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# Achieving the MDGs in Kenya with some aid and reallocation of public expenditures

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## Abstract

Kenya has ascribed to the Millennium Declaration and is already in the process of mobilising resources and instituting measures to achieve Millennium Development Goals (MDGs). A MDGs status report on Kenya indicates that progress has been made towards achieving the goal of universal primary education. However, the Government will need to scale-up its efforts beyond the current momentum, if the other goals are to be realised by 2015. A preliminary conclusion is that the resource requirements are not extremely large to reach the MDGs in Kenya. If the resources are effectively used and targeted to MDG sectors they could have a substantial impact on whether Kenya would reach the MDGs or not. Some targets seem to be easier to reach than others. The target of 100 percent completion in primary school can be achieved with some additional resources targeted to the primary sector. However, a substantial increase of resources is needed at secondary and tertiary level of education to reach other goals set by the Kenyan government. Even if higher investment in all MDG-sectors is needed the water sector seems to be requiring a substantial increase compared to what have been invested in the past. With regard to poverty our results show that annual average real GDP growth rate of around 8 percent would be enough to meet the poverty target of reducing the number of poor by half.

JEL classification: F35, O11, O55

Keywords: Millennium Development Goals, Kenya, Aid and CGE

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## 1. Introduction

While there has been progress towards the Millennium Development Goals (MDGs) at the global level there are vast differences across and within regions and countries. Much of the progress toward poverty reduction has been driven by advances in China and India. Other parts of Asia have also seen strong progress in poverty reduction. In sharp contrast to Asia's progress most of sub-Saharan Africa faces significant challenges in meeting the MDGs: sub-Saharan Africa is off-track to meet every MDG. It has the highest rate of under-nourishment and the lowest primary enrolment rates of all regions. The region also has the highest tuberculosis incidence in the world and the highest maternal child mortality ratios. Without sustained support, sub-Saharan Africa is unlikely to meet any of the goals.

Attention to aid effectiveness and absorptive capacity has gained increasing attention as efforts have grown to raise new and large-scale financial resources to help developing countries achieve the Millennium Development Goals. At the level of the individual country this implies a large increase in Official Development Assistance (ODA) flows, in some cases tripling or quadrupling of current flows to countries already receiving high levels of aid. In a number of country-case studies this means a considerable expansion in government consumption and investment (UN Millennium Project, 2005).

A basic question is whether low-income countries can implement MDG programs and effectively 'absorb' much higher levels of aid, if committed by donors, and efficiently use them for the purpose of achieving the MDGs. Many of the policies and foreign aid flows targeting MDGs have strong effects throughout the economy that feed back on the MDG indicators through markets for labour, goods, services and foreign exchange. Therefore, economy-wide analysis of MDG strategies is a necessary complement to sectoral studies.

Kenya has ascribed to the Millennium Declaration and is already in the process of mobilising resources and instituting measures to achieve Millennium Development Goals (MDGs). A needs assessment study has been conducted and provides the current situation in Kenya with regard to each MDG and the indicative resource requirements (Republic of Kenya, 2005). According to the report, Kenya requires a total of about US\$ 61 billion during 2005-2015 to realize the MDGs. This translates to an annual expenditure of about US\$ 5.5 billion annually. A MDGs status report on Kenya indicates that significant progress has been made towards achieving the goal of universal primary education, but the Government will

need to scale-up its efforts substantially beