMIS	Education management information system
ESQAC	Education Standards and Quality Assurance Council
GDP	Gross domestic product
GER	Gross Enrolment Rate
ICT	Information and communication technology
INSET	In-service training
IRI	Interactive radio instruction
KDHS	Kenya demographic and household survey
KICD	Kenya Institute of Curriculum Development
KNAPA	Kenya National Association of Parents Associations
KNBS	Kenya National Bureau of Statistics
KNEC	Kenya National Examinations Council
KNUT	Kenya National Union of Teachers
KPA	Kenya Publishers Association
KPSA	Kenya Private Schools Association
KPSA	Kenya Private Sector Alliance
Ksh	Kenyan Shillings

KTTC	Kenya Technical Trainers College
KUPPT	Kenya Union of Post Primary Teachers
LAY	Last available year
MOEST	Ministry of Education, Science and Technology
NCPWD	National Council for Persons with Disabilities
NESP	National Education Sector Plan
OPM	Oxford Policy Management
PER	Public expenditure review
PISA	Programme for International Student Assessment
PTR	Pupil teacher ratio
RTI	Research Triangle International
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SDG	Sustainable Development Goals
TSC	Teachers Service Commission
TTC	Teacher training college
TVET	Technical and Vocational Education and Training
UBE	Universal Basic Education
UNICEF	United Nations Children's Emergency Fund
USAID	United States Agency for International Development

1 Introduction

Kenya has made good progress in terms of access to education. The gross enrolment rate (GER) in pre-primary increased from 57.6% in 2004 to 76.5% in 2015; in primary the GER has increased from 88.7% in 2000 to 103.6% in 2015, and in secondary from 28.8% in 2005 to 63.3% in 2015 (MOEST, 2016). However, there are still issues in the system, such as late-entry into school, and inefficiencies like repetition and drop-out. In terms of equity, across the country more girls are enrolled than boys with the exception of the north eastern region where the reverse is true. Children from the arid and semi-arid lands are particularly disadvantaged, as are those from poorer households. Meanwhile learning outcomes are far below expectations. According to the 2014 Uwezo assessment, 39% of 7 to 13 year olds could solve class two numeracy and literacy problems. Again the north eastern region is far below the national average, and nationally girls out-performed boys on the tests, with the reverse in the north east (Uwezo, 2016).

In recent years, following the publication of Kenya's *Vision 2030* and the 2010 Constitution, momentum has grown behind ambitions to reform the education curriculum. This new curriculum would aim to align with the updated government policies and vision, as well as reflecting on criticisms of the sector and the existing curriculum. The curriculum reform process is led by the Ministry of Education, Science and Technology (MOEST), with the Kenyan Institute for Curriculum Development taking responsibility for technical development and advice to the Ministry.

As the Government of Kenya is reviewing various options for the design and implementation of the curriculum reform, Oxford Policy Management has been contracted by UNICEF on behalf of MOEST to support in providing evidence to aid decision making. This assignment was conceived as having three major components. First, to conduct an analysis of expenditure in the education sector and how it relates to overall public spending. This is intended to set the scene of spending trends – how much the sector receives and how it allocates those funds against sub-sector levels and types of spending. This analysis, in particular unit costs, provides a baseline to then project forward future costs under various assumptions. Second, to create a simulation model in order to produce and analyse scenarios of future costs to the sector, to better understand the implications of the curriculum reform for costs. These scenarios are purely hypothetical and depend on assumptions relating to policy decisions and exogenous factors, but they are intended to support stakeholders in deciding what policies are realistically affordable. Third, to review the likely benefits to come from the curriculum reform, in order to get a good picture of the main future costs and benefits.[1]

The objective of this assignment is to support the planning and decision-making process of MOEST, but also to support them in their discussions with other stakeholders including other parts of Government. This report sets out the findings from the analysis. In addition the interim findings were presented to a workshop of stakeholders in July 2016, which included demonstration of the cost projection model. The workshop was used to consult on assumptions to be used in the scenarios. This model will be provided to and owned by the Ministry of Education, allowing further scenarios and updates to be carried out.

The rest of this report is structured as follows:

Chapter 2 sets out the historical trend of the macroeconomic context. It describes recent trends in Kenya's population, including the population of children. This is followed by national resources in terms of GDP, government revenues and total government spending. Chapter 3 moves on to focus

[1] It is possible to include some benefits in the simulation model, most particularly enrolment. However benefits such as improved learning outcomes or economic and social returns cannot be modelled due to the additional layer of uncertainty and the lack of evidence for the extent to which changes will occur. This is discussed further in Chapter 7.

on the education sector, setting out an introduction to the sector's structure and performance. It goes into more detail in terms of enrolment over the last five years in the various levels of education, from early childhood education and development, through primary, secondary, technical and vocational education and training (TVET), teacher education and higher education, as these form starting points for the simulation scenarios. The backward looking analysis continues with a review of public spending on education in Chapter 4. This chapter shows levels of the education expenditure and how this breaks down by recurrent and development costs, salary and non-salary, and by levels of education. The unit costs of education are then estimated using total spending and enrolment by each level. Again, this analysis is critical to then setting up future cost scenarios. A brief review of potential off-budget costs of education is included, focusing on development partners and household expenditure.

From Chapter 5, the focus moves towards the future, starting with an introduction to the proposed curriculum reform. Here the evolution and rationale for the reform are explained, along with the major defining features of the proposal when compared to the current curriculum.

The implications of the curriculum reform for sector costs and resource needs are set out in Chapter 6. Firstly, the projections of the macroeconomic framework are shown, based on assumed growth rates, revenue generation and allocations to the education sector. Following this, forecasts of population are given. Finally three scenarios are set out for projecting financial costs of the sector, showing what they mean for enrolment and recurrent costs, particularly when the new curriculum is implemented which changes the structure of years of schooling. The implications for the financial gap are shown, with sensitivity analysis showing how the resource envelope would need to change to make the scenarios affordable. Finally, the development expenditure required to meet the new curriculum, such as new classrooms and laboratories, is estimated.

Chapter 7 looks at the anticipated benefits of the curriculum reform. It begins with the benefits estimated in the scenarios, which include the increase in human capital through enrolment and completion, and cost-savings from improving the efficiency of the sector. The chapter then draws on international experiences of implementing curriculum reforms, or interventions similar to those included in the reforms, to highlight useful implications for Kenya in designing and implementing its proposals. Finally, Kenya has articulated some of its expected benefits in the policies and development documents produced in recent years, and these are summarised.

Finally, Chapter 8 concludes by summarising the key findings in this report.

2 Macroeconomic context

This chapter sets out the recent trends in the country's population and wealth, as well as government revenue and spending. This is intended to put the curriculum reform into a wider context. The level of the population, and proportion of the population who are of school-age, have been provided to set out a baseline for the projections as presented in later chapters. Based on available data, the share of the country's wealth collected as domestic resources, and the amount spent by the government, have been documented. Where available, the last six years of data is shown, and in some cases data is shown for five years.

Box 1 Chapter 2: Key findings

- Kenya's population is growing at 2.8% per year, bringing it to 44.2 million in 2015.
- However real annual economic growth has averaged 5.5%, meaning increasing per capita incomes.
- Government domestic revenues have been stable at around 19% of GDP in recent years, but public expenditure has been between 23% and 26%, indicating a fiscal deficit.

2.1 Total and school age population

Kenya's population has been growing steadily in recent years, reaching over 44 million in 2015/16. Table 1 shows the development of Kenya's population between 2010 and 2015. The population censuses carried out in 1989, 1999 and 2009 have shown steady increases in population. According to the last population and housing census conducted in 2009 there were 38.5 million people in Kenya, this is projected to have grown at 2.8% per year to 44.2 million 2015.

Table 1 Total Population and School Age Population

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Population (millions)	38.473	39.545	40.652	41.788	42.961	44.163
Population Aged 3-17 (millions)	16.099	16.477	16.869	17.271	17.682	18.176

Source: Economic Survey (2014-2016)

The school-age population increased by about 2 million between 2010 and 2015 representing an annual average growth of 2.5%. The Ministry of Education defines the official age for basic education as children and youth between three and 17 years old. On average, this group constitutes about 40% of the total population in the country. In essence, more than half of Kenya's population falls outside this age category making them potentially active in generating the resources needed for the supply of basic education services. The dependency of the school age population slightly eased from 41.8% in 2010 to 41.2% in 2015. Continuing growth in population will increase pressure on the education sector through higher enrolment.

2.2 Gross domestic product

Kenya has seen relatively strong economic growth in recent years, in both nominal and real terms. [2] Table 2 shows the progression of the country's wealth over the last six years. Overall, the country's gross domestic product at market prices increased from Ksh 3.1 trillion in 2010 to Ksh 6.2 trillion in 2015, growing at an annual average rate of 14.5%.

[2] 'Real' or 'constant' prices are a way of measuring the real change in output. All prices are adjusted to what they would be in the base year (in this case 2014), so removing the effect of inflation. 'Market,' 'nominal' and 'current' prices refer to the actual price given in the year, and hence include any inflation.

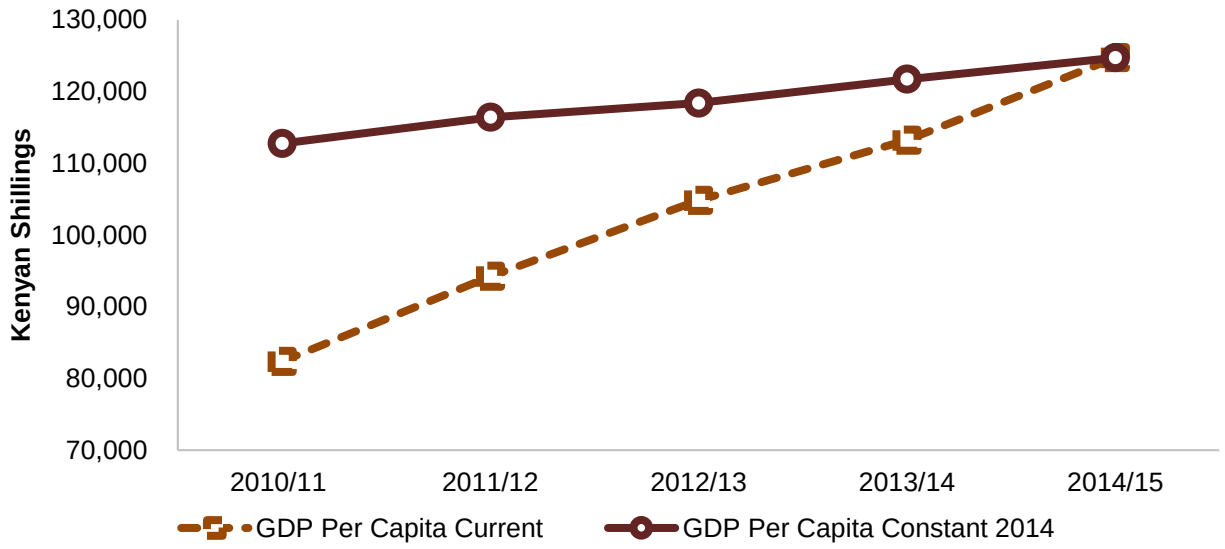
Table 2 Gross domestic product

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
GDP current (Ksh millions)	3,169,302	3,725,918	4,261,151	4,730,801	5,357,672	6,224,369
GDP constant (2014 Ksh millions)	4,338,212	4,603,254	4,812,924	5,086,648	5,357,672	5,660,879
Real GDP Growth (%)	-	6.1%	4.6%	5.7%	5.3%	5.7%
GDP per capita current (Ksh)	82,376	94,219	104,821	113,210	124,710	140,942
GDP per capita constant (Ksh) (2014)	112,759	116,405	118,394	121,726	124,710	128,183

Source: Economic Survey (2014 - 2016)

In real terms, the country's GDP increased from Ksh 4.3 trillion in 2010 to Ksh 5.7 trillion in 2015 (2014 prices), representing a real average annual growth of 5.5%. Real growth rates fell from 6.1% to 4.6% between 2011/12 and 2012/13, before growth accelerated to 5.7% in 2013 and has since remained more or less the same. **GDP has been growing faster than population, increasing the average citizen's wealth.** GDP per capita at market prices increased at an annual average rate of 11.3% from Ksh 82,000 to Ksh 141,000 between 2010 and 2015 (see Figure 1). At constant 2014 prices, the GDP per capita increased at an annual average rate of 2.6%.

Figure 1 GDP per capita, 2010/11 to 2014/15



2.3 Government resources and spending

Government revenues have remained fairly consistently around 19% of GDP in the last five years. As shown in Table 3, over the five years to 2014 government revenues fluctuated within less than a percentage point of GDP. **Meanwhile, government expenditure has been four to five percentage points higher, indicating a fiscal deficit.** The total government expenditure fluctuated from 24% in 2010, down to a low of 23.5%, and up to 25.9% of GDP. The difference between revenues and total expenditure implies the part of spending which is financed by grants or loans, and therefore is less predictable.

Table 3 Government resources and spending as a % of GDP

	2010/11	2011/12	2012/13	2013/14	2014/15
Total revenues excluding grants	19.4	19.4	18.8	18.8	19.4
Total government expenditure	24.0	23.5	23.7	23.7	25.9
Of which					
Recurrent expenditure	16.9	17.2	16.3	17.5	17.6
Development expenditure	7.1	6.4	7.4	6.6	7.1

Source: World Bank (2014)

Recurrent expenditure receives around 70% of government expenditure. Government expenditure is split between two categories: recurrent and development expenditure. Recurrent expenditure relates to the spending incurred in operating the services provided by the national government, whilst development expenditures are for the creation or renewal of assets. Development expenditure can be funded from government domestic revenues or relate to specific projects financed by development partners. According to the 2012 Public Financial Management Act, over the medium term recurrent expenditure should be financed purely from domestic revenues, and borrowing should only be used to finance development expenditure. The share of GDP allocated to recurrent expenditure fluctuated between 16.3% and 17.6%, and therefore remained well within Kenya's revenues. Development expenditure averaged about 7% of GDP during the period, fluctuating erratically between 6.4% and 7.1%.

3 Education sector overview

This chapter provides an introduction to the education sector, as an opening towards further analysis of the education sector budget and spending, and future scenarios. It begins by setting out the institutional structure of the education sector, defining the mandate of the key governing bodies in education. It moves on to set out the strategic framework in which the sector operates, from the national long term visions through to the sector specific plans and policies. This is followed by a brief overview of sector performance.

Finally, more detailed data on past enrolment trends is presented in section 3.4, as this forms a building block of the spending analysis in Chapter 4, where unit costs are calculated by comparing spending against enrolment. Enrolment is also the starting point for creating future sector scenarios, where assumptions about enrolment growth have implications for both costs and benefits in the sector.

Box 2 Chapter 3: Key findings

- At the national level, education comes under the purview of the Ministry Of Education, Science and Technology. However since the introduction of the 2010 Constitution, the 47 counties have responsibility for pre-school and vocational education.
- The education sector is directed by the National Education Sector Plan (NESP 2013-18), which has six priorities: governance, access, quality, equity, relevance, and social values.
- Access to education has increased substantially over the last decade or so, although 850,000 children remain out of school. There are still equity issues: girls are underrepresented at secondary school, and the arid and semi-arid lands (ASAL) have lower access levels.
- Learning outcomes are found to have been stagnant or declining over the last decade. Again there are wide disparities in learning outcomes, particularly with the ASAL areas falling behind.
- Secondary education has seen the highest enrolment growth since 2010, of 9.1% per year. ECDE enrolment growth was also high at nearly 6% each year. Primary growth was lower at 1.5%, but gross enrolment is already over 100%.
- The share of enrolment in private schools falls as the level of education rises.
- Over six years, enrolment in TVET almost doubled, and was close to tripling in universities – both seeing enrolment growth outstrip population growth.

3.1 Institutional structure

At the national level, education comes under the purview of the Ministry Of Education, Science and Technology (MOEST). MOEST's mission is to provide, promote and coordinate quality education, training and research; and enhance integration of science, technology and innovation into national production systems for sustainable development (MOEST 2016). MOEST's mandate is derived from the 2010 Constitution.

After the introduction of the 2010 Constitution, Kenya embarked on a reform to increase devolution of political power and government functions, aiming to ensure a more equitable distribution of resources and strengthen democracy. The constitution introduced 47 county governments, which are not subordinate to the national government according to the constitution. In Kenya, the responsibility for delivering pre-school and vocational education is held at the county level.

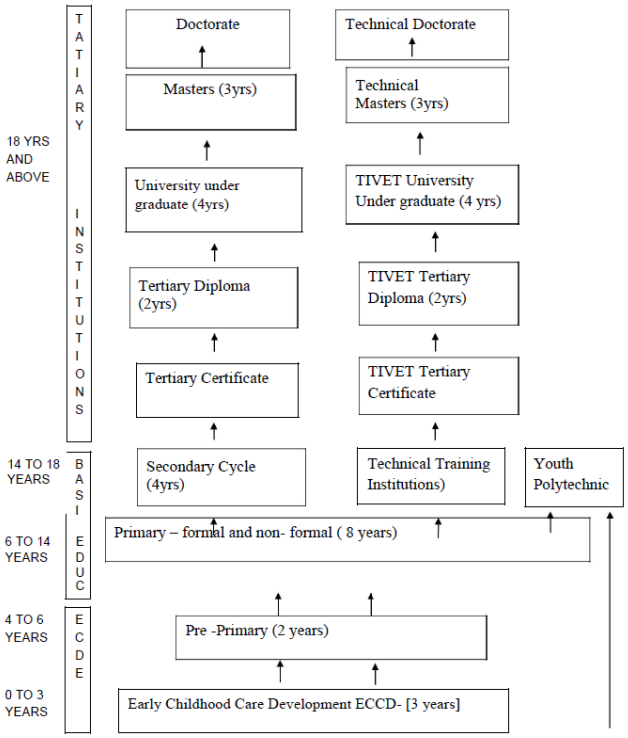
The national MOEST remains responsible for all policy and regulation, including standards, curriculum and examinations, and delivery of primary, secondary and tertiary education, and special education. Within MOEST, there are three State Departments: Education, University (Higher) Education and Vocational and Technical Education. In addition to some devolution to county level, public schools have a degree of autonomy because the free primary education grant

is a devolved fund, which schools receive as a direct transfer. School committees and parent teacher associations have authority for decisions about spending school budgets.

The Basic Education Act was (2013) operationalised the legal, institutional and regulatory shifts created by the 2010 Constitution. The Act re-defined basic education to cover primary and secondary education, introduced the National Education Board and County Education Boards in the 47 counties, established the National Council for Nomadic and Marginalized Education and mandated the Government to provide free and compulsory basic education.

The structure of the sub-sector levels of education is as follows: pre-primary education consists of two years, largely provided in centres attached to primary schools. Primary education is eight years, followed by four years of secondary education. University education for an undergraduate degree is also four years, and hence the system has been known as the '8-4-4' structure. Basic education consists of pre-primary, primary and secondary education, i.e. 14 years in total. There are options for technical and vocational training after primary and after secondary levels. Figure 2 below shows the structure of the system.

Figure 2 Structure and organisation of education and training



Source: MOEST (2014b) Education for All 2015 National Review

3.2 Strategy and policy framework

Vision 2030 is Kenya's long term strategic plan, written in 2008, and aims to turn Kenya into a newly industrialising, middle income country by 2030. The vision has three pillars: economic, social and political; in turn built on a number of foundations, including human resource development. Here, the vision aims to see lifelong training and education to meet the needed resource base for a rapidly industrialising country (Government of Kenya, 2007). This is elaborated further under the social pillar, where the overall goals for education are to reduce illiteracy by increasing access to education, improve transition from primary to secondary, raise the quality and relevance of education, and to integrate special needs education into learning and training institutions. Public and private universities are encouraged to emphasise science and technology courses.

The government, led by MOEST, developed the National Education Sector Plan (NESP, 2013-2018) as the five year programme for delivering the government's reforms as required by the Basic Education Act 2013, the Jubilee Manifesto 2012, Vision 2030, the national Medium Term Plan II (2013-18) and the 2010 Constitution.

The NESP emphasises a holistic and balanced development of the entire education sector, and sets out aspirations under six priority investment areas:

- Sector governance and accountability, including the education management information system (EMIS), communication and publicity, and school-based auditing;
- Access to free and compulsory basic education, including materials and operational expenses, infrastructure and laboratory investment, bursaries, grants and scholarships, special needs education, alternative provision of basic education, adult education, school health and meals, child-friendly schools, co-curricular activities, and education in emergencies;
- Education quality, including standards and quality assurance, early reading and mathematics, teacher management and education, capacity building for education managers and ICT;
- Equity and inclusion, including gender, most vulnerable children, and opportunities in arid and semi-arid lands;
- Relevance, including curriculum, examinations and assessments;
- Social competencies and values, including nurturing national values, education for sustainable development, life skills, guidance and counselling, peace, HIV and community empowerment.

Over the last fifteen years, the education sector has been dominated by a number of flagship policies, including Free Primary Education, which was introduced in 2003, Free Day Secondary Education, which was introduced in 2008, and compulsory early childhood education, introduced in the 2010 Constitution. In higher education, the Taskforce on Aligning Higher Education to the Constitution and Vision 2030 (Some, 2012) formed the basis for the New Universities Act, Science Technology and Innovation Act and the TVET Act noting the critical role TVET should play in national development.

3.3 Sector performance

As with many developing countries, Kenya has seen great success in terms of increasing access to education, reflecting its commitment and programmes such as free primary and day secondary education. Over the last decade or so, the gross enrolment rate in pre-primary increased from 57.6% in 2004 to 76.5% in 2015; in primary the GER has increased from 88.7% in 2000 to 103.6% in 2015, and in secondary from 28.8% in 2005 to 63.3% in 2015 (MOEST, 2016). The growth in enrolment has been facilitated by expansion in capacity, with the numbers of schools growing over the period 2009 to 2014 from 38,000 to 40,000 in early childhood development and education (ECDE), 23,000 to 29,000 in primary, and 6,000 to 9,000 in secondary.

That said, still more than 850,000 children aged six to 17 years old are out of school (Table 4). Of the 380,000 14 to 17 year olds out of school, still 21% have not ever attended any schooling.

Table 4 Numbers of out of school children by education level attained, 2014

	No school	Incomplete Primary	Complete Primary	Incomplete secondary	Complete Secondary +	Total
In Thousands						
6-9	278.3	20.7	0.0	0.0	0.0	299.0
10-13	136.0	25.7	8.3	1.3	0.0	171.3
14-17	78.9	82.0	175.8	44.8	0.4	381.9
Total	493.2	128.3	184.2	46.2	0.4	852.3
In %						
6-9	93.1%	6.9%	0.0%	0.0%	0.0%	100.0%
10-13	79.4%	15.0%	4.9%	0.8%	0.0%	100.0%
14-17	20.7%	21.5%	46.0%	11.7%	0.1%	100.0%
Total	61.5%	14.3%	19.3%	4.8%	0.0%	100.0%

Source: UNICEF, Out of school Children situation in Kenya (draft June 2016), based on KDHS 2014 (Kenya Demographic and Health Survey)

Whilst basic education is predominantly provided by the public sector, private schooling has been increasing, particularly in urban areas. The number of private primary schools has grown rapidly from 1441 in 2002 to 8719 schools in 2011 (Economic Survey 2006 and 2014, referenced in World Bank PAD June 2014). Low cost private schools have become the main education providers for children from the most disadvantaged background in informal urban settlements. By 2014, in pre-primary 31% of all enrolment was in the private sector, 16% of primary enrolment, and in secondary 7% of enrolment was in private schools (MOEST 2014a). Behind these averages, private primary enrolment ranged from as high as 61% in Nairobi to only 2% in West Pokot.

Despite the overall progress on access, there are still issues of inequity and marginalised groups. Although gender parity is almost reached on GER in pre-primary and primary, girls are still underrepresented in secondary school with a gender parity index (ratio of female GER to male GER) of 0.86 in 2010 (MOEST, 2015a). Geography is a particular issue for access, with the northern and eastern counties, particularly in arid and semi-arid lands, repeatedly showing lower rates of enrolment and other indicators of performance. Wajir, Mandera, Garissa and Turkana are amongst the counties frequently highlighted, with girls in these counties particularly disadvantaged.

Internal efficiency indicators are relatively stable through primary level, except for notable drops in the final two years. For example, promotion rates are around 90% for classes 1 to 6, but drop to 79% and 75% for classes 7 and 8 – and high drop-out rates in these final two classes (MOEST, 2014a; 2014 data). Currently, 80% of class 8 students transition into form 1 of secondary school. At the secondary level, promotion is very high for forms 1 and 2 at 100.7% and 99.8% respectively, but this drops to 90.1% in form 3 as completing secondary becomes more of a challenge. Despite the lower levels of enrolment of girls in secondary school, the indicators of efficiency are generally more positive for girls than for boys across primary and secondary (MOEST, 2014a).

Pupil teacher ratios are relatively low on average, at 31.1 in ECDE, 34.5 in primary and 20 students per teacher in secondary (all public schools). However, this includes Board of Management teachers who are employed by the BoM from community funds, rather than by the government through the Teachers Service Commission (TSC). Looking at just the TSC teachers, primary PTRs range from over 100 in Turkana down to just above 20 in Baringo, suggesting huge disparities in the provision of services across counties. In private schools, PTRs are around half – or less – that in public schools. Likewise, average class sizes are almost double that of private schools in public schools.

It has been reported that the rapid expansion of the education system has had a negative effect on the quality of education, as seen by various assessments of learning outcomes (World Bank, 2014b). In the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) assessment of standard 6 pupils, Kenya scores above the average for the 15 participating countries in both reading and mathematics in 2007 (SACMEQ, 2011). However between 2000 and 2007, there was a slight decline in the mean scores for both reading and mathematics suggesting some kind of stagnation. Furthermore, Kenya's reading proficiency dropped from second to fifth of the 15 African countries. The Uwezo 2014 assessment found that only 39% of children aged seven to 13 years could solve class 2 numeracy and literacy problems – and this has remained stagnant (or even declined) since 2011 (Uwezo, 2015).

As with access, there are wide disparities in learning outcomes across different groups. The Uwezo results explain this well: a child in the Central region is over seven times more likely to have attained a standard 2 level of literacy and numeracy than a child in the North Eastern region.

National examinations indicate a low level of educational attainment at secondary school, with three quarters of candidates not achieving the minimum grades required for admission to University (C+) or other middle level colleges (C-) (MOEST, 2015a). Poor education quality has been partly blamed on the curriculum, and hence the impetus for the curriculum reform, which is discussed further in Chapter 5.

With low results at secondary level, it thus follows that only a small proportion of secondary school leavers are admitted to public and private universities (7.7% in 2010/11 – less than one quarter of those who qualified) (MOEST, 2015a). University enrolment almost doubled in five years, from 123,000 in 2008 to 240,000 in 2012. Enrolment in technical institutions also doubled over the decade from 2003, reaching 128,000 in 2012 (MOEST, 2015a).

Kenya still faces challenges with the educational achievement of its adult population. According to the 2009 census, one quarter of the population have not even completed primary education (MOEST, 2015a). Meanwhile, again, there are large regional and gender disparities, with the arid and semi-arid lands and women having particularly low education outcomes. For example, female literacy rates were below 10% in Mandera, Turkana and Wajir counties, but 90% in Nairobi and Uasin Gishu counties.

3.4 Review of enrolment trends

Enrolment has grown across the levels of basic education in the last few years, with ECDE and secondary seeing particularly rapid growth. Table 4 presents a summary of enrolments in Kenya's public and private basic education system in between 2010 and 2015. The relationship between enrolment and spending trends is analysed in section 4.5, which looks at the average spending per student.

Table 5 Basic education enrolment trends, 2010-2015

	2010	2011	2012	2013	2014	2015
ECDE						
Public	1,746,670	1,832,060	1,914,188	1,993,055	2,068,659	2,136,600
Private	655,125	724,252	796,642	872,293	951,206	1,031,256
Total	**2,401,795**	**2,556,312**	**2,710,830**	**2,865,348**	**3,019,866**	**3,167,856**
Primary						
Public	7,902,766	8,088,028	8,235,300	8,358,123	8,359,488	8,634,457
Private	1,450,069	1,473,035	1,522,340	1,499,513	1,591,258	1,456,302
Total	**9,352,835**	**9,561,063**	**9,757,639**	**9,857,636**	**9,950,746**	**10,090,759**
Secondary						
Public	1,542,297	1,648,951	1,786,171	1,962,882	2,175,036	2,387,049
Private	111,087	118,769	128,652	141,380	156,661	171,932
Total	**1,653,384**	**1,767,720**	**1,914,823**	**2,104,262**	**2,331,697**	**2,558,981**
Total Basic Education	**13,408,014**	**13,885,095**	**14,383,293**	**14,827,246**	**15,302,309**	**15,817,596**

Source: Ministry of Education EMIS

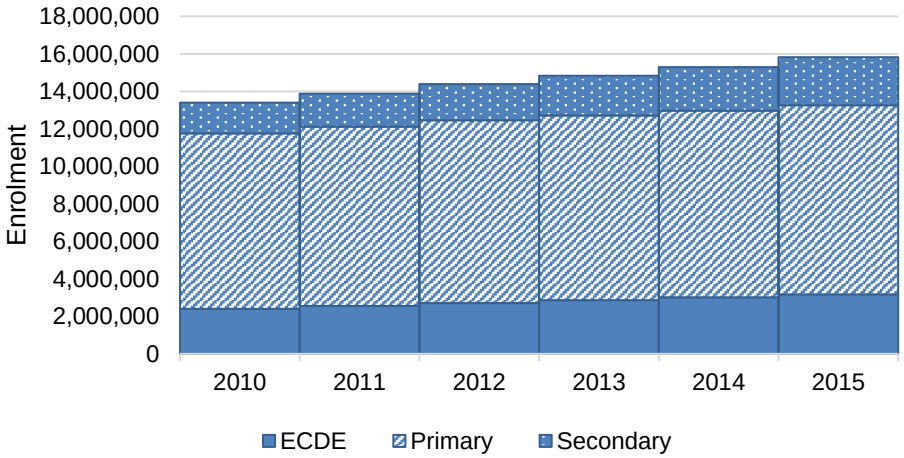
ECDE enrolment grew on average by 5.7% each year, from 2.4 million in 2010 to 3.2 million in 2015. Enrolment in private centres accounts for around 30% of all ECDE enrolment, and the annual growth rate for private ECDE enrolment was high at 9.5%, whereas public enrolment grew by 4.1% each year on average. The overall growth may be a response to the efforts by government to ensure children are well prepared before joining primary education. As part of this, the government ensured that each public primary school has a pre-primary centre established to facilitate the enrolment of all eligible learners from the nearby community.

At primary level, the overall enrolment increased by 7.9% over the five years, growing at an average annual rate of 1.5%. The net addition to the system between 2010 and 2015 was more than 700,000 pupils, making the total just over 10 million in 2015. The share of enrolment in private schools fluctuated around 15% during the period, in absolute terms ranging from 1.45 million to 1.6 million. Converse to the trend in ECDE, in primary schools the growth in enrolment in public schools has been much higher (1.8% annually) than in private schools (0.1% annual average).

Secondary education enrolment increased by almost one million students between 2010 and 2015, showing an annual growth of 9.1% in both private and public schools. Total enrolment reached 2.6 million in 2015. The share of private enrolment remained constant at 6.7%. The proportion of children in private schools falls as we move up the education ladder – at secondary level this could be due to the relatively higher fees collected in private compared to public secondary schools.

Figure 3 below summarises the evolution of enrolments in the basic education system. It is the total of ECDE, primary and secondary enrolments.

Figure 3 Basic (ECDE, primary, secondary) enrolment, 2010-2015



Source: Ministry of Education EMIS

At post-basic level, Table 6 below shows enrolment in teacher training, TVET and universities. The TVET enrolment relates only to the formal public sector TVET institutions under MOEST.

Table 6 Post-secondary enrolment trends, 2010-2015

	2010	2011	2012	2013	2014	2015
Teacher Trainees						
Primary - Public	17,750	18,158	17,667	21,008	21,214	22,818
Primary - Private	8,640	9,762	11,285	14,389	16,257	16,613
Diploma Trainees	1,463	1,693	1,744	1,716	2,382	1,971
Total	**27,853**	**29,613**	**30,696**	**37,113**	**39,853**	**41,402**
TVET						
Public	82,653	101,759	127,691	148,009	148,142	155,176
Private	-	-	-	-	-	-
Total	**82,653**	**101,759**	**127,691**	**148,009**	**148,142**	**155,176**
University						
Public	139,770	157916	196,737	289,733	363,334	427,034
Private	37,848	60,712	54,459	71,646	80,448	85,889
Total	**177,618**	**218,628**	**251,196**	**361,379**	**443,782**	**512,923**

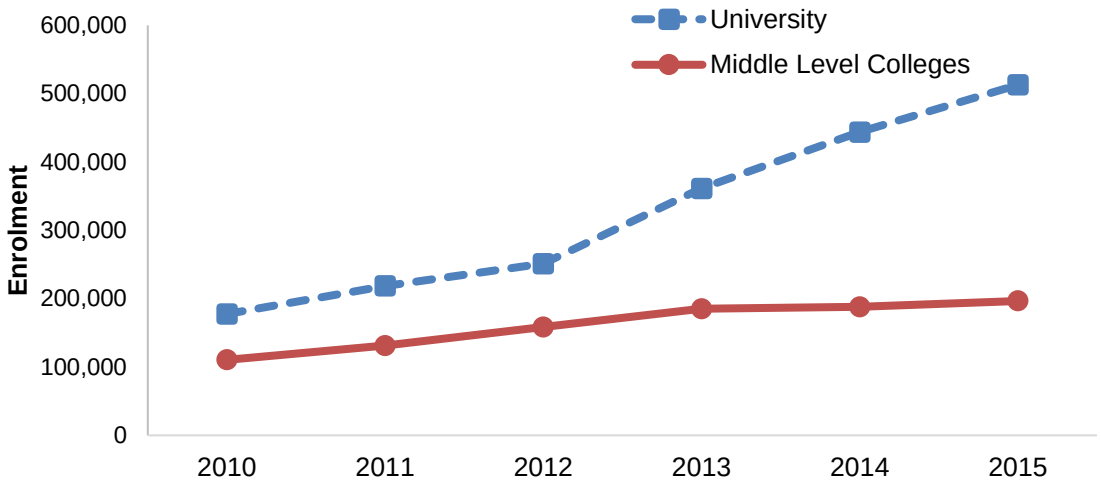
Source: Ministry of Education

Teacher trainees can be in private or public training for primary schools, or diploma students who are training for secondary schools. Enrolment in primary teacher training colleges increased from 26,000 trainees in 2010 to 39,500 in 2015, growing at an annual average of 8%. The proportion of these trainees in private institutions has increased gradually from around 32% to 42% over the five year period. Diploma teacher trainees who are directly deployed to secondary schools after training increased at an annual rate of 6% from approximately 1,500 trainees in 2010 to 2,000 in 2015.

TVET enrolment registered a double digit annual growth of 13% from 83,000 students to 155,000 in 2015. This growth was accelerated by the introduction of the Competence Based Education and Training (CBET) curriculum. Under the CBET, trainees take independent modules of a course or programme as opposed to having a multiple years programme. After acquisition of a set of skills, trainees are certified to go out and practice the field in which they have been trained.

Enrolment growth was highest in the university sector. University enrolment grew three-fold from 177,600 students in 2010 to more than half a million in 2015. This expansion relates to the end of the intake-pegged-to-bed capacity policy which has allowed more students to enrol based on tuition-capacity, and universities offer multiple shifts. Figure 3 below shows the trend in growth of enrolment in middle level colleges (teacher training and TVET) as well as universities.

Figure 4 Enrolment in universities and middle level colleges (teacher training and TVET)



Source: Ministry of Education

3.4.1 Education coverage

Gross enrolment rates (GER) – the level of enrolment divided by the relevant population – measure the extent to which the targeted population is covered by the education system. The ECDE GER improved significantly between 2010 and 2015, from 64.5% to 76.4%, representing an 18% increase. At the primary level, the GER has consistently registered more than 100% over the period under review. A GER greater than 100% indicates existence of overage and underage children enrolled in the system. At the secondary level there has been consistent growth in the GER from 45.7% in 2010 to 63.3% in 2015, a 17.6 percentage point increase.

Gross and net enrolment rates by county are presented in Annex B, showing the substantial variation. Across the levels, Mandera and Wajir are among the counties with the lowest gross enrolment rates. However interestingly Turkana has one of the lowest GERs for primary and secondary, but relatively higher GER in ECDE. The type of rapid expansion in enrolment seen recently in pre-primary and secondary, seen earlier in primary schools in Kenya, can have pressure on the system if resources are not growing at appropriate rates too. For example, the growth in primary enrolment after the introduction of free primary education in 2003 is argued by some to have contributed to a stagnation or even decline in quality (see Kimenyi, 2013). The extent to which this happens will also depend on what spare capacity the system already had for an increase in enrolment.

Table 7 Education coverage

	2010	2011	2012	2013	2014	2015
Gross Enrolment Rate						
ECDE	64.5%	67.0%	69.4%	71.6%	73.6%	76.4%
Primary	106.8%	106.7%	106.4%	105.0%	103.5%	103.6%
Secondary	45.7%	47.8%	50.5%	54.3%	58.7%	63.3%
Students/100,000 population						
TVET	214	257	314	354	345	352
University	461	552	617	864	1,033	1,162

Source: Ministry of Education

At TVET and university levels, coverage is computed by considering enrolments at these levels per 100,000 population. Overall, the number of students per 100,000 of the country's population has shown substantial increase. The enrolment rate for TVET gained 138 students from 214 in 2010 to 352 in 2015, while that of universities more than doubled from 461 in 2010 to 1,162 in 2015. A more detailed study may be valuable to look at the implications of this for the quality of provision.

4 Education sector budget and expenditure

This chapter looks in more depth at the public finances of the education sector in particular. It is intended to give a good understanding of how much the sector receives and how it chooses to allocate this resource. This can be used to assess the allocation of spending against priorities, as well as to compare the spending and efficiency between sub-sector levels and with other countries. In addition, the analysis presented here forms building blocks required for developing future sector scenarios, as presented in Chapter 6.

Chapter 4 begins by looking at the total government spending on education, and compares this with overall spending to see how far the sector is prioritised. As part of this, the average spending per member of the target population is shown to demonstrate the government's effort to education.

The chapter moves on to break down education expenditure by education levels from early childhood development and education (ECDE) to tertiary, indicating the sub-sectoral prioritisation by volume of expenditure. Special focus is put on basic education levels to detail recurrent and capital expenditures against the priority programs set out in the National Education Sector Plan. Recurrent expenditures are further disaggregated to economic classification i.e. salary and non-salary expenditure. An analysis of budget allocation versus expenditure is also provided to give a sense of implementation realities for the new curriculum should the status quo remain.

The review of enrolments in the previous section is used to compute average spending at the sub-sector levels. This gives some indication of which levels are receiving more resources, although does not necessarily tell us if the quality or efficiency is changing without a full situation analysis.

Finally, the off-budget spending is estimated, based on information from the development partners in the education sector and provisions from households.

This review sets out the trends to form the baseline for the future cost scenarios. However, this exercise is limited as it does not present a full analysis of why trends have occurred – this would require a full public expenditure review and situation analysis.

Box 3 Chapter 4: Key findings

- Government spending on education almost doubled in market prices between 2010/11 and 2015/16, and around 90% of this goes on recurrent expenditure. Spending has increased faster than school-aged population, increasing the real amount spent per child of school-going age.
- The education sector receives a substantial portion of all government spending, fluctuating around 14% - 20%, and 5.1-5.5% of GDP. Furthermore, education spending is equivalent to about one quarter of domestic revenues – the more predictable part of the budget.
- Primary education receives the largest share of spending at about 42%. Secondary receives the second largest share at about 31%, followed by university at around 15%. ECDE received only 0.2% in 2010/11, and the share has increased to 2% in 2014/15. Trends in recurrent expenditure are similar to those for overall expenditure.
- Development expenditure grew substantially in nominal terms over the last five years, and ECDE and TVET benefited from much of that increase. This reflects the operationalisation of county governments, and government focus on strengthening TVET institutions.
- Salaries account for between 60% and 66.5% of education recurrent expenditure, and in this teachers receive 90% of the salary bill. The average annual increase in the teachers' salary bill was 14%.
- Unit costs have generally been stagnant or falling in real terms, with the exception of pre-primary which has seen substantial increases in average spending. Where unit costs have fallen, this may reflect the increase in enrolment and resources not keeping up; a full situation analysis would explore what this means for quality of service provision and efficiency. Kenya's average spending on primary

pupils is slightly above average for a group of African countries with a similar primary cycle. Within Kenya, unit costs increase substantially at each progressive level of education.

- Development partners play a substantial role in financing education – and much of this is not recorded in the government's budget. Data from the DPs suggests this could be as much as USD 90 million per year, almost the same amount as the government spends on development.
- Households also make a significant off-budget contribution to education. Even those whose children are in public schools may be contributing around two thirds of the total amount that government spends on primary and secondary education.

4.1 Review of public education expenditure

Government spending on education almost doubled over the past six years, reflecting increases in enrolments and costs. Over 90% of this spending goes on recurrent activities, suggesting relatively less development spending happens in education than in other sectors, given the national average.

Table 6 shows a summary of key indicators in the evolution of public expenditure on education for the period 2010 to 2015. Government spending on education almost doubled in market prices between 2010/11 and 2015/16, increasing from Ksh 169 billion in 2010/11 to Ksh 319 billion in 2015/16. Recurrent expenditure on education increased by 87% from Ksh 159 billion in 2010 to Ksh 298 billion in 2015. More than 90% of education expenditure goes to recurrent items. Development expenditure averaged 5.9% of the total education expenditure, recording a high of 7.5% in 2014/15 and a low of 4.7% in 2012/13.

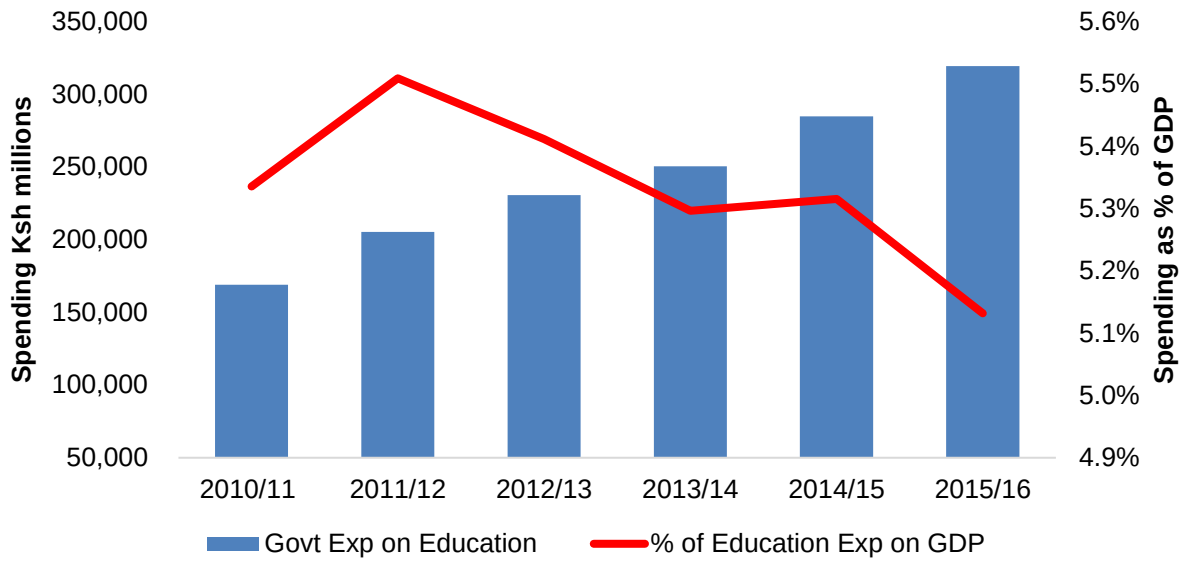
Table 8 Government expenditure on education, 2010/11-2015/16 (current prices)

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16*
Government expenditure on education (Ksh millions)	169,093	205,262	230,599	250,551	284,792	319,425
Of which						
Recurrent Expenditure	159,540	193,811	219,868	235,677	263,537	297,851
Development Expenditure	9,553	11,452	10,731	14,874	21,255	21,574
Proportion of education expenditure which is recurrent	94.4%	94.4%	95.3%	94.1%	92.5%	93.2%
Education expenditure as a share of total government expenditure	17.7%	20.2%	18.6%	16.3%	14.6%	14.4%
Education expenditure as share of GDP	5.3%	5.5%	5.4%	5.3%	5.3%	5.1%

Source: The National Treasury, Ministry of Education, Kenya National Bureau of Statistics, authors' calculations.
*Provisional – this is the approved budget for 2015/16.

Whilst the volume of government expenditure on education increased in market terms over the period, it is worth noting that expenditure on education as a share of GDP fluctuated. In 2010/11 education spending was worth 5.3% of GDP, and this share increased to 5.5% in 2010/11 but had fallen down to 5.1% in 2015/16 (provisional estimate). Figure 5 shows this visually. This may not be considered unusual where minor fluctuations are expected, as actual outturn across sectors varies depending on actual revenues and immediate priorities. If the recent trend towards a reduction in GDP going to education continues, this may suggest a shift in government priority away from education towards other sectors – though the government continues to put an increasing absolute amount into education each year.

Figure 5 Government expenditure on education, 2010/11-2015/16



The education sector continues to receive one of the largest allocations of government expenditure, having consistently spent more than 14% of the total government budget between 2010 and 2015. Over the last six years, the share of total spending going to education peaked at 20.2% in 2011 before falling about 6 percentage points to reach 14.4% in 2015.

Furthermore, around a quarter of total government recurrent spending goes to education – and this is equivalent to more than a quarter of government revenues (Table 9)**.** It is instructive to see how much of domestic revenue goes to education, since these revenues are more predictable, can be forecast, and do not depend on more volatile international factors and aid developments. This again reinforces the extent to which education has been prioritised in Kenya. At the same time, the high amounts could indicate that there may be little room for this proportion to increase further.

Table 9 Government recurrent expenditure on education, 2010/11-2015/16

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16*
Education Recurrent expenditure						
as a share of total recurrent expenditure	22.4%	25.7%	23.4%	23.1%	24.6%	24.3%
as a share of domestic revenue excluding grants	25.9%	26.8%	27.4%	26.5%	25.4%	-
as share of GDP	5.0%	5.2%	5.2%	5.0%	4.9%	4.8%

The National Treasury, Ministry of Education, Kenya National Bureau of Statistics, authors' calculations. *Provisional – this is the approved budget for 2015/16.

4.1.1 International comparison

Kenya commits slightly more of its GDP to education than comparable neighbouring east African countries.[3] On average, these countries with 7 or 8 year primary cycles spend 5% of GDP on education, nearly one percentage point more than the average for the entire continent. Within the six selected countries, Kenya spends more than the average, and significantly more than

[3] These countries were selected for comparison as they all have 7 or 8 years of primary school, so comparable to Kenya.

Ethiopia, Tanzania and Uganda. However Kenya's commitment to education is considerably lower than Malawi and Mozambique.

Table 10 International comparison: education spending and completion rates

Country	Education as % of GDP (LAY*)		Completion rates (%) (LAY)		Efficiency index	
	% (a)	Relative to average (b)	G6 (c)	G9 (d)	c/a	d/a
Kenya	**5.3**	**1.1**	**99.6**	**63.1**	**20.3**	**12.8**
Ethiopia	4.5	0.9	50.7	33.0	10.3	6.7
Malawi	6.9	1.4	75.0	17.1	15.2	3.5
Mozambique	6.7	1.3	56.4	24.0	11.5	4.9
Uganda	3.3	0.7	79.7	33.3	16.2	6.8
Tanzania	3.5	0.7	83.7	45.9	17.0	9.3
Average selected countries	**5.0**	**1.0**	**74.2**	**36.1**	**15.1**	**7.3**
Average Africa	4.3	0.9	67.0	37.0	13.6	7.5

Source: UIS, IIEP-Pôle de Dakar, World Bank. *LAY: Last available year, circa 2013.

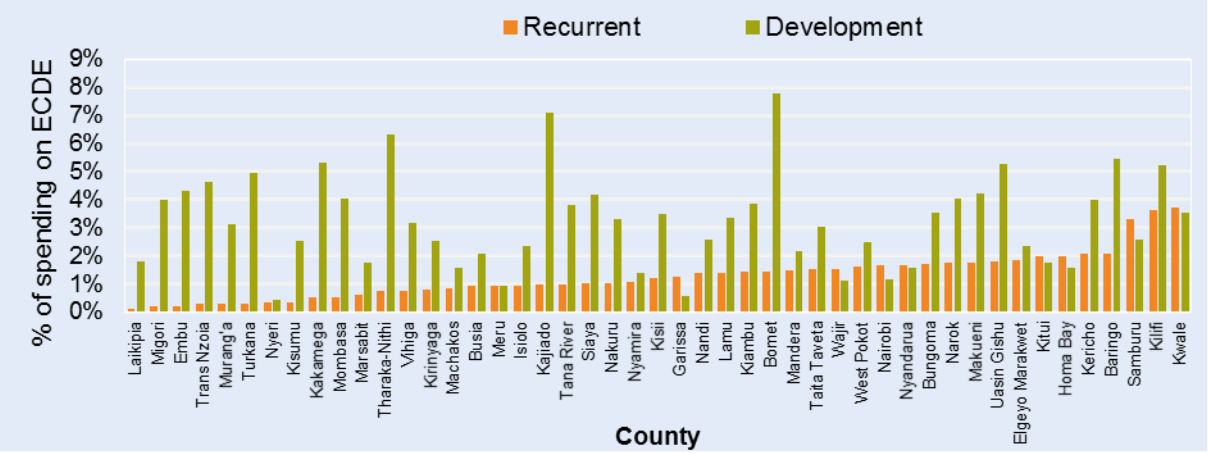
Kenya has the highest Grade 6 and Grade 9 completion rates among the selected countries, making it the most efficient at delivering on this measure of outcomes. Grade 6 completion for Kenya is 34% higher than the average for the selected countries and for grade 9 it is 75% higher. For comparison, this means from 1% of GDP spent on education, Kenya gets about 20.3 points of Grade 6 and 12.8 points of Grade 9 completion,[4] far above the other selected countries and far better than the African average. Malawi, which spends 1.6 percentage points more of their GDP on education relative to Kenya, only manages 15.2 points of completion to grade 6 and 3.5 points to grade 9 for each 1% of GDP spent. Mozambique only delivers 11.5 points of completion to grade 6 and 4.9 points to grade 9 per every percentage of GDP.

4.1.2 Counties' spending on ECDE

Counties are responsible for early childhood development and education, and as such pre-primary expenditure falls under their budgets rather than national government. Estimates of counties' spending in 2014/15 suggests there is wide variation in the proportions committed to ECDE (see Figure 6). In terms of recurrent spending, counties spent as low as 0.1% (Laikipia) and as high as 3.7% (Kwale) of all recurrent expenditure on ECDE, and the average was 1.3%. Meanwhile development spending also varied widely, from 0.4% (Nyeri) up to 7.8% (Bomet) with an average of 3.2% of all development spending on ECDE. However, there is no correlation between a county's share of recurrent spending and its share of development spending on ECDE. Annex D shows more detail on the counties' spending.

[4] This is calculated as the proportion of children completing grade 6 (or grade 9) divided by the spending on education as a proportion of GDP.

Figure 6 Counties' spending on ECDE as a proportion of their overall spending, 2014/15



Source: Controller of Budget County Expenditure Report 2014/15 and authors' calculations. See Annex B.

4.1.3 Budget execution

Budget execution has been relatively strong for recurrent spending, and lower for development spending, although this has been improving. Recurrent spending was between 94% and close to 100% of budget allocation over the last four years (Table 11). Meanwhile development budget execution was as low as 72% in 2011/12 but increased to 88% in 2014/15.

Table 11 Budget execution rates in education

	2011/12	2012/13	2013/14	2014/15
Allocation (Ksh millions)				
Recurrent	199,750	220,991	243,727	280,904
Development	15,858	14,525	18,970	24,121
Total	215,608	235,516	262,697	305,025
Expenditure (Ksh millions)				
Recurrent	193,811	219,868	235,677	263,537
Development	11,452	10,731	14,874	21,255
Total	205,262	230,599	250,551	284,792
Execution Rate (%)				
Recurrent	97.0%	99.5%	96.7%	93.8%
Development	72.2%	73.9%	78.4%	88.1%
Total	95.2%	97.9%	95.4%	93.4%

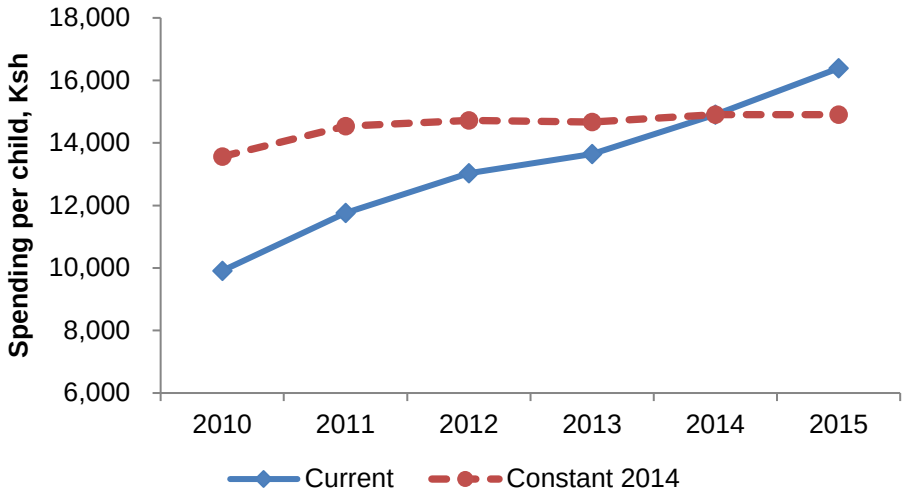
Note: Execution rate for counties' education spending was assumed to be the same as the overall county budget execution rate.

4.2 Government effort to education

Government has been increasing its effort to education over recent years, measured by the average spend on education per child in the population. Figure 7 presents the evolution of this government effort in Kenya, which at market prices shows an annual average growth of 13.4%, having increased from about Ksh 10,000 in 2010 to Ksh 16,000 per child. Looking at the effort in constant prices the effort increased notably in real terms between 2009 and 2011, before assuming marginal increments between 2011 and 2015. This reflects a number of underlying movements:

spending has been increasing in nominal terms but at the same time inflation has worn away some of that increase; at the same time population has been increasing (see Table 1) which means the growth in spending is spread amongst more children.

Figure 7 Government effort to education



4.3 Education budget by sub-sectors of education

Public education expenditure is shared between pre-primary (early childhood development and education), primary education, secondary education, post-secondary non-tertiary education; technical vocational education and training (TVET), and higher education; as well as administrative expenditure. Table 12 shows the spending by these levels each year from 2010/11 to 2014/15 and Figure 8 shows the distributions as percentages.

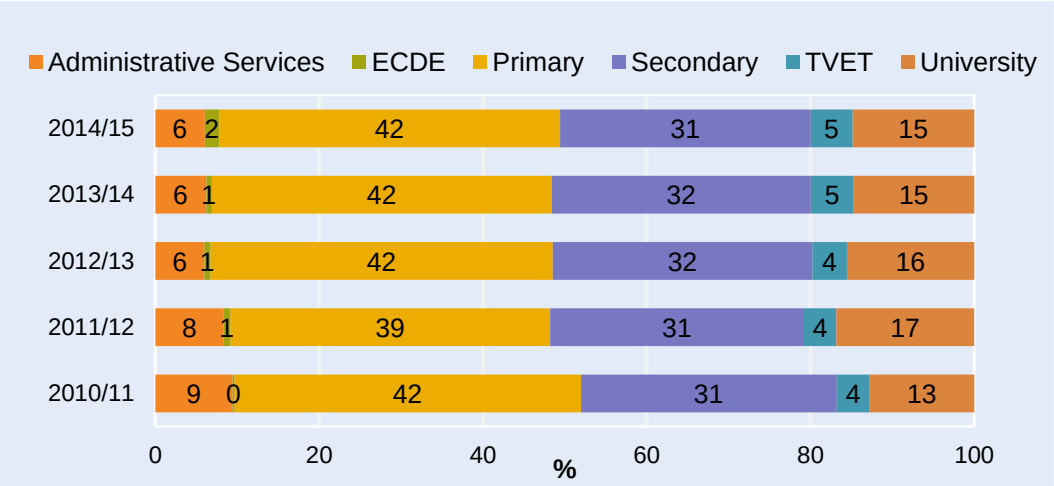
All levels of expenditure increased in absolute terms each year in the review period. Administrative expenditure is shared across the various levels, and ranged between 6% and 9% of all spending for the review period. Pre-primary education expenditure was only 0.2% of the total education expenditure in 2010, but has since grown to about 2% in 2014/15, reflecting the operationalisation of county budgets. Primary expenditure including teachers' salaries constitutes the biggest single share of the total education expenditure, ranging between 39% and 43%. Secondary is the second largest constituent with about one third of total expenditure dedicated to secondary programmes and salaries. The expenditure on universities ranged from 13% to 17% while TVET accounts for about 5% of total education expenditure.

Table 12 Education expenditure by levels (current Ksh millions)

	2010/11	2011/12	2012/13	2013/14	2014/15
Administrative Services	15,943	17,118	13,825	15,573	17,137
ECDE	405	1,687	1,687	1,675	5,073
Primary	71,546	80,184	96,409	104,062	118,590
Secondary	52,780	63,595	73,119	79,230	87,108
TVET	6,836	8,090	9,686	13,133	14,603
University	21,583	34,589	35,873	36,877	42,281
Grand Total	**169,093**	**205,262**	**230,599**	**250,551**	**284,792**

Source: The National Treasury, Ministry of Education, Kenya National Bureau of Statistics

Figure 8 Distribution of education spending by levels



Source: The National Treasury, Ministry of Education, Kenya National Bureau of Statistics

Primary education takes the largest share of recurrent spending, ranging between 40.6% and 43.7%, and this category includes primary teachers' salaries. Table 13 looks specifically at the allocation of recurrent spending across the levels of education. Secondary education receives around one third of recurrent expenditure. TVET received around 4% of the total education recurrent expenditure, with fluctuations around this point. Recurrent expenditure on universities increased from 11.8% in 2010 to 16.1% in 2011 and has since fallen to 13.7%. There was a striking increase in allocation to ECDE from only Ksh 380 million in 2010/11 to almost Ksh 1,700 million in 2011/12 as counties took responsibility for ECDE level.

Table 13 Recurrent expenditure by level of education

	2010/11	2011/12	2012/13	2013/14	2014/15
Spending (Ksh millions, current)					
Administrative Services	13,064	12,762	12,124	12,104	15,209
ECDE	380	1,678	1,678	1,675	2,180
Primary	69,145	78,686	94,911	102,571	115,049
Secondary	51,369	61,385	70,909	75,583	84,852
TVET	6,836	8,090	7,946	9,624	10,206
University	18,746	31,210	32,300	34,119	36,042
Total	**159,540**	**193,811**	**219,868**	**235,677**	**263,537**
Spending (% of total)					
Administrative Services	8.2%	6.6%	5.5%	5.1%	5.8%
ECDE	0.2%	0.9%	0.8%	0.7%	0.8%
Primary	43.3%	40.6%	43.2%	43.5%	43.7%
Secondary	32.2%	31.7%	32.3%	32.1%	32.2%
TVET	4.3%	4.2%	3.6%	4.1%	3.9%
University	11.8%	16.1%	14.7%	14.5%	13.7%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: The National Treasury, Ministry of Education, Kenya National Bureau of Statistics

Development expenditure grew substantially in nominal terms over the last five years, and ECDE and TVET benefited from much of that increase. Table 14 below presents the breakdown

of development expenditure across the levels of education including administrative services. The volume of development expenditure grew by Ksh 11,700 billion over five years, more than 120% increase. Over five years, there has been significant capital investment at secondary, TVET and university levels. Investment in ECDE grew substantially in 2014/15 with the operationalisation of county governments, with the sub-sector receiving 13.6% of development expenditure, compared with less than 0.3% in the previous four years. In addition, following the adoption of the 2010 Constitution and creation of county governments, there was an immediate need to establish county offices for education services, requiring new buildings and vehicles. This explains why the share of development expenditure directed to administrative services was high over the review period.

The TVET sector also gained priority, receiving over Ksh 4 billion in 2014/15, compared to no investment in 2010/11 and 2011/12. The increment was part of the government's strategic focus on TVET, increasing capacity of existing institutions as well as establishing new ones to ensure secondary school leavers who do not enter university can find a place to pursue technical training.

Table 14 Development expenditure by level of education

	2010/11	2011/12	2012/13	2013/14	2014/15
Development as % of Educ Exp	5.6%	5.6%	4.7%	5.9%	7.5%
Spending (Ksh millions, current)					
Administrative Services	2,879	4,356	1,701	3,469	1,928
ECDE	24	9	9	0	2,894
Primary	2,401	1,498	1,498	1,492	3,541
Secondary	1,411	2,210	2,210	3,647	2,256
TVET	0	0	1,740	3,509	4,397
University	2,837	3,379	3,573	2,757	6,239
Total	**9,553**	**11,452**	**10,731**	**14,874**	**21,255**
Spending (as % of total)					
Administrative Services	30.1%	38.0%	15.9%	23.3%	9.1%
ECDE	0.3%	0.1%	0.1%	0.0%	13.6%
Primary	25.1%	13.1%	14.0%	10.0%	16.7%
Secondary	14.8%	19.3%	20.6%	24.5%	10.6%
TVET	0.0%	0.0%	16.2%	23.6%	20.7%
University	29.7%	29.5%	33.3%	18.5%	29.4%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Ministry of Education, the National Treasury

The government invested in primary schools through rehabilitation of existing classrooms and establishment of new ones in selected schools. The share of development spending at secondary education has been significant over the years, rising from 14.8% in 2010/11 to 24.5% in 2013/14, as the government expanded of secondary schools to achieve higher transition from primary. The amount, and share, went down in 2014/15.

With the implementation of double intake at university and with the government having a policy shift from intake-pegged-to-bed capacity to intake-pegged-to-tuition capacity there has been a consistency in the investment made in public universities with the share averaging close to 30% over the period.

4.3.1 Spending on the NESP priorities

The National Education Sector Plan (NESP) under operation between 2013 and 2018 was conceptualised to address six key priority areas, as summarized in Table 15 below. The priority areas transcend the entire education system. At the time of planning, it was estimated that the cost of ongoing activities as well as anticipated reforms in the sector would cost Ksh 275 billion in the 2014/15 financial year. In addition, tertiary education which includes TVET was projected to cost Ksh 67 billion. Out of the total, 52% was estimated to be the cost associated with quality education. This cost was inclusive of payment of teacher salaries, additional teacher recruitment, and conducting research to facilitate pedagogical development of teachers. Reforming the basic education curriculum to make it relevant was estimated to cost Ksh 881 million.

Table 15 Expected cost of education sector priority areas

Priority	Expected cost 2014/15	
	(Ksh millions)	%
Access to Free & Compulsory Basic Education	91,079	27%
Education Quality	179,222	52%
Education Relevance	881	0%
Equity and Inclusion	2,319	1%
Governance & Accountability	595	0%
Social Competencies & Values	958	0%
Tertiary Education	67,126	20%
Grand Total	342,180	100%

Source: NESP Volume Two - Operational Plan

Actual spending on the sub-sectors of education in 2014/15 shows some similarities to the NESP projections. Although actual expenditure cannot be mapped exactly against the priorities in the NESP, spending by programme or sub-sector is shown in Table 16 below. Overall, the total spending was not as high as the projected requirement of Ksh 342 billion. Whilst teacher resource management did not receive as high a spend as required (Ksh 170 billion actual compared with Ksh 179 billion), it received a much higher share of all spending than expected, particularly since the 52% projection for education quality included other costs relevant to quality. With teachers taking a large share, the proportion going to ECDE, primary and secondary – aligning more closely to access – is much lower than the projected Ksh 91 billion, at only Ksh 56 billion (20%).

Table 16 Education sector expenditure by programme

Program	Actual spend 2014/15	
	Ksh millions	%
Administrative services	10,424	4%
ECDE – County spending	5,066	2%
Primary Education	20,197	7%
Secondary Education	30,445	11%
Teacher Resource Management	169,856	60%
TVET & Youth Training	6,522	2%
Higher Education	42,281	15%
Grand Total	284,792	100%

The expected cost of the development of the curriculum reform has now been revised to Ksh 1,693 million in total by 2024, actually much lower than the lifetime costs estimated in the NESP, which were Ksh 881 million in just one year.

4.4 Review of salary and non-salary expenditure

In projecting forward the costs of the sector, it is critical to understand how spending has been distributed in terms of economic classification – salaries, goods and services and investments.

The sector's salaries account for between 60% and 66.5% of the total recurrent expenditure, leaving the remaining for other running costs to support quality education. Table 17 below shows the decomposition of education recurrent expenditure into four classifications, separating salary and non-salary items. Salaries in the sector are included in 'compensation', and spending here grew from Ksh 106 billion to Ksh 173 billion representing a growth of 63% in four years. The level of salary spending is important for budgeting as the Government, and the education ministry in particular, generally has little room to reduce the wage bill. Grants and transfers include the Free Primary Education and Free Day Secondary Education funds as well as tertiary student grants, and these ranged between one fifth and one quarter of the recurrent expenditure.

Table 17 Salary and non-salary expenditure, 2010/11-2014/15 (current Ksh millions)

Economic Classification	2010/11	2011/12	2012/13	2013/14	2014/15
Compensation to Employees	106,120	116,384	142,148	156,392	173,465
Grants and Other Transfers	31,138	50,889	50,912	52,614	57,274
Use of goods and services	5,473	3,872	4,114	4,806	4,793
Other Recurrent	16,809	22,666	22,694	21,864	28,006
Grand Total	**159,540**	**193,811**	**219,868**	**235,677**	**263,537**

Source: The National Treasury, Ministry of Education, Kenya National Bureau of Statistics

The total teachers' wage bill accounts for more than 90% of the salaries in the sector, and grew by close to 70% between 2010 and 2014 at an annual average rate of 14%. Primary teachers' salaries constitute about 60% of the total teachers' salaries, secondary accounts for 35%, while teachers in teacher training colleges and TVET institutions about 5% (Table 18). These are all employed by the Teachers Service Commission and are fully compensated by Government.

Table 18 Spending on teacher salaries, 2010/11-2014/15 (current Ksh millions)

	2010/11	2011/12	2012/13	2013/14	2014/15
Primary Teachers	58,330	65,995	82,219	90,330	98,379
Secondary Teachers	33,522	37,927	47,251	51,912	56,538
Post-Secondary Teachers	4,786	5,415	6,746	7,412	8,072
Grand Total	**96,638**	**109,337**	**136,217**	**149,654**	**162,989**

Source: The National Treasury, Ministry of Education, Kenya National Bureau of Statistics

4.5 Recurrent Costs per Pupil/Student

Unit costs across the sub-sectors have generally been stagnant or falling in real terms, with the exception of pre-primary which has seen substantial increases in average spending (Table 19). In constant prices, ECDE cost per pupil increased significantly from Ksh 300 in 2010 to around Ksh 1,000 in the following years, though with fluctuations. At primary level there was an

increase in the unit cost by 15% from 11,976 in 2010 to 13,763 in 2015. At secondary level, cost per student decreased by about 14% over the same period. Real unit costs for both TVET and university levels fell notably over the period, such that 2014 spending per student was around 65% and 54% of the 2010 levels for TVET and university respectively. These sectors experienced substantial increases in enrolment, and the reduction in unit cost could reflect more efficient use of resources, or a prioritisation away from TVET and university within the education sector. Further research into the TVET and university sectors may be worthwhile to understand this better.

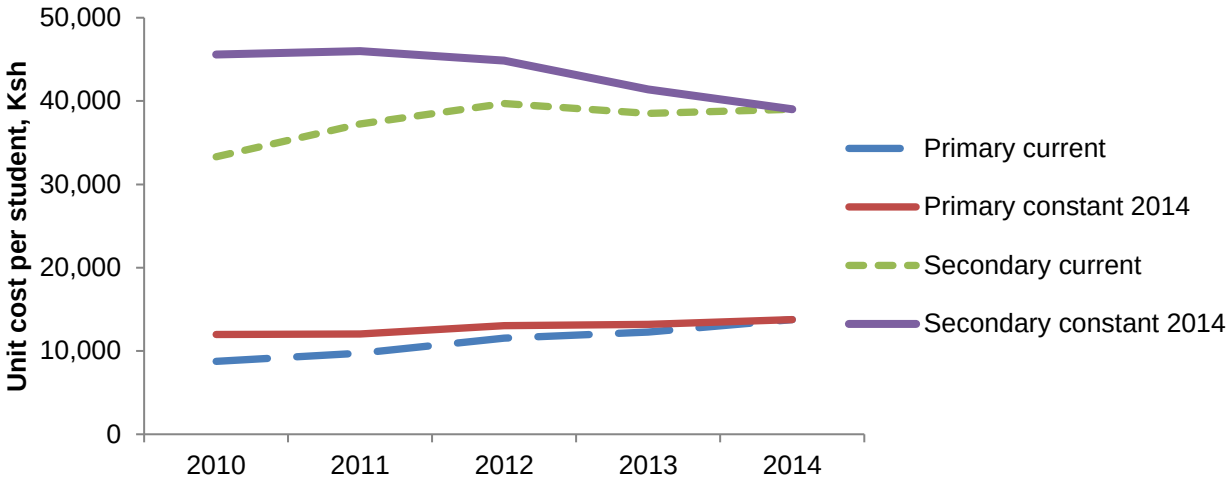
Table 19 Student unit costs in public institutions, 2010-2014

	2010	2011	2012	2013	2014
In constant Ksh 2014					
ECDE	298	1,132	990	904	1,054
Primary	11,976	12,019	13,017	13,195	13,763
Secondary	45,591	45,992	44,840	41,403	39,012
TVET	91,861	82,189	61,014	60,611	59,429
University	183,587	244,174	185,437	126,620	99,199
In current Ksh					
ECDE	218	916	877	840	1,054
Primary	8,749	9,729	11,525	12,272	13,763
Secondary	33,307	37,226	39,699	38,506	39,012
TVET	67,109	66,525	54,019	56,371	59,429
University	134,120	197,637	164,178	117,762	99,199
In % of GDP per capita					
ECDE	0.3%	1.0%	0.8%	0.7%	0.8%
Primary	10.6%	10.3%	11.0%	10.8%	11.0%
Secondary	40.4%	39.5%	37.9%	34.0%	31.3%
TVET	81.5%	70.6%	51.5%	49.8%	47.7%
University	162.8%	209.8%	156.6%	104.0%	79.5%

Source: Authors' Calculations

Meanwhile in current prices, government spending per pupil increased for ECDE, primary and secondary education, but as with the constant price unit costs, decreased dramatically for TVET and university between 2010 and 2014. Figure 9 below shows how per pupil spending increased in current terms but less so in constant terms in both primary and secondary.

Figure 9 Cost per pupil/student in primary and secondary, 2010-2014 (current and constant prices)



Expressing the unit cost per pupil/student in relation to per capita GDP is interesting because it shows its evolution relative to the real development of the economy. This is also shown in Table 19 above. At primary level, the cost per pupil remained relatively stable relative to GDP per capita over the period, at around 10.8%. At secondary, TVET and university, the cost per student as a percentage of GDP per capita dropped by 9, 34 and 83 percentage points respectively.

Compared to its neighbours with 7 or 8 year primary cycles, Kenya's unit cost of primary is above the average. Ethiopia and Kenya spend similar amounts per pupil in primary education as a share of their GDP, while Malawi and Mozambique spend about 20% more per pupil than the case in Kenya. Uganda and Tanzania spend much less than Kenya in primary education. Reflecting on the comparisons in section 4.1.1, rather than seeing Kenya as spending too much or too little, Kenya is more efficient in delivering outcomes (primary completion) than any of these other countries.

Table 20 International comparison: unit cost per pupil in primary as % of GDP per capita

Country	Unit cost as % of GDP per capita
Kenya	**11.0**
Ethiopia	11.1
Malawi	13.1
Mozambique	12.5
Uganda	6.9
Tanzania	9.3
Average selected countries	**10.7**
Average Africa	10.5

Source: UIS, IIEP-Pôle de Dakar, World Bank

Another measure often used to review unit costs in education is the ratio of unit cost in each level compared to that of primary (Table 21). In 2014, secondary, TVET and University student received 2.8, 4.3 and 7.2 times more resources respectively from the government relative to pupils enrolled in primary education. These were all substantial reductions from 2010, when spending per student in these levels was 3.8, 7.7 and 15.3 times the primary spending per pupil.

Table 21 Unit costs in public institutions relative to primary school unit costs, 2010-2014

	2010	2011	2012	2013	2014
ECDE	0.02	0.09	0.08	0.07	0.08
Primary	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Secondary	3.81	3.83	3.44	3.14	2.83
TVET	7.67	6.84	4.69	4.59	4.32
University	15.33	20.31	14.25	9.60	7.21

Source: Authors' Calculations

In summary, in real terms the country increasingly spent more on each pupil at ECDE and primary education and much less on each student enrolled at secondary, TVET and university over the last five years. This notwithstanding, even after the sharp decrease at secondary, TVET and university levels, each student therein received far more resources compared to each pupil in primary.

4.6 Off-budget spending on education

The analysis above has presented public spending on education, but education financing is not limited to the resources provided by the Government. There are several other stakeholders such as parents and other education partners who contribute to the financing of education in Kenya.

4.6.1 Development partners

Development partners (DPs) play a substantial role in supporting Kenya's education sector. Although exact figures are not known, there are indications that DPs' funding could amount to as much as USD 193 million – or Ksh 19 billion, in 2014 alone (Table 22).[5] This would be equivalent to 7 to 8% of the amount that the government spends on education directly, and could even be higher than the government's own development spending. Of the DPs' spending, more than half goes to the NESP priority areas, and the rest to other areas including higher education. These figures should be used with caution as there may be double-counting of activities across the priority areas.

Table 22 Development partners' education commitments, 2014-2016 (current USD millions)

Spending ($millions)		2014	2015	2016
In NESP	Priority 1	4.1	4.1	2.1
	Priority 2	53.6	52.2	52.8
	Priority 3	21.8	29.8	22.4
	Priority 4	9.0	7.8	3.2
	Priority 5	0.3	0.2	0.2
	Priority 6	4.4	1.5	1.5
	Total	**93.2**	**95.7**	**82.2**
Outside NESP		100.7	21.3	21.3
Total		**193.9**	**117.0**	**103.5**

Source: Development partners and authors' own calculation. The years for spending are not always clearly defined so this is based on estimates of the split over multiple years. It is assumed all numbers are given in USD.

[5] These figures were provided by the Education Sector Development Partners Coordination Group, and include multilateral organisations, bilateral donors, and international non-governmental organisations.

4.6.2 Parents

Contributions from parents may be grouped into two main categories as follows:

- direct contributions to school through
  - fees (except officially for primary education)
  - instructional materials
  - salaries for teachers employed by the Board of Management (BOM), and
  - other various fees and levies paid to schools.
- indirect contributions such as transport, uniforms and so on.

This analysis has not been able to exhaustively cover all these aspects of education financing but has attempted to reflect some of the main categories of costs.

Table 23 shows the estimated direct spending on education for public schools by category and education level. The total cost borne by households was estimated at Ksh 132 billion in 2014, which is almost two thirds of the amount put in by Government on primary and secondary (Ksh 206 billion). Boarding fees account for 75% of this cost. These are underestimates given that some fees and indirect costs are not included.

Table 23 Direct household spending in public schools (2014) (current Ksh millions)

	Primary	Secondary	Total
BOM Teachers	11,350	22,135	33,485
Boarding Fees		99,277	99,277
Total	11,350	121,412	132,762

Source: Authors' Calculations based on EMIS data. EMIS provides the number of BOM teachers, and an estimated salary based on an EMIS verification sample. Boarding fees were estimated from the number of boarding students reported in EMIS, and the Government's Secondary School Report.

It is also important to note that parents pay substantial fees in private schools. Due to a lack of accurate and representative data, the detailed costs of private schools cannot be included in this report. One of the methodologies of estimating this type of contribution to education financing is to make use of per pupil spending in public schools. This together with enrolments in private institutions should give an indicative total cost of what is paid by parents to private schools, assuming the average costs are the same. Of course it is possible that private schools have higher unit costs than public schools, and also some may be lower where they are in the low-cost private school market. However, using the average rate from public schools gives an indication of the potential resources the Government would need to provide if there were no private schools or universities. Table 24 shows the estimated cost of the private sector under these assumptions.

Table 24 Estimated cost of education in private institutions (current Ksh millions)

	2010	2011	2012	2013	2014
Primary	12,687	14,331	17,545	18,402	21,900
Secondary	3,700	4,421	5,107	5,444	6,112
University	5,076	11,999	8,941	8,437	7,980

Source: Authors' calculations. This is estimated by applying the unit costs in public institutions to the total enrolments in private institutions.

5 Kenya's Curriculum Reform

Kenya's current process of curriculum reform has been developing at full speed since 2014, when the Kenya Institute for Curriculum Development (KICD) established a Curriculum Review Steering Committee and MOEST set up a technical committee. However, the reform's origins date back further to policies, laws and taskforces. This chapter setting out the evolution and rationale for the curriculum reform. It then moves on to briefly describe the key elements of the reform.

Box 4 Chapter 5: Key findings

- Over the last two decades Kenya has come to demand comprehensive reforms in education, to respond to societal needs, economic ambitions, and to reduce inefficiency, wastage and inequities in the system. The current curriculum reform process responds to internal commitments as well as international ones.
- The curriculum reform process is led by MOEST with much activity undertaken by KICD.
- Major components of the proposed new curriculum include: a shift from 8-4 to 6-3-3 in primary and secondary education; a set of competencies for learners at each level; provisions for local context and content in the curriculum; introduction of three pathways in secondary education; more emphasis on formative assessment; and inclusive education for children with special education needs.

5.1 Evolution and rationale for curriculum reforms in Kenya

The last time Kenya conducted major curriculum reforms was in 1985 when there was a shift from the then 7-4-2-3 system (seven years of primary, four years of lower secondary, two years of upper secondary, and three years of university) to the 8-4-4 system (primary, secondary, university). This change sought to reduce the pressure on the need for higher education and thus develop practical and meaningful skills for the development needs of the country. At the turn of the century, there were some efforts to review the curriculum based on the recommendations of the Commission of Inquiry into the Education System (1999), but no substantial changes. In 2002, a review of the curriculum found it to be overloaded, after which some subjects were removed while others were merged. The practical subjects were affected most substantially.

The desire of Kenyans for comprehensive reforms in education that respond to societal needs and address the emerging developmental needs is seen as the primary driver of the reform agenda. According to the KICD Curriculum Reforms Needs Assessment Report (2016), there is a need to focus on a balanced, equitable, relevant and sustainable education system. Realisation has also been growing that there is inequality and wastage within the system. Inequalities are evidenced through incomplete access, particularly for marginalised groups such as populations in arid areas and children with special needs. The inefficiency can be seen in low transition rates from low to higher education levels, and declining enrolments in tertiary colleges whilst demand for university education keeps rising amidst national industrial and development priorities.

Education is recognised as a critical sector in the social pillar of the Vision 2030 (Republic of Kenya, 2008). This first well-coordinated and structured development strategy in Kenya was developed riding on the successes of the 2003 Economic Recovery Strategy for Wealth and Employment Creation. The strategy introduced paradigm shifts in development thinking. Vision 2030 introduced major reforms across the entire development spectrum and the government shifted spending and development priorities towards those that were aligned to the Vision.

The curriculum reform process is a culmination of many developments and increasing awareness of the need for changes. Both internal commitments (to achieving Vision 2030 and implementing the 2010 Constitution), as well as international obligations, give a strong backing and rationale for the country to make comprehensive curriculum reforms that address the underlying structure,

implementation and evaluation mechanisms of the curriculum. The evolution of and rationale for the reform process to where we are today can be tracked through a number of key documents, which are summarised in Table 25 below.

Table 25 Key documents in the evolution of the curriculum reform

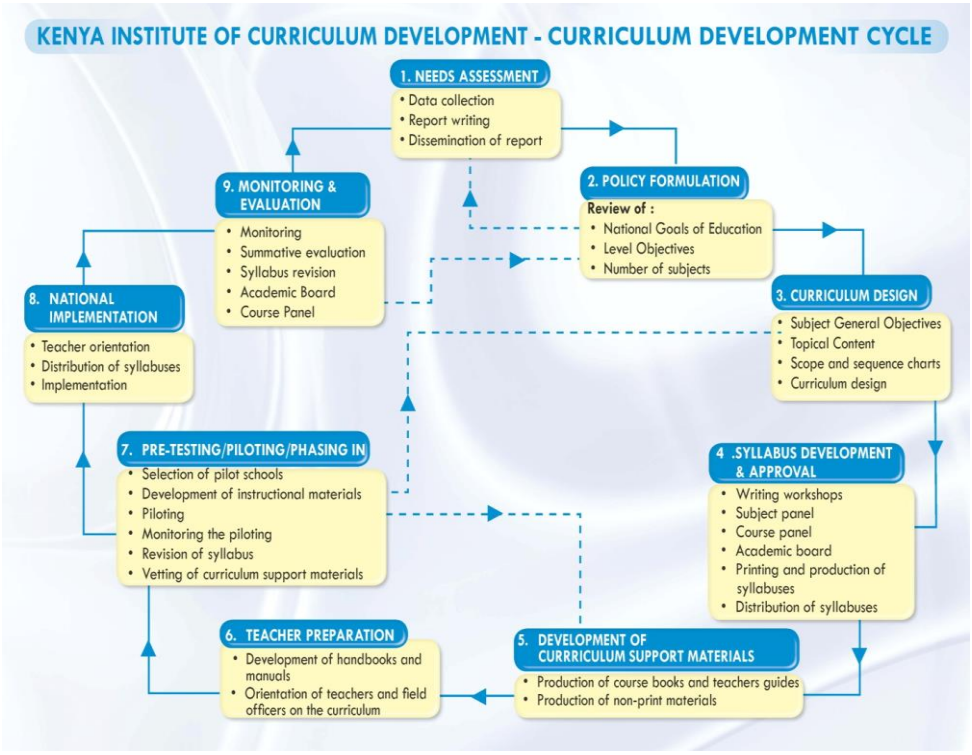
Document	Curriculum Reform Provision
Vision 2030 (Republic of Kenya, 2008)	Visualises Kenya providing a globally competitive quality education. Education priorities and spending are aligned to the medium term plans for the Vision. Developments across the country are hinged on this broad development plan.
The East Africa Treaty Protocol (2008)	The Education Protocol foresees a four-phased development process of harmonisation of the East African Education Systems and Training Curricula (already complete in Tanzania and Uganda) that seeks to fundamentally ensure the free movement of human resources.
Curriculum Summative Evaluation Report (KICD, 2009)	The summative evaluation identified that learners exiting secondary schools were lacking in competencies and skills appropriate for the job market, pointing to the need for a system with less wastage and inefficiencies.
Constitution of Kenya (Republic of Kenya, 2010)	Article 53 guarantees the right to free and compulsory basic education to all children. It defines a child as anyone below 18 years, directly implying that the curriculum ensures continued education of all children. Articles 10(1) national values, and Articles 12, 20, 35, 42, 43, 53, 54, 55, 57 and 59 all touch on education.
Taskforce on Aligning Education to the Constitution and Vision 2030 (Odhiambo, 2012)	Recommended and even proposed a complete structure of education with a competency-based curriculum; with provision for alternative pathways while integrating ICT as a key driver of a knowledge-based economy that would guarantee higher completion rates.
Taskforce on Aligning Higher Education to the Constitution and Vision 2030 (Some, 2012)	Reviewed the architecture and design of TVET and higher (University) education making far-reaching recommendations that led to reforms in legal and policy design of TVET and higher education. This formed the basis for the New Universities Act, Science Technology and Innovation Act and the TVET Act noting the critical role TVET should play in national development.
Jubilee Party Presidential Campaign Manifesto (Jubilee Coalition, 2012)	The manifesto identified ICT as a key driver to curriculum implementation, and put curriculum reforms on the Government's agenda. The Government has since May 2016 began to roll out the digital literacy programme in primary schools. The National Government allocated funds in both the 2015/16 and 2016/17 fiscal years towards the curriculum reforms clearly demonstrating the commitment towards the curriculum reforms.
Basic Education Act (Republic of Kenya, 2013)	The Act was a major reform replacing the 1968 Education Act. Enacted as a recommendation of the Sessional Paper and the Odhiambo Taskforce, the Act seeks to operationalize the right to free and compulsory basic education. The Act indirectly implies the mainstreaming of pre-primary as part of basic education.
Sessional Paper No. 2 of 2015 (Republic of Kenya, 2015)	Sessional Paper No. 2 of 2015 on 'Reforming Education and Training in Kenya' recommends reforming the education and training sector to provide for a holistic development education, competency-based curriculum, establishment of a national learning assessment system, and alternative pathways. This is the broad framework for the curriculum review.
National Technical Committee on Curriculum Reform (MOEST, 2015b)	Proposed a road map for rolling out curriculum reform. Major recommendations of the committee included restructuring from 8-4-4 to 2-6-6-3, creating alternative pathways at secondary and for learners with special needs, providing continuous school-based assessments, and for KICD to carry out a needs assessment and preparation for the reforms.

National Curriculum Policy (MOEST, 2015c)	Sets out the vision for the new curriculum, "Nurturing every learner's potential." The objectives of the policy include establishing flexible pathways, competency-based curriculum, formative assessment, strengthening Science technology, engineering and maths, providing for county-specific content, and ensuring the curriculum is friendly to learners with special needs.
Sustainable Development Goals (United Nations and World Leaders, 2015)	Kenya is committed to the SDGs, the most relevant of which, goal 4, is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. However education and the curriculum has a role in addressing and contributing to all the goals.
Curriculum Reforms Needs Assessment Report (KICD, 2016)	Identified the need to reform education to address the national development needs, equip learners for the 21st Century as well as reduce wastage that will ensure that all learners exit the system with functional skills for life and the job market. This is the basis for the Basic Education Curriculum Framework

5.2 Curriculum reform process

The curriculum reform process requires a collaboration of stakeholders, led by MOEST and with much activity undertaken by KICD, whose core mandate included developing curricula and support materials. KICD are using a nine phase curriculum reform cycle process (Figure 10).

Figure 10 KICD Curriculum development cycle



In mid-2016, KICD had completed the needs assessment and policy formulation and were in the process of designing further details, under the third phase. Preparatory steps towards other phases have also been taken.

5.2.1 Major proposals of the curriculum reform

The proposals on the curriculum reforms are articulated in the National Curriculum Policy (2015) and detailed in the Basic Education Curriculum Framework (BECF) (2016). Major areas that have been agreed are set out in Table 26, though this is not an exhaustive description.

Table 26 Major aspects of the new curriculum

Curriculum Reform Aspect	New Curriculum
Curriculum Vision	Curriculum Vision: Nurturing Every Learner's Potential
Curriculum pillars and theoretical framework	Introduces and emphasises values. The values to be included in the BECF will be drawn from the National Values of Kenya Act, 2011: responsibility, respect, excellence, care and compassion, understanding and tolerance, honesty and trustworthiness, trust, and being ethical. Other values will be unity, integrity, peace, humility, cooperation, and simplicity
Competencies	Seven expected competencies of basic education, including communication and collaboration, critical thinking and problem solving, imagination and creativity, citizenship, digital literacy, learning to learn and efficacy.
Organisation of learning	Shifts basic education structure from 8-primary-4-secondary the following levels: early years – 5 years (2 years pre-primary, 3 years lower primary with expected entry to primary at age 6); middle school – 6 years (3 years upper primary, 3 years junior secondary); high school – 3 years senior secondary. This is followed by four years of tertiary education. Junior secondary schools are expected to be housed in primary schools.
Learning areas	Defines the number of learning areas as follows: pre-primary (5), lower primary (9), upper primary (10 compulsory and an optional foreign/indigenous language), junior secondary (12 compulsory and a minimum of 1 and maximum 2 optional from 7 areas), senior secondary (2 core areas regardless of the pathway). Provides for local contexts and county-specific content. Identifies ICT as a learning tool across the continuum, with digital-based instruction a methodology used in all learning areas and all classes.
Teachers	Focus shall be on in-service training for teachers on paradigm shift to competency based curriculum, new training on new learning areas, increased capacities on formative assessment and inclusivity. Plans include reviewing the existing teacher training approaches and content.
Materials	Learning areas will have activity books that are more practical than information-heavy books. There would be one activity book per child per grade, and these will be re-used by the next year's cohort. Teachers will have information books.
Definition and operationalisation of pathways in education	Identifies and describes three pathways at the Senior Secondary Level: Social Sciences (previously called 'General'), Arts and Sports (previously called 'Talent'), Science, Technology, Engineering and Maths (previously called 'Technical').
Assessment	More emphasis on formative, continuous assessment with individual learning profiles being established and following a child through the system. Assessment will be more holistic – looking not only at cognitive skills but also non-cognitive and motor skills.
Inclusive education	Learners with physical disabilities, visual impairment and hearing impaired will follow the regular curriculum with modifications.
Pertinent and contemporary education issues	Identifies and describes six pertinent and contemporary education issues that include: citizenship, health education, life skills/values education, education for sustainable development, non-formal programmes and service learning and parental involvement.
Transition and roll-out	The curriculum shall be implemented as a pilot model in some pre-primary and primary schools, before final roll-out following through the cohorts.

6 Education projection model

This chapter sets out projections of what the education sector might look like – and in particular what this means for costs – up to 2030. Any future projections are conjecture and depend on numerous assumptions about factors outside of the sector's control, those the sector can try to influence, and those the sector can control through policy decisions. Although there is no known scenario of what will happen were there to be no curriculum reform, we set out a number of scenarios which show how costs change when assumptions – particularly those related to introducing the new curriculum – change. The assumptions are also drawn from Education for All, the Sustainable Development Goals as well as Kenya's long term Vision 2030.

The model, which is built in a spreadsheet, builds from the bottom up the various cost drivers of education (for example from population to enrolments to teachers and classrooms to salary costs). Although the details of the model are not set out here, the model was presented to stakeholders from the Ministry, KICD and UNICEF to demonstrate how the concepts behind it and test some of the assumptions. The model will be provided to these partners for them to own and further use and develop for decision making.

This chapter begins by presenting the assumptions around the macroeconomic framework and what this means for government resources to the education sector. It moves on to review projections in the underlying population, which drive changes in enrolment and therefore costs.

Section 6.3 then presents the development of three projection scenarios. These scenarios are based on different assumptions about enrolment and student flow, and the efficiency and unit costs in the system relating to the curriculum reform. The implications for enrolment by level and recurrent costs are explored, followed by analysis of the extent to which these scenarios are affordable in the projected fiscal envelope. The section then looks at what levels of GDP and domestic revenue would need to be allocated to education to afford the new curriculum scenario.

Finally section 6.4 estimates the development costs, including both the short term costs of preparing the new curriculum, and the ongoing costs of implementing government investment priorities, including those associated with the new curriculum.

Box 5 Chapter 6: Key findings

- Based on expectations of GDP growth (4.4%) and revenue collection (19.4%), real allocations to education could almost double over the next 15 years if education continues to receive 25.4% of domestic resources.
- Meanwhile the school aged population is projected to grow to from 18 million in 2015 to 24 million in 2030, which is a key driver of increased enrolments.
- Three scenarios are developed to look at the affordability of various assumptions for the sector.
- Under a status quo scenario, enrolment will increase due to population growth, and recurrent costs to the sector will increase. This be affordable given the conservative resource envelope estimates presented above.
- If the government pushes to achieve universal basic education, with 100% enrolment and completion up to secondary and follow through impacts on higher education, enrolment expands substantially. As a result, the recurrent costs become over 50% more expensive than the status quo by 2030, and this introduces a Ksh 223 billion annual financing gap.
- Introducing the new curriculum organisation, which reduces the years of senior secondary and instead introduces junior secondary (assumed to run with primary level cost structures), the total costs fall and reduces the financing gap by Ksh 33 million. However this is still not affordable.
- Government would have to allocate over 35% of its domestic revenue to education in 2030 to afford the new curriculum scenario presented here.

- These scenarios provide an opportunity for the government to review the assumptions and policy targets to find a future scenario which looks financially plausible.
- In addition, development costs could reach up to Ksh 90 billion per year, largely driven by laptops for students, as well as new textbooks under the new curriculum. Again, this is well above the usual development budget from government, which was around Ksh 20 billion in 2014/15.

6.1 Macro-economic Framework and Projected Resources

Chapter 4 provided a review of expenditure in the education sector and some of the findings will be used conservatively in projecting the resources likely to be available for the sector in the simulated period. All costs in the projection model are expressed in constant (2014) prices, meaning regardless of inflation.

With fairly conservative assumptions, Kenya's domestic revenues available for government spending could almost double between now and 2030. Kenya's gross domestic product is projected to almost double between 2015 and 2030. With an estimated annual GDP growth rate of 4%, the GDP is expected to increase from Ksh 5.5 trillion in 2015 to Ksh 10 trillion in 2030 (see **Table 27**). Should the domestic revenues net of lending remain conservative at 19.4% of the country's wealth, the resources at the disposal of government would increase from Ksh 1 trillion in 2015 to Ksh 1.95 trillion in 2030. However, with recent increases in the effort to collect domestic revenue, this projection may even be conservative and resources could increase further.

Table 27 Projected national resources, 2014-2030 (Ksh millions, constant prices)

	2014	2015	2020	2025	2030
GDP	5,357,672	5,571,979	6,779,164	8,247,889	10,034,819
Domestic Revenue	1,039,388	1,080,964	1,315,158	1,600,091	1,946,755
Education Recurrent Expenditure	263,537	274,078	333,458	405,703	493,600

Source: 2014 and 2015 taken from earlier chapters, projections are authors' calculations based on model assumptions

As a direct consequence, if the recurrent spending dedicated to education by the national and county governments remains at 25.4% of domestic resources, education recurrent expenditure will almost double between 2015 and 2030. This would mean an increase from Ksh 274 billion to Ksh 494 billion in 2015 and 2030 respectively, as shown in Table 27 above. This significantly increases the fiscal space for the government to implement education programmes.

6.2 Population growth projections

The cost projections are influenced by the enrolment rates in the education sector, the population growth for each of the school/college age groups and the increase in unit costs in constant prices.

The total population is projected to increase by 46% from its 2014 levels, reaching 62.7 million in 2030. The school age population will have a net addition of 6 million, increasing from 18 million in 2014 to 24 million in 2030 (

Table 28). This of course has implications for the education sector as there are more children of school-going age and thus expected to enrol. However, the share of this age group relative to the total population will fall by 3 percentage points, reducing their relative pressure on resources.

Table 28 Projected total and school-age population

	2014	2015	2020	2025	2030
Total Population	42,961,181	44,139,331	50,133,872	56,193,830	62,653,179
School Age Population	17,865,338	18,150,123	19,769,940	21,805,002	24,151,387
School Age as % of Population	41.6%	41.1%	39.4%	38.8%	38.5%

Source: 2014 and 2015 taken from earlier chapters, projections from the model

The increase in numbers of children at each of the age ranges for basic education are major drivers for expenditure. The population of children eligible for early childhood development and education (age 3 to 5 years) is expected to grow from 4.1 million in 2014 to 5.2 million in 2030 (see Table 29). At primary level, the population grows from 7.5 million to 10.3 million. Junior secondary – which is equivalent to grades 7-8 and form 1 in the current structure – has an eligible population of 3 million in 2030, up from 2.3 million in 2014. Senior secondary (form 2-4 in the current secondary system) has a growth in eligible population from 4 million to 5.6 million.

Table 29 Projected population by basic education level

		2014	2015	2020	2025	2030
ECDE	Age 3-5	4,102,148	4,161,763	4,480,099	4,835,026	5,230,752
Primary*	Age 6-11	7,451,273	7,537,990	8,267,931	9,218,310	10,277,933
Junior Sec*	Age 12-13	2,289,181	2,339,134	2,461,539	2,735,544	3,049,989
Senior Sec*	Age 14-17	4,022,736	4,111,237	4,560,372	5,016,122	5,592,713

Source: Authors' projections based on 2.2% population growth and 0.7% mortality. *Note that as the existing primary and secondary have been redistributed into primary, junior secondary and senior secondary, the total amounts in 2014 shown here should be added across these three levels to match the primary and secondary amounts in chapters 3 and 4.

6.3 Cost projections

This section provides indicative future cost scenarios for the sector based on different assumptions. Whereas the main focus is to model the expected impact of curriculum reform on future costs, the model provides a sector-wide view of what will happen under the considered assumptions. All levels of education – from basic through to university education, and including administration – are included in the model, although it is basic education which is the focus of this discussion. The assumptions can be further adjusted by stakeholders to align the outcomes to Government targets and also ensure that the corresponding resource requirements for achieving the results are within the expected macroeconomic envelope. The simulation model can yield any number of other scenarios based on varied assumptions. The Government is encouraged to make use of the tool and fine tune the assumptions to get optimal results.

Three expenditure scenarios have been selected to demonstrate the implications for enrolment, expenditure and financing gaps between 2014 and 2030. The year 2014 acts as the baseline, and is based on the actual data presented in chapters 2, 3 and 4, and 2030 represents the endline, in line with Kenya's Vision 2030 and the Sustainable Development Goals. These scenarios have been chosen to demonstrate the incremental changes as key assumptions change. Box 6 sets out the rationale and hence the assumptions behind each of the scenarios.

The rest of this section works through implications of the three scenarios on key outcomes of interest. First, the projected enrolment in basic education is assessed. Following this, the recurrent spending of each scenario at basic education is analysed, which is driven by the enrolment as well as other assumptions which are discussed. In section 6.3.4, the enrolment and recurrent costs at

post-basic education are looked at, in other words all forms of adult and alternative education. The total implication for recurrent spending is assessed in 6.3.5, analysing what this means for the financial gap with the projected resource envelope. Finding a large fiscal gap, 6.3.6 looks at how high the government's allocation to education would need to be to fund these scenarios.

Section 6.4 goes on to look at the development costs for the sector. These are considered separately to recurrent expenditure as recurrent is seen as the ongoing running costs needed for education service provision to be sustainable. There are two types of development costs covered: the short term costs of developing and rolling out the new curriculum, and the longer term development costs of the sector implementing the new curriculum.

6.3.1 Developing the scenarios

As mentioned, three scenarios have been developed to shape thinking and discussions about the affordability of the sector in future years. The differences between the three scenarios are given in Box 6. With hundreds of variables about the future unknown, many assumptions remain fixed through all the three scenarios. The share of enrolment in private remains at 14.3% in Stds7-8/Junior secondary and 6.7% in secondary (as today). Since GDP is expected to grow within the period, the model has slightly reduced the average teacher salary from current rates to 3.6 times the GDP per capita for primary, 3.9 times for junior secondary and 5.5 times for senior secondary for all considered scenarios. These are down from 3.8, 4.1 and 6.3 respectively in 2014. It is important to note that this does not reduce the average teacher salaries, just how high they are relative to average GDP. The unit cost of ECDE remains constant as a share of the GDP per capita. More details on the fixed and varying assumptions are given in Annex D.

Box 6 Assumptions in the evolution of three expenditure scenarios

Scenario 0: Status quo

- This scenario is based on retaining the status quo in 2014, in other words there is no change in the structure of education (8-4-4), and enrolment and pupil flow rates remain the same as in 2015. This scenario is the closest to imagining 'nothing changes.' Meanwhile, the conservative assumptions around the continuing resource available to education, set out in section 6.1 above, hold in this scenario.
- Detailed assumptions are based on continuation of the current rates, including: primary gross intake rate of 100% with 5% repeating class 1; primary retention (Class 1-8) of 77%; transition from primary to secondary at 80%; secondary retention of 78%. Pupil teacher ratios (PTR) remain as they are at the baseline (36.2 in primary, 35 in Stds7-8 and secondary).

Scenario 1: Universal basic education

- This scenario builds on Scenario 0 by now assuming that student flow is optimised to universalise basic education (twelve years in primary and secondary) by 2018. This means 100% intake, enrolment, retention and completion – no drop-outs and no repetition, the only reduction in student flow is due to natural mortality. This implies much greater internal efficiency of the system, but also much larger numbers of students in the system. In addition, efficiency increases in this scenario in terms of use of teachers. Dependence on Board of Management teachers (those paid by the BOM and hence parents) decreases, requiring more teachers to be hired through the Teachers Service Commission to meet the PTR, and hence there are more teachers on the government payroll.
- Detailed assumptions include: Primary gross intake rate at 100% with zero repeaters in class one; maximum (100%) retention in primary (i.e. no drop-out or repetition) taking into account natural mortality; primary to secondary transition of 100%; secondary retention of 100% and again taking into account the mortality rates for this cohort. Use of teacher resource has been maximised, increasing the weekly hours worked by each teacher in junior secondary to 27 compared to the 25.4 in Scenario 0 and improving the pupil teacher ratio to 35 compared to 36.2 in Scenario 0. PTRs in secondary increase to 40 from 35 in Scenario 0. In addition, this scenario increasingly reduces the use of BOM teachers to 1% by 2023 in primary and 2025 in junior/senior secondary.

Scenario 2: UBE, new curriculum

- This scenario maintains the optimal student flow assumptions from Scenario 1 (i.e. equivalent to universal basic education), but introduces the new curriculum structure. The new structure of education (2-6-3-3-4) starts in 2018. Focusing on the primary and secondary levels, there are three tiers i.e. six years in primary education; three years in junior secondary; and three years in senior secondary. Under the new structure, the former primary and secondary cycles reduce by two and one years respectively.
- Enrolment, student flow, PTRs, use of BOM teachers remain as in Scenario 1. The main additional assumption is that the three years of junior secondary have the same cost structures as upper primary – in particular the same teachers' salaries. This salary level is much lower than the salary level at secondary, so the switch is from a year of students with senior secondary teachers and their high salaries, to junior secondary with lower salaries.

In many respects, each of these scenarios presents an extreme case – and may not be considered a likely outcome. They are chosen to demonstrate the wide range of implications for enrolment and costs, given that reality will lie somewhere in between these. The background, and limitations to these scenarios are discussed briefly.

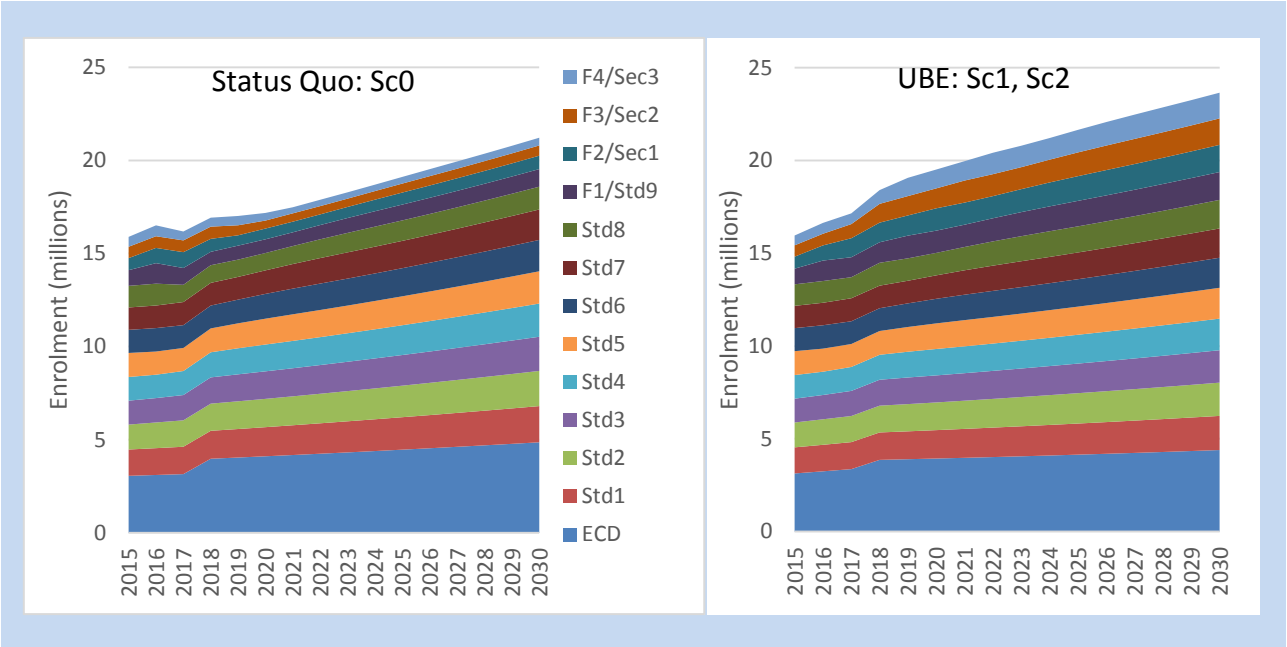
The assumptions for **Scenario 1 – UBE** – came out of discussions at an interim findings workshop with Government stakeholders in July 2016. This was setting out the most optimistic assumptions for how the sector should perform; with universal, compulsory education achieved, low contributions from parents (through the reduction in BOM teachers), and high internal efficiency (no repetition) within the system. This would be very difficult for any country to achieve, especially with such a rapid transition, and if a more likely scenario – of less-than-full enrolment and some dropout – were achieved, the costs for the sector would be lower.

The assumptions for **Scenario 2 – UBE, new curriculum** – are relatively simple given the range of details about the curriculum reform roll-out which were unknown at the time of the July workshop. For example, whether teacher specialisation would change, or instructional hours, leading to different PTRs, were still being discussed. Given the enormity of the aspects which could change, this scenario was chosen to show the cost saving that could be achieved simply by shifting students away from a class where teachers have a higher salary. The structure of junior secondary is assumed to be the same as primary (rather than senior secondary) based on conversations in July, where it was felt primary teachers and infrastructure would be used to create this new level of basic education. As the details become clearer, the recurrent costs (particularly the implications for unit costs) of the curriculum reform may change from those set out in this scenario.

6.3.2 Enrolment projections in basic education

Shifting from an assumption of Status Quo to Universal Basic Education sees a substantial increase in total enrolment across basic education over the next 15 years. Scenario 0 – the Status Quo – will see enrolment increase across all of ECDE, primary and secondary between now and 2030 – as seen in the left panel of Figure 11. This is due to the increase in population, such that even with enrolment and student flow rates remaining the same, the enrolment would increase. However with UBE assumptions, as in Scenarios 1 and 2, in the right panel of Figure 11, enrolment increases even further. Thus under the scenarios of 100% intake, retention and transition, total enrolment in the 14 years of basic education reaches almost 24 million in 2030, compared with less than 21 million where student flow rates do not improve. In universalizing primary and secondary education, Kenya will have 3 million more children in the schooling system.

Figure 11 Enrolment projections in basic education, Scenarios 0, 1 and 2



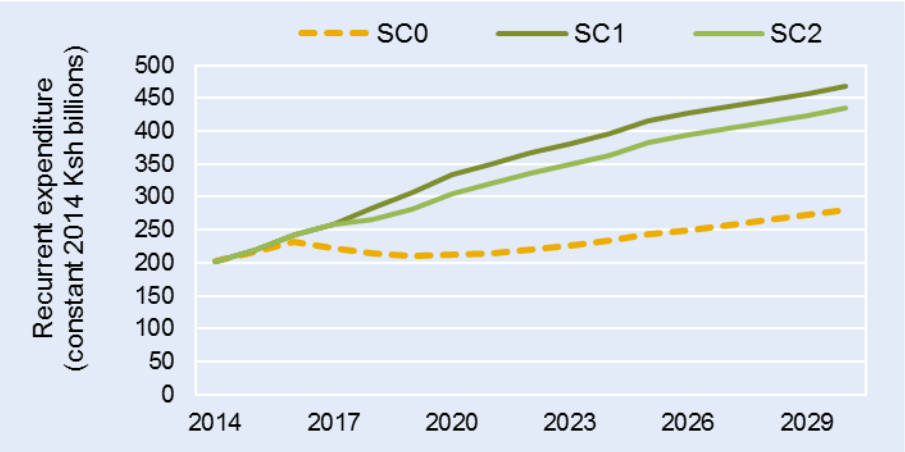
Source: Authors' calculations based on model assumptions

In this scenario, introducing the new curriculum does not change projected enrolment because there is assumed to be zero drop-out throughout the system. Because we have assumed that there is 100% transition and retention in Scenario 1, when we then introduce the new curriculum structure (from 8-4-4 to 6-3-3-4) the enrolment in each grade, and the total years of basic education both remain the same. Thus whilst primary reduces from eight to six years, and senior secondary from four to three, junior secondary 'absorbs' these three original year groups.

6.3.3 Projected recurrent costs of basic education

Whilst higher enrolment causes the costs of providing basic education to increase, more efficient use of resources associated with the new curriculum lessen the increase in costs. The jump between Scenario 0 – Status Quo – and Scenario 1 – UBE – necessarily means more enrolment. If unit costs remain the same, meeting UBE would cost the basic education sector Ksh 468 billion per year in 2030, compared with Ksh 280 billion if student flow rates remain the same as today (see Figure 12). However when the new curriculum is introduced in Scenario 2, one year of secondary education is 'converted' into a year of junior secondary, which is assumed to have the same delivery structure (teacher workload and teacher salaries) as the current upper primary level. Thus this year group becomes relatively 'cheaper.' It is literally only this one year group of enrolment that is assumed to be different between Scenario 1 and Scenario 2. By introducing the new structure alone, the recurrent costs of the basic education system will therefore reduce to Ksh 434 billion in 2030 (Scenario 2), saving 7% of the total annual cost compared to Scenario 1.

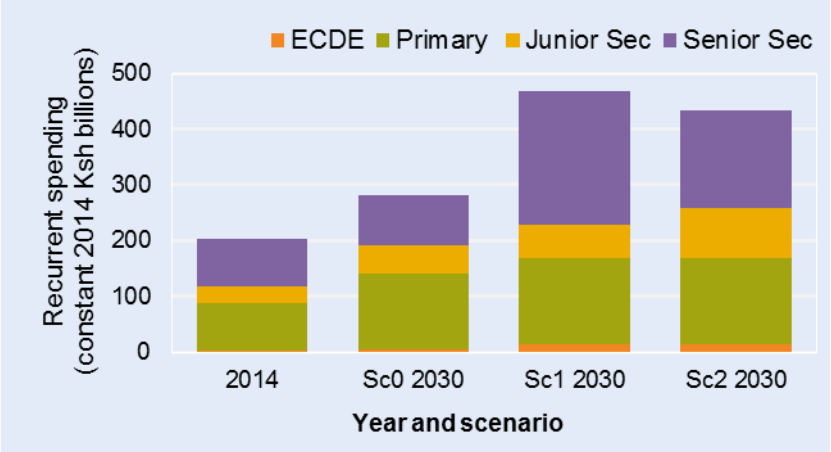
Figure 12 Recurrent education costs of the basic education sector (ECDE-senior secondary)



Source: Authors' calculations based on model assumptions. Constant 2014 prices.

The distribution of recurrent costs between the sub-sector levels of basic education can be seen more clearly in Figure 13 below. Whilst all scenarios have a higher total spending in 2030 than in 2014, in the case of Scenario 1 this is hugely exacerbated by the increase in enrolment, particularly at secondary due to the reduction of drop-out in the system. Scenario 2 reduces these costs, shifting a year away from senior secondary and into the cheaper junior secondary.

Figure 13 Recurrent spending on basic education at baseline (2014) and endline (2030)



Source: Authors' calculations. Note that primary, junior and senior secondary here correspond to standards 1-6, 7-9 and form 2-4 respectively. Although this structure is only applied in Scenario 2, the same year groups are used for comparability. All costs are 2014 constant prices.

6.3.4 Post-secondary education: enrolment and recurrent costs

For simplicity, straightforward assumptions have been made about post-secondary education. Teacher training college enrolment is made up of trainees for standards 1-8 (current curriculum) or standards 1-9 (new curriculum), so is based on the demand for new teachers in pre-secondary education. It depends on the levels of enrolment in primary and junior secondary schools. Thus, whilst in Scenario 1 enrolment increases substantially, in Scenario 2 teacher training college (TTC) enrolment increases further to train teachers for the additional year of junior secondary (rather than these 'standard 9' students being taught by university graduates, as they would be in senior secondary). TVET enrolment in Scenario 0 is assumed to grow in proportion to the growth of population, and in the UBE scenarios it is assumed that more ambitious enrolment targets are met. University enrolment in Scenario 0is assumed to grow in proportion with population growth, but to

grow by an additional 50% by the year 2030 in Scenario 1 and 2. The implications for enrolment are shown in Table 30.

Table 30 Enrolment in teacher training colleges, TVET and higher education (thousands)

	2014	2020	2025	2030
Enrolment in TTC (public only)				
Sc0	21.2	15.1	15.1	15.1
Sc1	21.2	16.9	16.9	16.9
Sc2	21.2	23.1	23.1	23.1
Technical and Vocational (public)				
Sc0	148.1	171.3	190.6	209.8
Sc1, 2	148.1	467.6	733.8	1,000.0
University (public)				
Sc0	363.3	425.5	480.5	537.6
Sc1, 2	363.3	454.6	527.0	591.0

Source: Authors' calculations.

Meanwhile enrolment is not the only factor driving changes in expenditure at these levels. The annual unit cost for TTCs and TVET are assumed to remain the same as 2014 as a proportion of GDP per capita in all three scenarios. University unit costs are expected to increase, as the Government is expected to increase the coverage of students' living costs up to a level equal to GDP per capita (average income), and the same assumption is applied in all three scenarios. This is likely to be on the higher side of what Government would really expect to pay.

Recurrent expenditure on everything excluding basic education is expected to increase over the next 15 years. Under Scenarios 1 (UBE) and 2 (UBE and new curriculum), these costs increase further due to assumptions around greater enrolment in TVET and more teachers in training colleges to cover the greater basic enrolment.

Table 31 Recurrent expenditure on everything except basic education (Ksh millions)

Scenario	2014	2020	2025	2030
Sc0	61,456	93,302	130,047	177,860
Sc1	61,456	116,223	175,917	249,238
Sc2	61,456	116,304	176,004	249,332

Source: Authors' calculations. Note: includes Central administration, Teacher education, Technical/vocational, Apprenticeship, Literacy and non-formal education, Higher education. Constant 2014 prices.

6.3.5 Projected recurrent resource envelope and fiscal gap

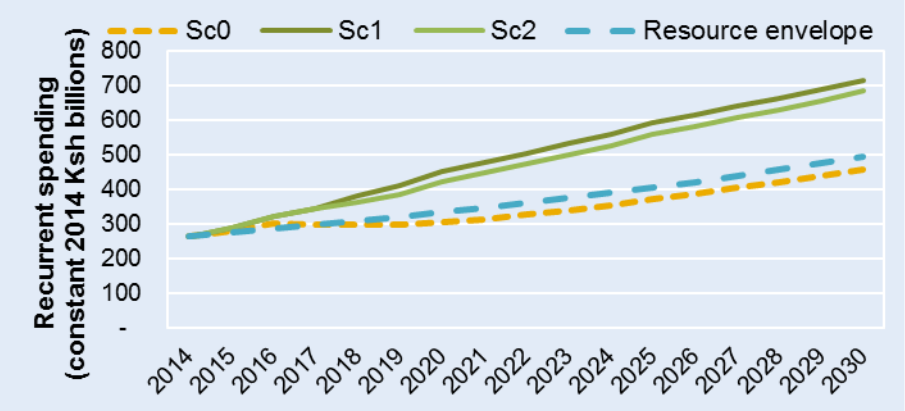
Combining the projections for basic education and the rest of the sector, the total recurrent costs of the scenarios is given. The status quo scenario (Scenario 0) has the lowest costs to the sector of the three scenarios, although it does see annual recurrent costs rise from Ksh 263 billion to Ksh 460 billion in 2030 (Figure 14). **Based on the conservative resource projection set out in section 6.1, the status quo scenario is within the funding available to the education sector.** The sector would have a budget surplus of Ksh 35 billion by 2030 (Figure 15).

With UBE, Scenario 1 increases costs to the sector substantially, bringing 2030 costs up to Ksh 716 billion. **Meeting universal basic education under the current curriculum structure would**

not be affordable for the sector, introducing a financing gap which reaches Ksh 223 billion per year by 2030.

If the new curriculum structure is introduced, efficiency savings mean that the recurrent costs of the sector fall, and this closes the funding gap by Ksh 33 billion by 2030 – meaning the gap is reduced to Ksh 190 billion per year.

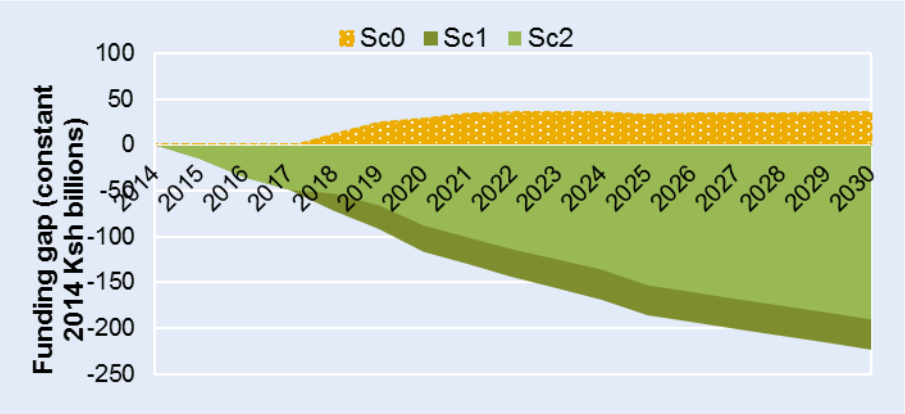
Figure 14 Recurrent expenditure and resource envelope under Scenarios 0, 1 and 2



Source: Authors' calculations. Constant 2014 prices.

Whilst the new curriculum introduces some cost savings for the sector, as can be seen in the reduction of the funding gap against the UBE scenario, **the new curriculum, with universal basic access, is still not likely to be affordable based on current government priorities.**

Figure 15 Funding gap under Scenarios 0, 1 and 2



Source: Authors' calculations. Constant 2014 prices.

6.3.6 Required resource envelope

What would the government's resource allocation to education have to look like to make the new curriculum scenario affordable?

If the Government were to meet the costs of each of the three scenarios, we can see what this means in terms of spending on education as a proportion of GDP and of domestic revenues.[6]

[6] It is not possible to say what this would be as a proportion of the overall budget, since the budget depends on wider Government decisions about other sectors and borrowing.

In order to meet the costs of the new curriculum scenario, the government would have to commit up to 6.8% of GDP to education recurrent spending, compared with just 4.9% in 2014. This would be equivalent to allocating 35.1% of domestic revenues to education recurrent spending in 2030, compared with only 25.4% in 2014.

Figure 16 shows how the sector costs under the three scenarios would compare to GDP, and Figure 17 compares these costs to domestic revenues. With the increase in enrolment under UBE, both Scenario 1 and Scenario 2 see the allocation to education needing to rise substantially and levelling off after 2025. For Scenario 2, the new curriculum, this means almost ten percentage points more of domestic revenues goes to education in 2030 than it does today.

Figure 16 Required spending as % of GDP under Scenarios 0, 1 and 2

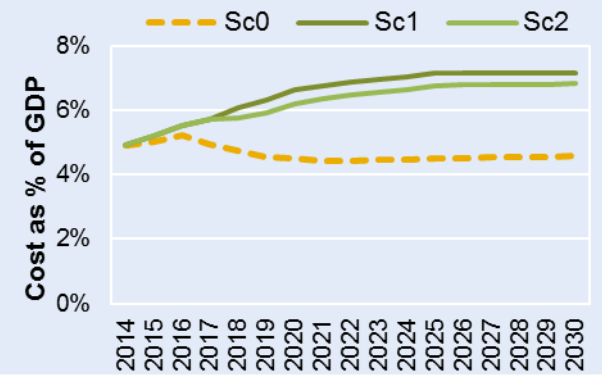


Figure 17 Required spending as % of domestic revenues under Scenarios 0, 1 and 2

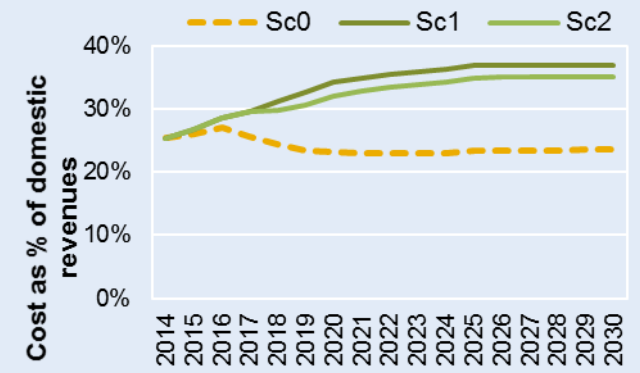


Table 32 Required resource envelope under scenarios 0, 1 and 2

	2014*	2015	2020	2025	2030
Education recurrent spending as % of GDP					
Sc0	4.9%	5.0%	4.5%	4.5%	4.6%
Sc1	4.9%	5.2%	6.6%	7.2%	7.1%
Sc2	4.9%	5.2%	6.2%	6.8%	6.8%
Education recurrent spending as % of domestic resources					
Sc0	25.4%	26.0%	23.2%	23.3%	23.6%
Sc1	25.4%	26.7%	34.2%	37.0%	36.8%
Sc2	25.4%	26.8%	32.0%	34.9%	35.1%

Whether the new curriculum scenario is affordable thus depends on a number of uncertainties. The assumptions around government revenue (19.4% of GDP) could well be pessimistic – revenue may increase with more tax collection efforts, or high GDP growth. The share of revenue allocated to education is a political decision about inter-sectoral trade-offs, and depends on all government priorities. However it is very unrealistic for education to receive more than a third of revenues.

From the other view, the expectations of achieving UBE under the new curriculum – as in Scenario 2 – may need to be reviewed and down-scaled. For example, enrolment in senior secondary may not reach 100%, more education may take place in the private sector, textbooks may become cheaper or longer-lasting, PTRs could increase further, or subsidies to higher education may decrease. These variables are all to some extent policy levers of government, and MOEST can decide how far to push these directions – if it can afford the costs. MOEST is thus encouraged to continue testing scenarios in the tool in order to assess the affordability of its policy targets.

6.4 Development costs

6.4.1 Short term, transition cost of curriculum development

The total costs of curriculum development and roll-out are estimated at Ksh 1.7 billion over the next eight years. This is quite minor against a 2014/15 development expenditure of Ksh 21 billion. The curriculum reform process is expected to take eight years to conclude the full cycle as planned by KICD. The majority of the activities, amounting to two thirds of the total cost of reform are expected to be implemented by the close of 2018. These include the design of the curriculum, piloting of the lower levels curriculum as well as roll out including teacher preparation in 2018. The remaining one third of the cost will be directed to monitoring of the implementation of the new curriculum at respective levels. The full activity budget and timeline is given in Annex C.

Table 33 Estimated costs of developing and rolling out the new curriculum

Year	Spending (2016 Ksh millions)
2016	650
2017	303
2018	185
2019	145
2020	88
2021	103
2022	98
2023	53
2024	68
Grand Total	1,693

Source: KICD. Costs are presented in constant 2016 prices.

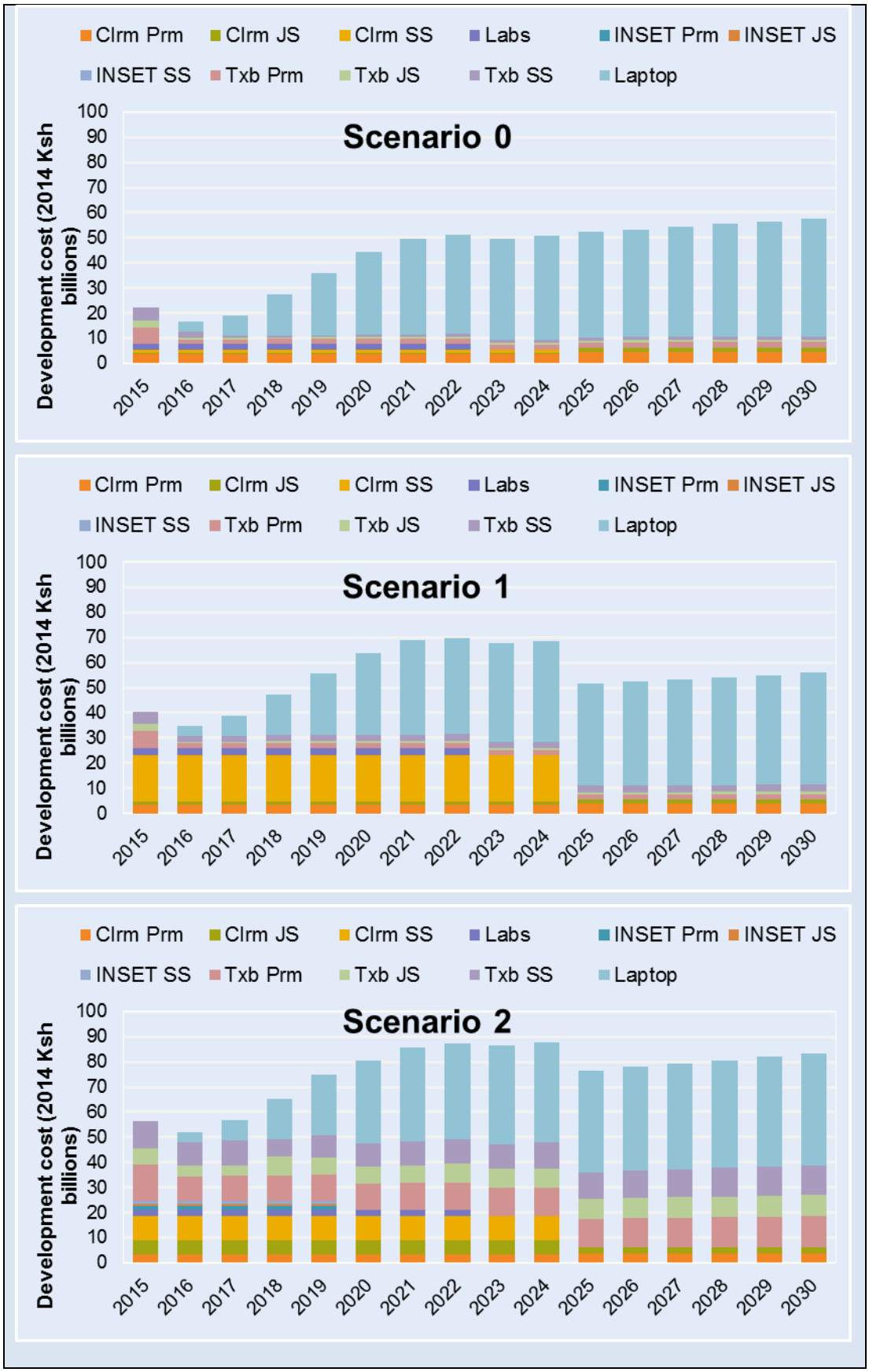
6.4.2 Long term development expenditure

The projected development cost for implementing key priorities in the sector has been estimated in the scenario model (Figure 18). A substantial cost to the sector – assumed to take place in all three scenarios – is the provision of laptops for every child.[7] This costs up to Ksh 47 billion per year even in Scenario 0. All scenarios require new classrooms to cope with new enrolment, but this cost is notably higher under UBE, and with the new curriculum, the costs of classrooms in senior secondary are transferred to junior secondary. All scenarios see replenishment of textbooks, but in Scenario 2 the cost is higher as it is assumed there are new textbooks associated with the new curriculum which need distributing. There is also a short term cost of training all in-service teachers in the new curriculum in Scenario 2.

Each of these scenarios sees annual development costs reaching above Ksh 60 billion, and in Scenario 2 with the new curriculum it goes as high as Ksh 90 billion (or 1.2% of GDP). Given that government development spending was just over Ksh 20 billion in 2014/15 (0.3% of GDP), this does not appear a feasible cost for MOEST to bear. This may suggest a role for development partners, although as seen in section 4.6.1, they are unlikely to be able to cover this full cost (given 2014 spending is roughly estimated at Ksh 19 billion). Thus it is likely the ambitions for investment projects would need to be reconsidered to ensure they are affordable.

[7] It is assumed every child in class 1, 4 and 7 receives a laptop, and keeps them for three years.

Figure 18 Projected development costs under Scenarios 0, 1 and 2



Source: Authors' calculations. Clrm = classroom, Labs = laboratories, INSET = in-service teacher training, Txb = textbook, Prm = primary, JS = junior secondary, SS = senior secondary

7 Benefits of the curriculum reform

This chapter gives an overview of the type of benefits that might be expected from curriculum reform. It begins by looking at the benefits included in the projection model, in terms of enrolment and unit cost reductions. It then gives a brief snapshot of international experience of implementing education interventions and reforms similar to Kenya's proposals. Finally, perspectives from Kenya are set out, based on the curriculum reform development documents and policies.

It is worth noting that there are various levels of benefits that may come from an education reform. There are immediate benefits to outputs such as the number of children enrolled – or as an outcome, the number completing. This can be estimated in the scenarios. Then there are the higher order outcomes in terms of quality of education and student learning. As we will see in section 7.2, the international literature is lacking robust evidence on these sorts of changes, but there are studies on how aspects of reforms might affect teaching approaches and learning. With a lack of evidence to base any projections on, these sorts of benefits have not been included in the scenarios model. Finally there are long term impact objectives, such as social and health indicators, political engagement and awareness, and most obviously employment and hence economic prospects. Without evidence on how learning outcomes will improve, estimating this eventual impact for Kenya, and monetising it in the case of Kenya, is not feasible. Instead, the expectations of benefits set out by Kenya's reform overseers are explained in section 7.3.

Box 7 Chapter 7: Key findings

- In the cost scenarios, if universal basic education is achieved, enrolment increases enormously over the scenario with current student flow rates. With UBE, over 1 million students are estimated to complete Senior Secondary in 2021/22, compared with just 327,000 completers with current levels of retention.
- The substitution of a year of senior secondary with junior secondary introduces a cost saving to the sector, equivalent to Ksh 33 billion per year in 2030.
- International experience relating to elements of the reform planned by Kenya show mixed results, and that the detail of design and implementation are key to success. Teachers need adequate, effective training with materials to be able to use the new curriculum, pedagogy and assessment. However implementing new curricula can be difficult due to structural challenges: class sizes, infrastructure, and cultural norms.
- The new curriculum is being designed with the objective of meeting the goal of becoming a middle income industrialised country by 2030, thus providing the human capital for that vision. The technical and vocational skills-focus is expected to prepare youth for a knowledge-intensive economy. The system should become more flexible for learners with different abilities and potentials, and also harmonise Kenya with the East African Community. Finally, the curriculum is expected to increase social cohesion.

7.1 Benefits included in the projection model

One of the main benefits intended by Kenya's curriculum reform is an increase in relevance and quality of education provision, leading to a population better prepared for 21st century challenges and a labour force more productive in an internationally competitive industry. Whilst the increase in quality cannot be monetised, the projection model does allow estimation of increase in human capital in terms of graduates of basic education. Through commitment to universal access and full completion of the new cycle, Kenya will have higher enrolment and consequently higher numbers of young people leaving the school system with senior secondary education.

The following table shows the number of pupils at different grades of education under the two main scenarios affecting enrolment. The first relates to continuation of the current curriculum and

student flow rates. The second looks at the situation under the new curriculum, with 100% transition to secondary and 100% retention in primary, junior and senior secondary.

Table 34 Enrolment projections under two scenarios (thousands)

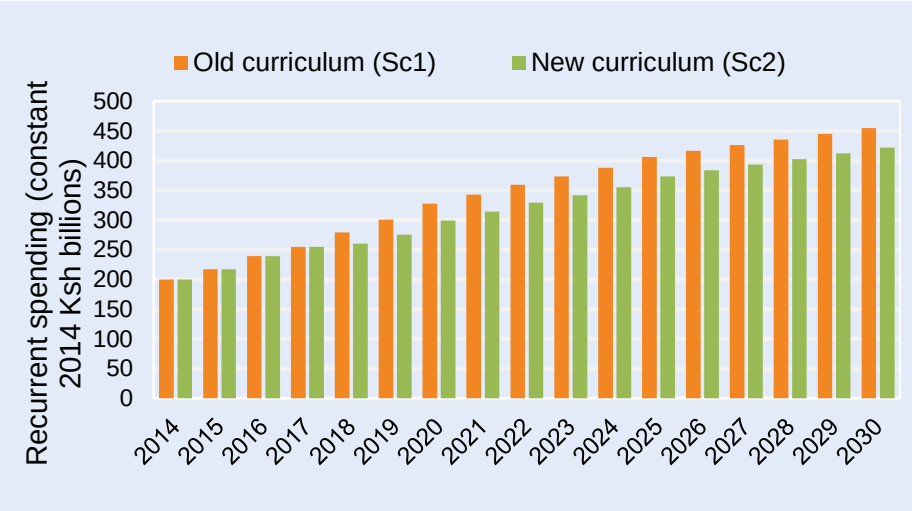
	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	Total 5 years
No change (Scenario 0)						
Std8	926	948	929	931	965	4699
Form1/Std9	902	720	750	735	737	3844
Form2/Sec1	850	695	555	578	572	3250
Form3/Sec2	631	657	538	429	447	2702
Form4/Sec3	479	481	501	410	327	2197
UBE and new curriculum (Scenario 2)						
Std8	1134	1232	1208	1211	1255	6040
Form1/Std9	1075	1106	1224	1199	1202	5806
Form2/Sec1	1026	1058	1089	1204	1191	5567
Form3/Sec2	762	1013	1044	1074	1188	5081
Form4/Sec3	578	741	985	1015	1045	4364
Increase in %						
Std8	22%	30%	30%	30%	30%	29%
Form1/Std9	19%	54%	63%	63%	63%	51%
Form2/Sec1	21%	52%	96%	108%	108%	71%
Form3/Sec2	21%	54%	94%	151%	166%	88%
Form4/Sec3	21%	54%	97%	148%	220%	99%

Source: Authors' calculations from projection model.

With the higher transition and retention rates, the new curriculum will see more students enrolled in each year of school. The effect increases in the higher grades, because of the increasing numbers making it through the system who would previously have dropped out. As this greater efficiency moves through the system, the new curriculum sees the number of Secondary graduates increase from 578,000 in 2017/18 up to over 1 million in 2021/22. This is in comparison with just 327,000 graduates in 2021/22 if retention rates remain as they are today. Eventually, the system will be producing three times as many graduates each year as under the status quo. These graduates then feed directly into the labour market as more educated and productive citizens, but also increase the supply of entrants into university, becoming even more educated and productive.

The projection model also includes two other benefits in the form of cost-savings. First, the increase in retention and reduction in repetition makes the system more efficient, and reduces costs spent on students who take longer to pass through the 12 years of basic education. Second, the new system is expected to have lower unit costs. This is because the reduction of secondary from four years to three, and shift to junior secondary, shifts students from the relatively more expensive school system to a cheaper one. Junior secondary is expected to use the same grade of teachers as primary school, so this assumption amongst others gives it a lower unit cost than senior secondary. The effect of the decrease in unit cost is shown in Figure 19 below, and leads to a reduction of recurrent spending on primary and secondary of Ksh 33 billion per year by 2030.

Figure 19 Recurrent spending on primary and secondary education



Source: Authors' calculations, from projection model.

Thus, whilst the increase in retention and student flow means that enrolment is higher and hence overall costs increase, the new curriculum brings in efficiency savings by reducing the number of years of more costly secondary education.

7.2 International experience

7.2.1 Issues in reviewing international literature on curriculum reform

In forming a view on the benefits expected from a policy intervention, it is often instructive to look at experiences from elsewhere. This section sets out the results of a short review of studies on curriculum reform, which are felt to be relevant to Kenya's current proposals.

The ability to compare Kenya's proposals to experience elsewhere is restricted by two major factors. The first is that at the time of discussion, there were still some aspects of the reform open for discussion. This means the final design of the reform was undecided, and there may be many possible alternatives. The second is that no two reform experiences are the same. A curriculum reform, particularly in the case of Kenya, can be a combination of many different changes – for example the objectives of the curriculum, the pedagogy and instructional materials, the learning areas or subjects, the assessment systems, the organisation of the school system and infrastructure that goes with it. Whilst Kenya is looking at all of these things, cases in other countries may be looking at only a smaller selection of features, and even then may be introducing quite different approaches. On top of that, even if two countries were to try to implement exactly the same set of policies, the reality of implementation can vary hugely. The roll-out and quality of teacher training, for example, has a substantial impact on teachers' ability to successfully implement the new curriculum. Likewise, timely distribution of relevant and effective instructional materials will be critical for implementation, and reality does not always go according to plan. These problems here relate to external validity – it would be very difficult to infer from a reform designed and implemented as X in country Y at time Z what the changed would be in Kenya in 2016 onwards.

When it comes to evaluating the impact of curriculum reform, there is also a challenge of internal validity – how to measure changes in a country/context and attribute them specifically to the change in curriculum. This is quite a massive task, where high quality data is required and ideally there would be some identifiable control group which does not receive the new curriculum, and so

can be compared to schools, teachers, and pupils who do get the new curriculum. The enormity of this task makes it unsurprising that no studies looking at the overall impact of curriculum reform have been found, particularly with quantitative estimates. Instead of looking at curriculum reform in its entirety, research tends to focus on particular aspects of a new curriculum and its implementation. This conclusion was also drawn in a rigorous literature review by Westbrook et al (2013, p.62): "Few studies explicitly pointed to a specific curriculum model."

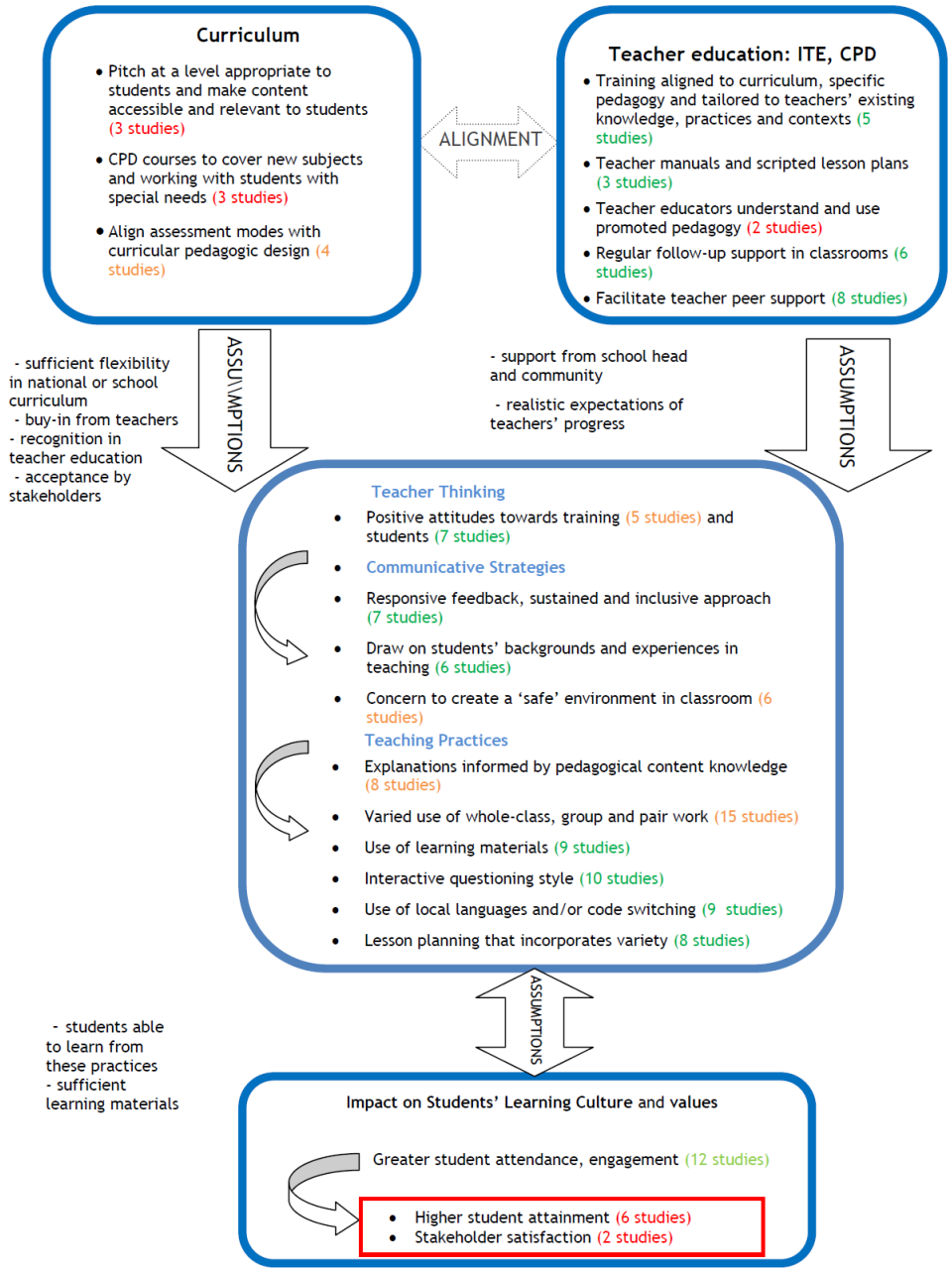
Despite the challenges faced in looking at the overall long term impact of curriculum reform, it is possible to look at international experiences of the components of curriculum reform. If Kenya's proposals are broken up into a number of constituent parts, research on similar projects elsewhere can be found to give an indication of what works or does not work. This is where studies focusing on specific aspects of education policy and reform may be useful. These have used varying methodologies, and been investigating different impacts, but some useful findings can be drawn for Kenya. The rest of this section sets out the methodology for this brief review of research, and then runs through evidence on the major aspects of the curriculum reform.

The methodology for this section was a brief review of international experience relevant to the curriculum reform. There have been a number of recent systematic literature reviews of 'what works in education', and these formed the starting point for identifying research. Westbrook et al (2013), Evans and Popova (2015), Glewwe and Muralidharan (2015) each looked at a range of interventions, and Power et al (2014) looked specifically at technology in education. Using the studies in these papers, there was then some snowballing to follow up further references, and internet searches around the main topics of the reform that are covered here. Studies were screened based on their relevance to this assignment and being a credible publication. This is not intended to be a rigorous literature review itself given the resources available for this assignment.

7.2.2 Overall theory of change for curriculum and pedagogy

This section draws heavily on the summary of an extensive literature review into pedagogy, curriculum and teaching practices in developing countries carried out by Westbrook et al for DFID in 2013. Given the wide scope of their research questions which do not refer to one specific intervention, the authors developed a general theory of change for practices and interventions under curriculum and teacher training. Their theory of change is shown in Figure 20 given the relevance to this assignment and its use in summarising the literature. It shows the general stages in the theory of change through to impact on students, the interlinkages and the assumptions required for each stage to hold. In addition the diagram sets out the strength of evidence for each practice, with weak evidence in red, moderate evidence in amber and strong evidence in green. Further sub-sections look at some specific evidence on aspects of the theory of change and assumptions and interventions relevant to Kenya's proposals, drawing out main conclusions on the importance of the details of implementation.

Figure 20 Westbrook et al's Theory of Change



Source: Westbrook et al (2013) p. 43

7.2.3 Competence based curricula and child-centred pedagogy

In a review of literature on curriculum and pedagogy, Westbrook et al (2013) found that most cases of curricular change were replacing content-driven curricula with process- and objective-driven curricula. Furthermore, these are often competency or outcomes-based curricula, which are structured around sets of learning outcomes that all learners are expected to have mastered at the end of the learning period. These curricula focus on the teaching of skills and attitudes as well knowledge, and students should be able to apply and integrate these learned competences. Thematic and interdisciplinary curricula (such as in Uganda and China) are similar but particularly highlight integration of subject knowledge.

Altinyelken (2009) reviews the shift to child-centred pedagogy that has been seen in Sub-Saharan Africa. Many papers find that the idea did not take root in classrooms, since pedagogy is so

complex and multi-dimensional, and as a result there is a wide gap between policy and practice, with teacher-centred instruction continuing. Altinyelken quotes Farrell (2002, p.256) however who found 'It can be done, and where done, it generally produces remarkable learning gains among even the poorest and most "disadvantaged" children.'

Two cases which explored how new curricula introduced child-centred pedagogy were Tanzania and Uganda in the mid to late-2000s. In Uganda, Altinyelken (2009) carried out fieldwork in primary schools which were piloting the new thematic curriculum and shift to child-centred pedagogy. Vavrus (2009) conducted an ethnographic study of a Tanzanian teacher training college which was training pre-service teachers in new student-centred learning methods. Both of these studies found that teachers did understand the new methods, including for example the importance of student participation, group work and use of teaching and learning materials.

In the case of Uganda, some teachers felt to see improvements in student learning, though they put this down to the organisation of the new curriculum rather than the child-centred pedagogy. In her 2010 paper, Altinyelken reports that following introduction of the new curriculum and pedagogy, teachers found the classroom interaction to be more varied, which made it more enjoyable for the children. Teachers believed the increased participation built children's self-esteem, assertiveness and confidence. With introduction of class teachers (rather than subject teachers) for P1-3, some teachers felt able to get to know students better and then support them more appropriately; but this also risks larger loss of instruction time when teachers are absent.

However, there were underlying structural obstacles to effectively using the new pedagogy in schools. Particular examples given were:

- large class sizes, which for example make student interaction and group discussion more difficult;
- the furniture, for example appropriate desk lay-out, and moving furniture around to facilitate activities was too noisy and disruptive;
- lack of or at least insufficient teaching materials linked to the new curriculum;
- a hierarchical approach to authority, for example making teachers uncomfortable in asking students questions as an engagement technique, as it implied they did not know the answers themselves.

7.2.4 Details of the design: teacher training, content and materials

A number of studies support the conclusion that the devil is in the detail of the design of new curricula and pedagogy. The teacher training is a particular area of importance. Kenya's national School-Based Teacher Development and Instructional Materials intervention project (SbTD), which trained three key resource teachers per school, led to teachers using more interactive questioning, more use of group work and equitable learning for boys and girls, helped by use of mother tongue and code switching and constructive feedback (Hardman et al. 2009, summarised in Westbrook et al. 2013). Aspects of support for teachers were found to particularly help the improvements: in-school and in-class support, regular meetings and teacher study guides.

There are many examples of where poor teacher training has been a barrier to improvements in learning. In their review of the outcomes-based curriculum introduced in South Africa in the late 1990s, Cross et al (2002) concluded that poor and hasty planning led to a misalignment between the curriculum, teacher development and learning materials. In this case, instead of proper teacher training, teachers were given ad hoc workshops, and supplied with insufficient materials. They recommended that local teachers should be involved in new curricula design in order to make it applicable and accessible. In interviews with teachers implementing Uganda's thematic curriculum,

Altinyelken (2010) found that teachers felt the training they received was low quality; specifically that it was rushed and the tutors themselves were not experienced. Although there were some positive reports of changes for children (see above), other teachers commented that they had not understood the new method or the benefits of it, and some even resented it due to the confusion. Reviewing a range of papers on improving learning outcomes in developing countries, Evans and Popova (2015) summarise that one-time in-service training sessions at a central location are not highly effective, and instead long-term teacher mentoring or in-school coaching for changes in pedagogy are more likely to have an effect on student learning.

The content and supporting materials for curricula are another important factor for effective implementation. A recurring theme across studies for ineffective implementation of a curriculum was lack of resources such as textbooks, not just because insufficient numbers were distributed but because either teachers were not using them as intended or at all. This might be because teachers did not have the time to use them correctly, or did not want to damage them (Westbrook et al, 2013). Experience from Kenya itself found that the material in textbooks was too hard for most children, who struggled to even read the text, never mind engage with the content (Glewwe et al, 2009). Teachers also need enough support, guidance and detail on how to cover subjects. When Botswana introduced 'environmental education' as learning area in the curriculum, the detail was left to the discretion of teachers which they were ill-prepared for, and resulted in little effective teaching (Nkambwe and Essilfie, 2012).

Both of the preceding paragraphs refer to details which matter for reforms to be successful. Altinyelken (2010) whilst reviewing studies on curriculum change also noted that literature has increasingly focused on how many education reform initiatives were implemented ineffectively and failed to meet their objectives. Westbrook et al (2013) found that challenges with implementing improvements in teachers' pedagogy included teachers' lack of subject knowledge (perhaps due to low achievement, or specific subjects), resistance to change to ingrained beliefs and fear of losing authority, and a perception of added burden from active learning and student-centred models – especially with large classes. Without sufficient understanding and pedagogical content knowledge, implementation was found to be diluted or shallow.

7.2.5 Introducing local content

Kenya's new curriculum is expected to allow for introduction of county-specific content. Westbrook et al (2013) found mixed evidence on the success of introducing localised content into curricula. They look at localised or indigenous curricula which aim to decentralise the curriculum such that activities and knowledge are included which are seen as useful and relevant to particular groups of children. Studies found some success in this approach in Mozambique, Afghanistan and Cambodia, and a common theme to this success was strong links between schools and the community and use of local teachers. Where less positive findings emerged, reasons included teachers being concerned that children would miss out on international perspectives, where they dismissed local knowledge and favoured information in textbooks, or where local content was unsuccessfully integrated into the national curriculum. Nkambwe and Essilfie's study of the introduction of environmental education as a new subject in Botswana may also be relevant here: where teachers were given responsibility for deciding how to cover the topic, they struggled to include it effectively. Teachers need to be given sufficient guidance on what to teach when it comes to local content.

7.2.6 Assessment

It is critical that the assessment system is realigned to any new curriculum, as curricula, pedagogy and assessment are connected and should relate to each other to achieve the intended teaching

and learning in the classroom. Westbrook et al (2013) found a number of studies suggesting that where high-stakes examinations continued despite a new curriculum being introduced, teachers struggled to implement the new curricula. High-stakes examinations encourage teachers to cover content rapidly and therefore revert to teacher-central methods, making it difficult to be true to the objectives of new child-centred and competence-based curricula. This was made worse in situations where parents believed quality education depended on having authoritative teachers and examinations for assessment.

However if assessments can be realigned, Westbrook et al's review found that continuous formative assessment was more effective than high-stakes summative evaluations. They note the interesting case of South Africa's hybrid assessment system, in which standardised tests in primary school are used for diagnostic purposes by teachers as well as for public information (Chisholm and Wildeman, 2013, in Westbrook et al, 2013). An assessment system aligned with curriculum content was concluded to be one of the four facilitating factors for pedagogy to lead to positive outcomes. For effective implementation, continuous professional development for teachers must include new curriculum demands such as continuous assessment. Altinyelken (2010) found teachers in Ugandan primary schools felt they were not adequately trained to be able to implement continuous assessment, and they faced difficulties using it with large class sizes.

7.2.7 Years of schooling

Kenya is proposing to change from the (3)-8-4-4 organisation to 2-6-3-3-4, in which 12 years of education are seen as compulsory basic education (primary to senior secondary). Here we do not present a full review of studies on the impact of changing the number of years of compulsory schooling; as with other descriptors of a curriculum, the years themselves are not critical, but it is the quality of implementation that matters. The global education community has increasingly recognised this, as summarised by Evans and Popova (2015, p.2): "evidence suggests – unsurprisingly – that additional years of schooling have little impact on economic growth in the absence of learning, which is a function of education quality (Hanushek and Woessman, 2007)." Meanwhile there is cumulating evidence that learning profiles – the relationship between learning outcomes (skills/knowledge mastered) and each additional year of schooling – are too flat (see for example Pritchett and Beatty, 2012). This means there is little marginal benefit from adding more years in the absence of other improvements to the education system.

One study from Germany found that when the years of schooling decreased, there was a negative impact on equity as low performing children fell further behind (Andrietti and Su, 2016). This could imply that more years of schooling would give children who are struggling a chance to catch up, if the overall content and burden of the curriculum remained the same and teachers were able to give more time to assist weaker students.

7.2.8 Use of ICT

There have been numerous studies in recent years looking at the application of digital technologies in teaching and learning. Glewwe and Muralidharan synthesise this evidence in their 2015 paper. They find only one paper which looked at the impact of ICT on access, and found no effect on repetition and dropout rates. However, nine different studies looked at the impact on student learning. A wide range in impact was found, from significantly negative to significantly positive, and clearly context is very important. The authors discuss a number of potential channels of impact for technology-enhanced instruction, including:

- Scalable high quality instruction through broadcast technology (TV, radio). This is also identified in Power et al's Topic Guide (2014) on education technology, where they find

interactive radio instruction (IRI) to have positive effects on average, and particularly in cases where IRI is used in teacher professional development rather than directly in the classroom.

- Ability to cover more advanced concepts and content. Again a similar conclusion is drawn by Power et al who specifically identify the BridgeIT programmes in Tanzania and India where teachers use their smartphones to play video lessons for their classes via projectors.
- Engaging children through interactive modules, and
- Customising student learning.

This last channel was also identified as effective by Evans and Popova (2015), whose review found that computer-assisted learning is most effective where it allows adaptation to individual students. However computer-assisted learning would be ineffective where there is no tailoring for students, insufficient training for students and parents on the technology, or where it is used to substitute for useful teaching time or home study. They also note that the use of the technology must be integrated into lessons and aligned to the curriculum.

While Power et al (2014) found that access to eReaders or tablets were effective in supporting early literacy, a study from Kenya itself indicates that supplying all children with eReaders is not cost-effective. The evaluation of the Primary Math and Reading (PRIMR) Initiative compared three versions of the intervention: giving eReaders to pupils, or tablets to teachers or to teacher educators/tutors. All three groups showed similar gains in student learning outcomes, but with the pupil eReaders the programme costs were substantially higher (Piper and Kwayumba, 2014).

A useful conclusion from Power et al (2014) is that simply increasing students' access to computers has no discernible impact on teaching or learning, since they may be used for non-educational purposes or not used at all. For technology to be effective in learning, it must have a clear curriculum focus, use relevant curriculum materials, focus on teacher development and training on pedagogy with the technologies, and evaluation mechanisms.

7.2.9 Equity

A small number of studies made reference to equity effects of curricula. Andrietti and Su (2016) used PISA assessment data to look at the impact of shifting from a nine year to eight year curriculum in Germany. The impetus for the reform was that German students spent comparably longer in school than students in neighbouring countries – so the new curriculum had very similar content but faster pace of expected learning. The study found that children who were already falling behind (those who had repeated a grade) were adversely affected by the more challenging curriculum, whereas well-prepared children performed better with the compressed curriculum. In effect, the harder (and in this case shorter) curriculum widened the gap between high and low performing students.

Glewwe and Muralidharan (2015) comment on equity more generally, noting that the natural heterogeneity across students will mean that an optimal policy for some students is not the same as for others. Westbrook et al's review (2013) finds similar results from a number of studies but with respect to specific groups: that the curriculum can disadvantage marginalised groups, especially rural children and girls, and often due to poor representation in textbooks. Another disadvantaged group would be those communities not using the language of curriculum instruction as their mother tongue. Barriers to including children with disabilities included the lack of training and knowledge of teachers on how to deal with heterogeneous groups and their differing needs (Westbrook et al, 2013). In cases where teachers were expected to adapt the curriculum for groups with special needs, making teaching resources and preparing different types of activities, could place further burden on teachers if they are not given adequate support and training.

7.2.10 Conclusions from international experience

Whilst this review was not able to systematically look at all literature on the aspects of curriculum reform being considered by Kenya, it has shown that the research that exists have found very mixed results about the impact of interventions and curricula practices. A running theme has been that the results depend on the details of the design and actual implementation of a policy or programme. This implies the importance of giving enough time and consideration (including consultation and then piloting) to designing and rolling out any changes, and an eye for detail in monitoring that the actual implementation goes to plan. A summary of the findings from international evidence and how they relate to Kenya's plans is given in Table 35.

Table 35 Summary of international evidence relating to Kenya's curriculum reform

Expectation in curriculum reform	International evidence
Introducing competence-based curricula and child-centred pedagogy	There can be a wide gap between policy and practice, as new techniques do not take root in the classroom. Application is challenged by large class sizes, infrastructure, lack of materials and discomfort from teachers who feel a strong approach to hierarchy. Where successfully implemented, the classroom interaction is more enjoyable for pupils, and builds their confidence.
Delivering training and materials	The detail of the design is critical for success. Training teachers for a new approach, evidence from Kenya suggests that in-class and in-school support, regular meetings and study guides improve effectiveness. Ad hoc workshops, rushed trainings with insufficient materials are likely to be unsuccessful. Schools need to receive – and importantly use – teaching materials like textbooks which are relevant to the new curriculum. At the same time, the content needs to be appropriate for learners' levels.
Introducing local content	There is mixed evidence. Success stories emerge when there are strong links between schools and the community and use of local teachers. The concept struggled when teachers prioritised international knowledge or the content was not successfully integrated.
Emphasising formative assessment	Evidence suggests that teachers struggle to implement a new curriculum if high-stakes examinations continue. Continuous formative assessment is found to be more effective than high-stakes summative evaluations, but teachers must be well-trained in using it.
Ensuring 12 years of compulsory education	The global education community has increasingly recognised that it is not the years of schooling alone but the quality of education that matters.
Focusing on use of ICT in learning	Use of ICT has been found to have positive and negative effects. Strategies found to be more successful include scalable high quality instruction broadcasts, covering more advanced content, interactive modules for learners, and customised student learning.
Equity	Natural heterogeneity in the population will mean that an optimal policy and curriculum for some learners is not the same for others. Marginalised groups can be disadvantaged by curricula, for example due to underrepresentation in textbooks. Teachers require adequate support to be able to adapt the curriculum for learners with special needs.

7.3 Perspectives from Kenya

The rationale for and objectives of the curriculum reform are set out in key documents, and reflect the expected benefits of the reform. This section summarises the key benefits expected, focusing on benefits in terms of outcomes and impacts.

A starting point for the new curriculum is to meet the goals of Vision 2030, which aims to transform Kenya into a middle income industrialised country. Where the overarching vision is "A globally competitive and prosperous nation with a high quality of life by 2030," there is a clear expectation that the new curriculum will provide the human capital necessary for achieving the vision. The overall expectation is the system will produce Kenyans with the skills, knowledge and competencies capable of lifelong learning, in turn making the country internationally competitive and economically viable. The system would meet the human resource requirements for a changing and diverse economy, as Kenya becomes newly industrialised (MOEST, 2015b).

The balance of general and technical and vocational skills in the curriculum is intended and expected to prepare youth for knowledge-intensive economies. This is turn would curb unemployment and vulnerable employment among young people (MOEST, 2015b).

Harmonising the duration of schooling in line with the East African Community is expected to improve Kenya's competitiveness in the region and globally. In addition, it should free up the movement of teachers and learners within the region.

In addition, the report of the Technical Committee (MOEST, 2015b) implies the new structure is intended to reduce wastage and educate students with a wide array of relevant and skills through an all-inclusive curricula. This was based on a shorter elementary education for foundational skills (6 years of primary rather than 8) followed by a junior secondary level which allows learners to explore their interests and strengths, before narrowing down in senior secondary.

There is an expectation of greater flexibility through pathways and options for students to exit and re-enter the system. At the same time these pathways are supposed to give opportunities for high performance and career progression for learners with diverse abilities and potentials. Academic routes, particularly to university, would no longer be seen as the only route to success. Ultimately all learners would be valued for their diversity, and this in turn is expected to reduce the disengagement of young people and reduce crime (KICD no date – Reform Brief).

There is reference to the curriculum being expected to support the building of social cohesion, as well as to build identity and belonging by fostering local cultures in the curriculum (presumably though the introduction of local content) (KICD - Curriculum Reform Proposal & Budget).

8 Conclusions

Having made good progress in expanding enrolment, and a strong financial commitment to education, the Government of Kenya is embarking on a reform of the curriculum in order to address identified weaknesses and challenges in the existing system. The new curriculum will seek to align education to Vision 2030 and the 2010 Constitution, taking into account aspirations for skills and human capital required to be a middle income country.

This assignment seeks to provide evidence and a tool for MOEST to support its decision making in moving ahead with the curriculum reform. It included a review of recent years of education expenditure and the macroeconomic context within which the education sector sits. Scenarios of future enrolment and costs for the sector have been created, to inform decisions about policy parameters in terms of what may be affordable. Finally, the potential benefits of the reform are reviewed, drawing on the outputs included in the scenarios, international evidence of outcomes, and Kenya's expectations of impact.

The report provides a basis for the Government to better understand student flow and the financial implications of a change in student flow related to the new curriculum. It also provides a starting point for discussions about the affordability of meeting such a strategy, given the scale of funds that would be needed from Government. As such, this report and tool should support the country's dialogue with sector stakeholders to come to the best combination of inputs and hence resources and expected results. It thus forms preliminary elements of a sector diagnostic.

This chapter summarises the findings from the assignment, and ends with reflections on the implications of the planned curriculum reform and recommendations for MOEST and Kenya's education stakeholders to move to an affordable solution.

8.1.1 Recent trends in education finance

Over the last five years, Kenya's GDP grew on average by 5.5% each year in real terms, bringing it to Ksh 6.2 trillion in 2015/16. Real economic growth has surpassed population growth such that GDP per capita has increased each year, reaching Ksh 128,000 per person. Out of its GDP, Kenya has been able to collect between 18.8% and 19.4% of its wealth in domestic revenues each year, and public expenditure has been between 23% and 26% of GDP in the last five years.

The government allocates over 14% of its total spending to education each year, although this share has fallen from over 20% in 2011/12. Nevertheless in market prices, the absolute amount spent on education has increased year on year to reach Ksh 320 billion forecast for 2015/16. This has stayed above 5% of GDP over the last six years. Within government spending on education, around 92% to 95% tends to be on recurrent expenditure, with the rest on development.

Primary education receives the largest share of recurrent education spending, at over 40% for the last five years. Secondary accounts for the second largest share at around 32%. The TVET and university levels receive around 4% and 14% respectively, and with administration taking 5-8%, this leaves less than one percent for early childhood education. Meanwhile, calculating unit costs (average spending per student) of public institutions, the cost increases with the level of education. Based on this, it costs three times as much to educate a student in secondary education for one year than it does in primary school, over four times as much in TVET and seven times in university. However, the gap between unit costs of TVET and university relative to primary have reduced substantially in recent years, suggesting resource input has not kept up with enrolment at higher levels.

In addition to public spending on education, there is a not insignificant amount financed from other sources and so remaining 'off-budget'. Development partners spend somewhere up to USD 190 million per year, which roughly matches the amount the government spends on development. Whilst data on other spending is scarce, estimates of household spending in public basic schools on board of management teachers and boarding fees puts the amount at Ksh 132 billion per year. If we assume the cost of private schools is equal to that of public schools, another Ksh 28 billion is spent each year on primary and secondary education. Compared to around Ksh 280 billion spent by the government on education, this suggests households are paying half of that amount again on top of government spend.

8.1.2 Kenya's curriculum reform

Kenya has developed proposals and policies for the curriculum reform, which build on a number of policy statements and legal commitments arising over the last eight years. Key defining aspects of the reform are a shift to competence-based curriculum, which has a structure of 2-6-3-3 years of schooling for basic education instead of the existing (2)-8-4. Within senior secondary education, three pathways will be introduced to give students flexible alternatives that cater to different abilities and interests.

8.1.3 Education projection model

A spreadsheet model was developed and used to project the costs of the education sector and resources available to the sector from the government budget. The model builds up blocks of levels of education and working from enrolments through to the costs associated with student numbers. Inevitably this type of projection is made using hundreds of assumptions about what will happen, and any number of scenarios could be developed by varying the assumptions in different combinations. This report presents three scenarios as a way to better understand the potential implications of policy decisions and what it means for the affordability of the sector.

With GDP predicted to grow by 4% each year, if revenue collection rates remain the same, and the share of revenue devoted to education remains the same, then the budget available for education would increase from Ksh 274 billion in 2015 to Ksh 494 billion in 2030 (in real terms). At the same time, the school age population is expected to grow by a third, from around 18 million to 24 million. If enrolment rates are also expected to increase towards achieving universal basic education, this means enrolment numbers could increase quite substantially.

Scenario 0: If the status quo rates of enrolment and retention continue, under the current curriculum, enrolment in basic education will increase from less than 18 million today to 21 million in 2030. Recurrent costs would be Ksh 280 billion per year in 2030. In this scenario, the sector's costs are easily affordable and the budget surplus to education would be Ksh 35 billion by 2030.

Scenario 1: Under a scenario of complete universal basic education but the current structure of 8-4-4, with 100% retention and transition and zero repetition, enrolment increases to 24 million by 2030. Recurrent spending thus increases: from Ksh 200 billion in 2014 to over Ksh 468 billion in 2030. This means the sector requires more resources than the projection of government budget allocation to education, leading to a financial gap of Ksh 223 billion in 2030.

Scenario 2: When the structure of education shifts to 6-3-3-4, it is assumed that one year of relatively more expensive secondary education is converted into junior secondary, which has the same lower price as primary education. Under this scenario, the cost of the sector still increases due to the higher enrolment, but by 2030 it reaches Ksh 434 billion compared with the Ksh 468

billion needed in the earlier scenario. This means the financing gap is smaller too, at around Ksh 190 billion per year in 2030.

In order to cover the costs of the curriculum reform (Scenario 2), the government would have to commit an increasing proportion of GDP – from 4.9% in 2014 up to 6.8% in 2030 – to education recurrent spending. This would be equivalent to over 35% of domestic revenues committed to education recurrent spending in 2030, far higher than the 25.4% committed in 2014. This shows the scale of inter-sectoral prioritization that would be required to finance a scenario of full enrolment and transition. As such, it does not appear realistically affordable. Kenya's decision makers can continue to test out other assumptions in the tool to see the affordability, such as changing the pupil teacher ratio or looking for price reductions.

8.1.4 Benefits of curriculum reform

The scenarios developed in the projection model show the benefits to the sector of increasing enrolment when universal basic education is pursued. With UBE, over 1 million students are estimated to complete Senior Secondary in 2021/22, compared with just 327,000 completers with current levels of retention. This feeds a more educated set of young people into adulthood and the economy. If the quality of education also improves, as intended by the curriculum reform, then these young people will be even more skilled and productive workers.

Looking at international experience, there is no study or paper that attempts to fully evaluate the introduction of a new curriculum. However, experience from interventions which correspond to aspects of Kenya's proposals show that positive outcomes can be there, but the detail of design and implementation quality is key. Sufficient preparation, relevant and quality training for teachers, matching resources like reaching aids and aligned assessment systems are all critical to the success of a new curriculum. The research and development work carried out by KICD should help MOEST to ensure that lessons from other countries are taken into account, and consultation and testing may be important for making sure the intended implementation of the new curriculum is suited to the realities for Kenyan schools, teachers and students.

Based on the Government's policy documents and vision for the curriculum reform, it is the overall expectation is the new system will produce Kenyans with the skills, knowledge and competencies capable of lifelong learning, in turn making the country internationally competitive and economically viable. Greater opportunities for learning technical and vocational skills in the curriculum are intended and expected to prepare youth for knowledge-intensive economies. This is turn would curb unemployment and vulnerable employment among young people. The shift in structure to 6-3-3 is expected to reduce wastage, drop-out and inefficiencies, and the pathways in secondary education are expected to increase flexibility and options for re-entering the system.

8.1.5 Implications and recommendations

The Government of Kenya is in pursuit of its long term vision of becoming a middle income economy. The vision, once achieved, is expected to be supported and sustained by a globally competitive and vibrant education sector. The government is therefore undertaking curriculum reform as well as other related reforms in the education sector aimed at improving the quality of education and making it more responsive to the needs of the local, regional and global markets.

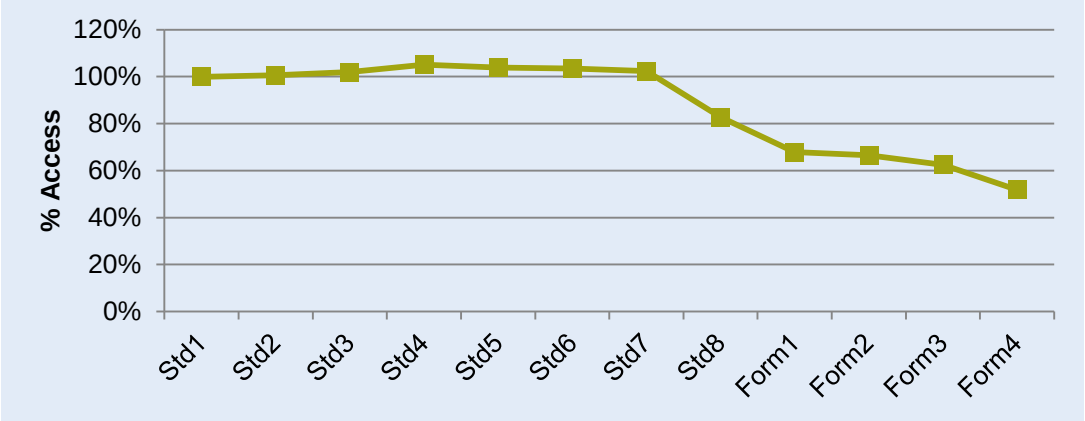
This report has reviewed the past trends in education with regard to public inputs to the education system, enrolments and different types of expenditures. This has been necessary in understanding the resource environment and the capacity of the system to make adjustments for new projects

and programmes. The review has made it possible to project potential resources that are likely to be at the disposal of the government for the implementation of the new curriculum.

The report has simulated scenarios through which the country will be able to achieve 12 years of free and compulsory basic education, as provided by the Constitution of Kenya 2010. The reform process will allow Government to accommodate more students in the education system and thereby ensure graduation of a high skilled labour force. The analysis shows that universalisation will see an additional 3 million children enrolled in pre-primary to secondary in 2030 who would otherwise have been outside the schooling system.

The shift in structure from 8-4-4 to 6-3-3-4 is expected to reduce wastage, drop-out and inefficiencies in managing student flows. Figure 21 below shows the schooling profile under the current education system in 2015. This profile suggests there is a substantial opportunity cost of staying in school beyond Standard 7, given the drop in access at Standard 8, with many students entering the labour market. With an economy that is mostly traditional, students with Standard 7 education possibly feel safe to go into employment. Without an assurance of new experiences in the system, learners opt to join the market to engage in gainful employment.

Figure 21 Schooling profile 2015



Source: Ministry of Education

The new system is expected to give learners new experiences when they join junior secondary after the primary cycle of six years, and thereby reducing the risk of dropouts. As discussed above, the change in structure is expected not only to reduce wastage but also provide a cost saving to the Government, with junior secondary delivered at a lower unit cost to the current secondary cycle. The cost saving will also accrue to parents.

Another issue that has continued to undermine progress in the sector is the assumption that everyone can excel in the academic pathway of an education system. The country has seen talented students struggle in the academic path with few alternatives offered. The three proposed pathways in senior secondary education will provide much needed flexibility to accommodate students with talents and passion for art as well as ensuring sufficient graduates from science technology and mathematics.

However, regardless of these anticipated benefits, it is clear from the scenario modelling conducted for this report that meeting universal basic education will require substantial additional resources if efficiency savings are not found, and this may be beyond the feasible allocation from the Government to education. The Government of Kenya will need to think about the pace and scale of ambitions, the likely benefit associated with these ambitions, and options for reducing the

costs. With this in mind, there are three key recommendations for furthering decisions about the curriculum reform and policy.

Recommendation 1: Conduct a full sector diagnostic and public expenditure review to better understand where there is room for reducing inefficiencies in the system

It is very likely there is room in the system to reduce wastage and unit costs in delivering education. A full public expenditure review (PER) would be necessary to see which parts of the sector have inefficiencies which could be removed without compromising quality service provision. Further, this report and curriculum development itself is based on aggregate pictures of the sector. A full sector diagnostic would document the situation on disparity, equity and efficiency in the use of resources and education outcomes. These analyses would inform where there is room for the Government to reduce unit costs and make the new reforms more affordable.

Recommendation 2: Use the projection model to test how reviewing the policy options and ambitions makes the reform more affordable.

The tool is there for policy makers to now iteratively adjust the targets in order to see how this affects the estimated costs of the sector. Here the PER and diagnostic already recommended would help inform the quality and equity implications of changes to targets or underlying assumptions (such as increasing PTRs, for example). For instance, is there room for tightening a target or assumption, or would this compromise quality, and if so what is the tolerance for this? The options to reduce costs may need further feasibility and political economy analysis to ensure they can realistically be implemented.

Recommendation 3: Conduct employment and market analysis to inform the pathways

Given the large cost of implementing a change in curriculum, the Government should be sure that the ambitions will produce the right outputs to match economic needs – the demands of the labour market and opportunities for job creation. For instance, one way to compete with middle income countries is to develop a large manufacturing sector, and to do this the economy needs a labour force with mostly around nine years of basic education and strong technical and vocational skills. How will the 12 years of basic education optimise learning for students entering Kenya's economy?

In Kenya, 83% of workers are employed in the informal sector, equivalent to almost 12 million people (Table 36). Employment in the informal sector has almost tripled since 2000, and at the same time this sector has grown as a proportion of all employment from only 70% in 2000. Whilst the modern sector has also grown, its growth has been far less rapid than the informal sector.

Table 36 Recorded employment in Kenya (thousands), 2000, 2005, 2010, 2014

	2000		2005		2010		2014	
	#	%	#	%	#	%	#	%
Modern sector - wage employees	1,695	*29%*	1,808	*22%*	2,059	*19%*	2,370	*17%*
Modern sector - self-employed or unpaid family workers	65	*1%*	67	*1%*	70	*1%*	103	*1%*
Informal sector	4,151	*70%*	6,397	*77%*	8,826	*81%*	11,846	*83%*
Total	5,912	*100%*	8,272	*100%*	10,955	*100%*	14,319	*100%*

Source: Economic Surveys

The informal sector has clearly been surviving and thriving with the current levels of education in the population. How will the new curriculum ensure students leave with competencies to improve productivity in the economy in general and especially in the informal sector? Will the economy be able to adapt to create opportunities for the graduates of the system under the new curriculum? Will the informal sector find ways to make use of their skills, or will employment in the modern sector evolve? Further employment and market analysis would help answer these questions, and make sure education policy and economic growth policy are aligned with each other. As part of this, the Government may want to consider alternative options for learners within the 12 years of basic education, which are suited to the needs of the economy and reflect the opportunity cost of education.

These three recommendations together would support Kenya's stakeholders in coming to a policy which is affordable, efficient in delivering its outputs and leads to outcomes that will be fully utilised by the country.

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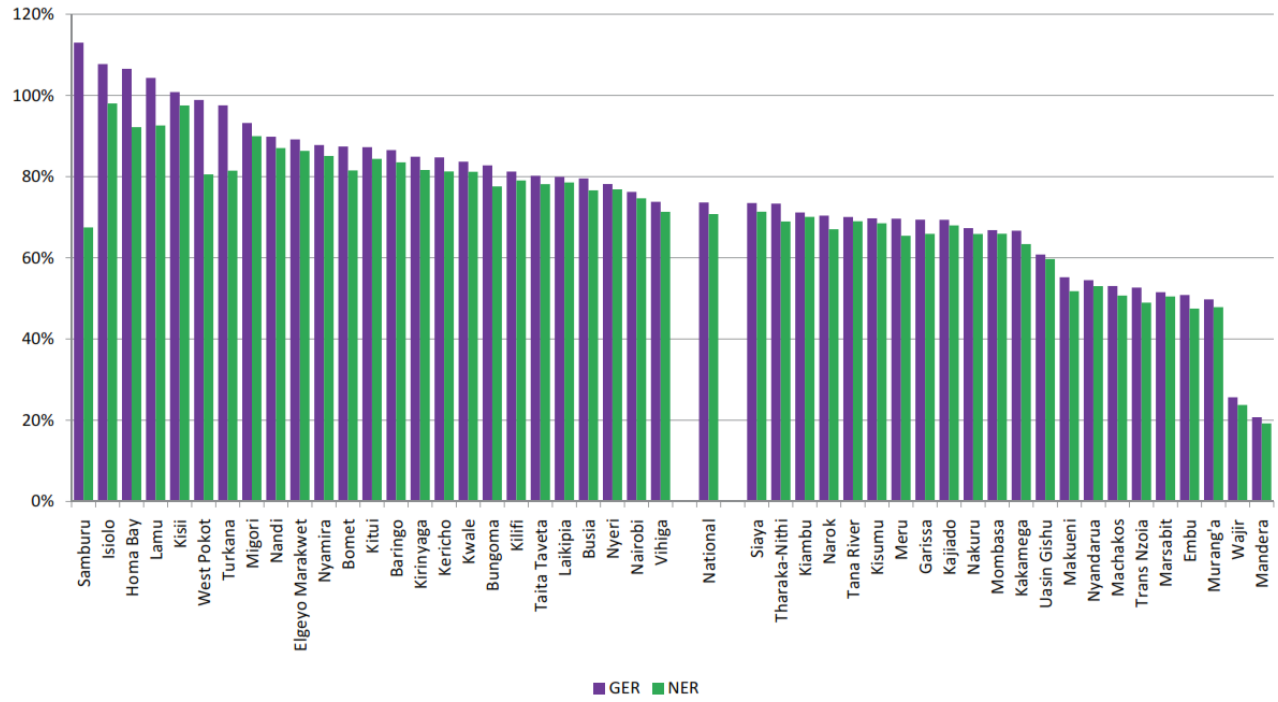
Annex A List of people and institutions met

A.1 List of people met or held discussions with in inception phase

Name	Organisation	Position
Ousmane Niang	UNICEF	Chief of Social Policy
Daniel Baheta	UNICEF	Chief of Education
Shweta Sandilya	UNICEF	Education Specialist
Darius Mogaka	MOEST	Director Policy
Sebastian Owanga	MOEST	Assistant Director - Policy
Prof Kaane	MOEST	NESP Consultant
Lillian Miliza	MOEST	Finance Officer, Basic Education
Esther Maina	MOEST	Finance Officer, TVET and University Education
Joan Murigu	MOEST	Director Basic Education
Turphenah Kirongo	MOEST	Director Secondary Education
Kapsir	MOEST	Finance Officer, TVET and University Education
Julius O. Jwan	KICD	Director / Chief Executive Officer
Jacqueline Onyango	KICD	Deputy Director
Reuben Nthamburi	KICD	Deputy Director
Franco Munene	KICD	Assistant Director - Pure Sciences
Macdonald Obudho	KNBS	Director Population and Social Statistics
Marie-France Provencher	Canadian High Commission	First Secretary (Development)

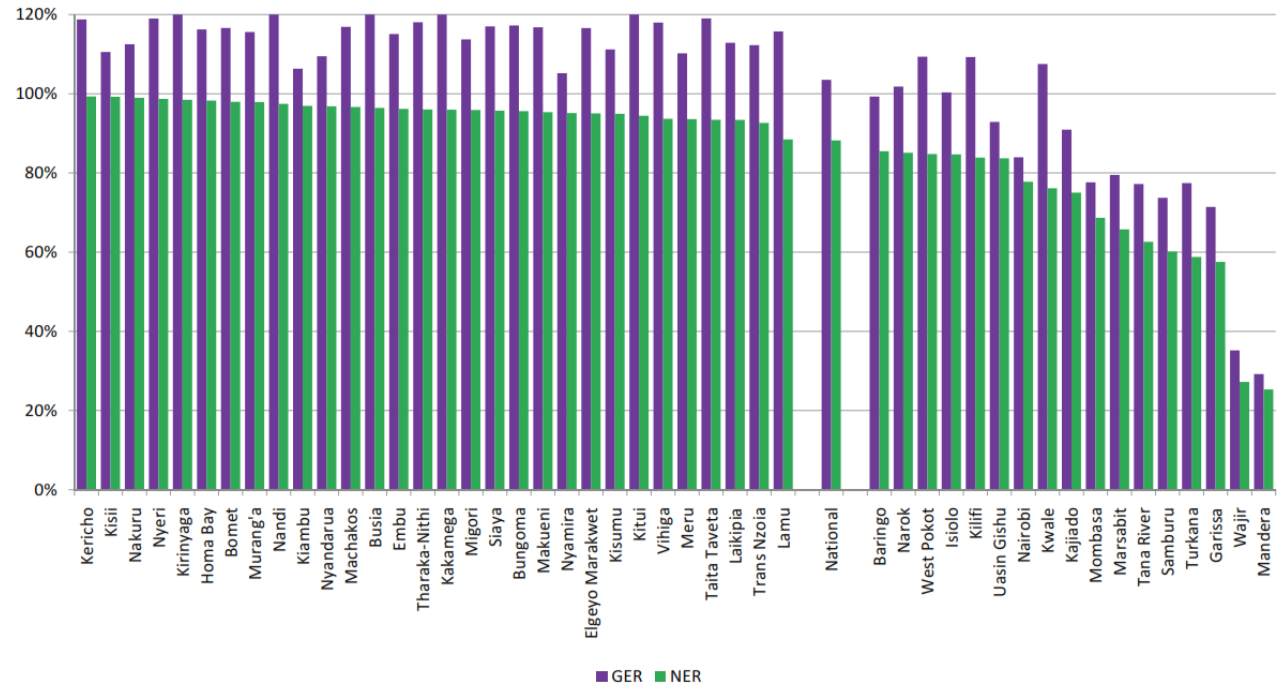
Annex B County level data

B.1 ECDE gross and net enrolment rates, 2014



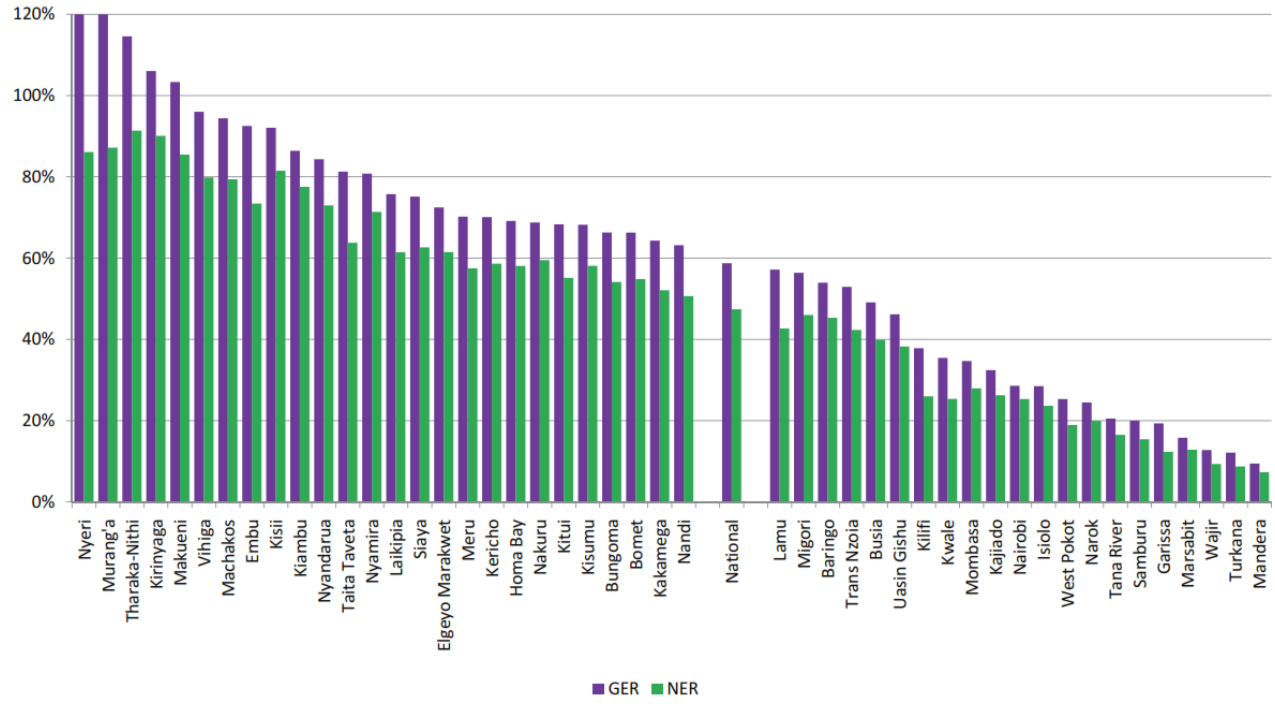
Source: MOEST (2014a)

B.2 Primary gross and net enrolment rates, 2014



Source: MOEST (2014a)

B.3 Secondary gross and net enrolment rates, 2014



Source: MOEST (2014a)

B.4 County Spending on ECDE, 2014/15 (Ksh millions)

	Total County Expenditure		Education, Sports, Culture and Arts Vote		Education (ECDE)			
					Total expenditure		As % of total County	
County	Recurrent	Development	Recurrent	Development	Recurrent	Development	Recurrent	Development
Baringo	2,945.6	1,215.6	245.4	189.8	61.3	66.4	2.1%	5.5%
Bomet	2,359.5	2,054.0	135.4	456.4	33.8	159.7	1.4%	7.8%
Bungoma	4,584.1	2,561.0	311.2	259.0	77.8	90.6	1.7%	3.5%
Busia	2,971.4	2,025.0	110.5	119.0	27.6	41.7	0.9%	2.1%
Elgeyo Marakwet	2,258.8	1,128.6	167.8	76.0	42.0	26.6	1.9%	2.4%
Embu	3,177.2	625.7	9.7	77.1	6.8	27.0	0.2%	4.3%
Garissa	3,676.6	2,919.6	183.0	46.5	45.8	16.3	1.2%	0.6%
Homa Bay	3,416.2	1,862.9	272.6	83.8	68.2	29.3	2.0%	1.6%
Isiolo	1,759.0	1,086.5	66.5	73.6	16.6	25.8	0.9%	2.4%
Kajiado	3,507.5	1,025.6	137.3	207.6	34.3	72.7	1.0%	7.1%
Kakamega	4,380.1	3,107.2	88.9	473.3	22.2	165.7	0.5%	5.3%
Kericho	3,035.3	1,245.4	251.6	142.8	62.9	50.0	2.1%	4.0%
Kiambu	6,478.6	2,287.3	369.3	251.5	92.3	88.0	1.4%	3.8%
Kilifi	4,535.9	2,986.4	656.0	447.3	164.0	156.5	3.6%	5.2%
Kirinyaga	2,282.4	902.6	70.8	65.1	17.7	22.8	0.8%	2.5%
Kisii	4,254.8	2,283.5	203.9	228.3	51.0	79.9	1.2%	3.5%
Kisumu	4,411.2	1,346.4	62.7	98.2	15.7	34.4	0.4%	2.6%
Kitui	3,936.5	2,964.8	310.3	149.2	77.6	52.2	2.0%	1.8%
Kwale	2,449.2	2,027.4	362.2	206.1	90.5	72.1	3.7%	3.6%
Laikipia	2,410.6	979.2	3.3	49.9	2.3	17.5	0.1%	1.8%
Lamu	1,141.0	576.0	64.3	55.4	16.1	19.4	1.4%	3.4%
Machakos	5,051.7	2,033.6	173.2	92.6	43.3	32.4	0.9%	1.6%
Makueni	3,132.9	1,251.0	222.9	151.3	55.7	53.0	1.8%	4.2%
Mandera	4,106.7	4,913.1	242.0	305.4	60.5	106.9	1.5%	2.2%

Marsabit	2,468.4	1,919.6	60.3	95.8	15.1	33.5	0.6%	1.7%
Meru	3,985.3	2,268.2	148.8	60.0	37.2	21.0	0.9%	0.9%
Migori	2,857.4	1,905.9	23.0	217.2	5.7	76.0	0.2%	4.0%
Mombasa	5,625.3	2,092.0	122.7	240.1	30.7	84.0	0.5%	4.0%
Murang'a	3,071.2	2,348.1	36.4	210.3	9.1	73.6	0.3%	3.1%
Nairobi	18,724.3	2,298.3	1,242.0	77.5	310.5	27.1	1.7%	1.2%
Nakuru	6,603.6	1,600.2	273.8	152.1	68.5	53.2	1.0%	3.3%
Nandi	2,399.1	2,266.7	132.9	166.5	33.2	58.3	1.4%	2.6%
Narok	4,302.2	2,356.7	303.9	272.7	76.0	95.4	1.8%	4.1%
Nyamira	2,361.6	1,277.8	103.2	51.2	25.8	17.9	1.1%	1.4%
Nyandarua	2,643.2	1,289.0	177.8	57.9	44.4	20.3	1.7%	1.6%
Nyeri	3,739.1	1,076.1	50.1	12.9	12.5	4.5	0.3%	0.4%
Samburu	1,664.7	1,618.2	220.4	119.4	55.1	41.8	3.3%	2.6%
Siaya	2,705.0	1,466.7	111.5	174.7	27.9	61.1	1.0%	4.2%
Taita Taveta	2,558.4	948.5	154.3	82.2	38.6	28.8	1.5%	3.0%
Tana River	1,274.0	982.7	18.0	106.8	12.6	37.4	1.0%	3.8%
Tharaka-Nithi	1,798.3	906.4	52.9	163.9	13.2	57.4	0.7%	6.3%
Trans Nzoia	2,875.4	1,215.9	33.1	161.0	8.3	56.4	0.3%	4.6%
Turkana	3,234.0	5,784.0	41.0	818.0	10.3	286.3	0.3%	4.9%
Uasin Gishu	3,103.0	2,434.5	222.7	368.2	55.7	128.9	1.8%	5.3%
Vihiga	2,234.6	1,271.2	68.0	114.7	17.0	40.1	0.8%	3.2%
Wajir	2,673.7	3,899.4	164.4	122.4	41.1	42.8	1.5%	1.1%
West Pokot	2,388.5	1,645.8	153.4	117.3	38.4	41.0	1.6%	2.5%
National	167,552.8	90,280.3	8,635.0	8,267.8	2,172.7	2,893.7	1.3%	3.2%

Source: Controller of Budget County Expenditure Report 2014/15. The allocation and expenditure numbers come from the Education, Sports, Culture and Arts Vote. The organization of the Ministry in charge of education is not standard across counties. Some counties have education standing alone. Some have education, sports and culture. Some have education, sports, culture and ICT. The actual spending on ECDE has been estimated by using the proportion of ECDE spending out of the vote from counties which do present that data.

Annex C Curriculum development

C.1 Curriculum development activities, timeline and budget

Activity	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Budget
1. Development of the Curriculum Framework (BCF)	2016	■	■	■	■	■								1.5
2. Meeting with stakeholders to reflect on the eight national goals of Education (universities, line ministries, colleges, industry, faith-based org., unions and teacher associations)	2016					■								1.56
3. Communication advocacy and social mobilization on curriculum reform issues and process (needs assessment report, curriculum framework)	2016			■	■	■	■	■	■	■	■	■	■	2.2
4. Retreat to tie the theoretical approaches and frameworks to inform the instruction materials	2016					■								0.5
5. Stakeholders engagement on inculcating values to the learners	2016					■	■							1.4
6. Conceptualization meeting for tier 3 with the higher education stakeholders (CUE, KUPCS, Universities, Colleges and tertiary institutions)	2016					■	■							0.7
7. Review meeting on APBET in the context of FPE, FDSE	2016					■	■							0.7
8. Review the SNE Policy and implementation	2016					■	■							0.3
9. Forum to engage experts on service learning and parental empowerment and develop a model	2016					■	■							1.4
10. Field visits to institutions to find out how competency based assessment is conducted	2016					■	■							0.6
11. Engage KNEC, KICD and other experts on formative and summative assessment for competency based education	2016					■	■							2
12. Engagement on development of instructional materials for competency-based curriculum in collaboration with UNESCO-IBE, AKF	2016						■							1.2
13. Development of Matrices on Pertinent and Contemporary Issues	2016						■	■						5.5
14. Validation and approval of ECF	2016							■						0.6
15. Writing and editing of competency based designs, scope and sequencing	2016							■	■					241

16. Development and editing of syllabus	2016													241
17. Validation of syllabuses by course panel and academic committee	2016													28
18. Material development (prototypes)	2016													50
19. Evaluation of curriculum support materials	2016													20
20. Teacher preparation (ECDE, Class 1, 2 and 3	2016													50
21. Piloting	2017													25
22. Beta phase (Monitoring and Evaluation)	2017													18
23. Development of curriculum support material (handbooks, radio programmes, TV and e-content)	2017													60
24. Teacher preparation for national implementation ECDE, Class1, 2, 3 and 4	2017													60
25. Development of curriculum for special needs learners and materials (Autism, Mental, Deafblind)	2017													60
26. Evaluation of curriculum support materials	2017													20
27. Teacher Preparation for Special Needs	2017													60
28. National implementation ECDE, Class1, 2, 3 and 4	2018													10
29. Development of curriculum support material 4,5, 6 and Junior 1 (handbooks, radio programmes, TV and e-content)	2018													60
30. Evaluation of curriculum support materials	2018													20
31. Teacher preparation for national implementation 4,5 and 6	2018													60
32. Teacher Preparation for Special Needs	2018													30
33. Monitoring and Evaluation	2018													5
34. National implementation 4,5, 6 and Junior 1	2019													5
35. Development of curriculum support material Junior 2 (handbooks, radio programmes, TV and e-content)	2019													15
36. Evaluation of curriculum support materials	2019													20
37. Teacher preparation for national implementation Junior 2 and 3	2019													80
38. Teacher Preparation for Special Needs	2019													20
39. Monitoring and Evaluation	2019													5
40. National implementation Junior 2	2020													3

41. Development of curriculum support material Junior 3 (handbooks, radio programmes, TV and e-content)	2020												15
42. Evaluation of curriculum support materials	2020												
43. Teacher preparation for national implementation senior 1	2020												40
44. Teacher Preparation for Special Needs	2020												25
45. Monitoring and Evaluation	2020												5
46. National implementation Junior 3	2021												3
47. Development of curriculum support material Senior 1(handbooks, radio programmes, TV and e-content)	2021												15
48. Evaluation of curriculum support materials	2021												20
49. Teacher preparation for national implementation for Senior 2	2021												40
50. Teacher Preparation for Special Needs	2021												20
51. Monitoring and Evaluation	2021												5
52. National implementation Senior 1	2022												3
53. Development of curriculum support material Senior 2 (handbooks, radio programmes, TV and e-content)	2022												15
54. Evaluation of curriculum support materials	2022												20
55. Teacher preparation for national implementation Senior 3	2022												40
56. Teacher Preparation for Special Needs	2022												15
57. Monitoring and Evaluation	2022												5
58. National implementation Senior 2	2023												3
59. Development of curriculum support material Senior 3 (handbooks, radio programmes, TV and e-content)	2023												15
60. Evaluation of curriculum support materials	2023												20
61. Teacher Preparation for Special Needs	2023												10
62. Monitoring and Evaluation	2023												5
63. National implementation Senior 3	2024												3
64. Summative Evaluation	2024												65

Source: KICD

Annex D Projection Scenarios Assumptions and Indicators

D.1 Summary of Main Indicators by Scenario

		Sc0	Sc1	Sc2
	2014	2030	2030	2030
Anticipated Resources				
Domestically-generated revenues as % of GDP	19.4%	19.4%	19.4%	19.4%
% domestic resources allocated to education recurrent	25.4%	25.4%	25.4%	25.4%
ECD				
Gross enrolment rate	73.6%	73.6%	100.0%	100.0%
% of private	31.5%	31.5%	35.0%	35.0%
% of pupils having school meals	47%	50%	50%	50%
Unit cost per school meal (Ksh)	1,200	1,200	7,800	7,800
Student flow assumptions: Primary to Secondary				
Access Class1	100.8%	100%	100%	100%
Repetition rate Class 1	5%	5%	0.0%	0.0%
Retention class1 to 7	97%	100%	100%	100%
Retention 7-8	77%	77%	100%	100%
Transition 8-9	80%	80%	100%	100%
Retention Form1-Form4/Senior Secondary	78%	78%	100%	100%
Introduction of new system				
Selection of new structure Key: 0=Current, 1=New system		0	0	1
Target year		2018	2018	2018
Transition 9-10 New system		100%	100%	100%
Average teacher salary in multiple of per capita GDP				
Primary (1-6)	3.8	3.6	3.6	3.6
Senior Primary (Std7-Sdt8) or Junior Secondary	4.1	3.9	3.9	3.9
Secondary (Form1-Form4) or Tiers 3	6.3	5.5	5.5	5.5
Primary (1-6)				
% of total private	16.4%	16.4%	18.0%	18.0%
Public				
Ratio students / teacher (PTR)	36.2	36.2	35.0	35.0
% BOM teachers	16.7%	16.7%	1%	1%
Senior Primary (Std7-Sdt8) or Junior Secondary 3 years				
% of total private	14.3%	14.3%	14.3%	14.3%
Public				
Students / stream (per class)	35.0	35.0	35.0	35.0
Weekly instructional hours for students	30	30.0	30.0	30.0
Teacher weekly hours of teaching workload	25.4	25.4	27.0	27.0
% BOM teachers	16.7%	17%	1%	1%
Secondary (Form1-Form4) or Tiers 3				
% of total private	6.7%	6.7%	6.7%	6.7%

		Sc0	Sc1	Sc2
	2014	2030	2030	2030
Public				
% in pathway 1: STEM		60.0%	60.0%	60.0%
% in pathway 2: Social Sciences		25.0%	25.0%	25.0%
% in pathway 3: Arts and Sports		15.0%	15.0%	15.0%
Pathway 1: STEM				
Students / stream	35.0	35.0	40.0	40.0
Weekly instructional hours for students	30	30.0	30.0	30.0
Pathway 2: Social Sciences				
Students / stream		30.0	30.0	30.0
Weekly instructional hours for students		30.0	30.0	30.0
Teacher weekly hours of teaching workload		27.0	27.0	27.0
Pathway 3: Arts and Sport				
Students / stream		20.0	20.0	20.0
Weekly instructional hours for students		30.0	30.0	30.0
Teacher weekly hours of teaching workload		27.0	27.0	27.0
% BOM teachers in Secondary all pathways	33.0%	33%	1%	1%
Technical and Vocational: Public Institutions				
Number of students	148,142	209,842	1,000,000	1,000,000
Unit cost as multiple of GDP per capita	0.47	0.47	0.47	0.47
University				
Students per 100,000 population	1,033	1,033	1,549	1,549
% in public institutions	18.1%	18.1%	40%	40%
Spending on Instructional material and administration as multiple of GDP per capita	0.62	0.62	0.62	0.62
Public financing	100%	100%	100%	100%
Student welfare/loans as multiple of GDP per capita	0.16	1	1	1

Annex E Stakeholder mapping

E.1 Table of stakeholders with interests or information relevant to the curriculum reform

Institution	Rationale
Canadian Government	Education sector development partner and current chair of the Education Development Partners Group
Centre for Mathematics, Science and Technology (CEMASTEA)	Responsible for in-service teacher training in mathematics, science and technology.
College of Education and External Studies, University of Nairobi	Teacher training university and centre of research on education in Kenya
Commission for University Education (CUE)	Accredit all the University programmes and ensure standards in higher education.
DFID Kenya	Education sector development partner, implementing support projects that include the Girls Education Challenge, KEEP and also jointly with USAID funding Tayari and Tusome initiatives with the MOEST.
Education Standards and Quality Assurance Council (ESQAC)	The Council is charged (by the Education Act 2013) to ensure that education standards are maintained across all the Basic Education levels.
Elimu Yetu Coalition	Elimu Yetu Coalition is the umbrella union for education CSOs in Kenya and is currently a member of the steering committee on the curriculum reforms
Federation of Kenyan Employers	The FKE members absorb majority of the graduates.
Head-teachers Associations (KEPSHA & KESSHA)	Heads are the chief implementers and currently are agents of the MOEST in schools.
Kenya Institute of Curriculum Development (KICD)	The institution charged with curriculum development, currently at the heart of designing the curriculum. Many staff are members of the Technical Committee on Curriculum Reform.
Kenya Literature Bureau	Involved in producing instructional materials
Kenya National Association of Parents Associations	Parents lobby group, acknowledged by the Basic Education Act
Kenya National Bureau of Statistics (KNBS)	Report data on expenditure in education and population
Kenya National Examinations Council (KNEC)	The KNEC by the KNEC 2012 Act has specific provisions on the evaluation of the curriculum.
Kenya National Union of Teachers	Largest teacher union (mainly primary school teachers), member of the SC on the curriculum reforms
Kenya Private Schools Association	Representative of private schools.
Kenya Private Sector Alliance	The Kenya Private Sector Alliance is an umbrella union for the private sector and largely draw the workforce from the graduants. They are currently spending significant resources to train for placement and have consistently complained of the quality of the graduates
Kenya Publishers Association	The Government shall heavily rely on the publishers to produce the curriculum materials.

Kenya Union of Post Primary Teachers	Teacher Union drawing membership mainly from the Secondary and tertiary colleges
Dr Manu Chandaria Local Philanthropists, Comcraft	One of the leading entrepreneurs and philanthropist in education (supported KU and USIU)
National Treasury	Central source of public expenditure data
MoEST Directorates (Basic, DG, Secondary & Tertiary, TVET, Policy)	At the heart of implementation, and members of the Technical Committee on Curriculum Reform.
National Assembly (Education Committee)	The National Assembly shall finally approve any approved changes to the curriculum. The Law requires that the Chair of the Education Committee shall submit the bill for parliamentary approval.
National Council for Persons with Disabilities (NCPWD)	This is a statutory organ that ensures that disability mainstreaming is realised in public service provision. It's a requirement that NCPWD is consulted when legislating and formulating any policy agenda.
National Steering Committee On Curriculum Reforms	Charged by the President with overseeing and steering the curriculum reform process
Research Triangle International (RTI)	RTI is jointly implementing the Tayari & Tusome national programmes with the MoEST.
School of Education, Kenyatta University	Largest teacher training University in Kenya, the Dean of which is a well-known educational researcher and member of the Steering Committee.
Senate	As a matter that touches on devolution, the Senate Committee must scrutinise the proposed changes and pass them before the National Assembly finally ratifies them. If either house of parliament rejects the proposals, the matter shall proceed to the Joint Mediation Committee.
Teachers Service Commission (TSC)	The body charged with recruiting and deploying teachers, and holding information on the salary bill.
UNICEF	Education sector development partner, supporting the curriculum reform process including the needs assessment (complete) and this assignment
USAID	Education sector development partner and previous chair of the Education Development Partners Group
Vision 2030 Delivery Secretariat	Vision 2030 is one of the critical development pillars of Kenya. The Secretariat is charged with ensuring that all development plans are in tandem with the Vision.
World Bank	Education sector development partner, who worked on sector modelling for the GPE application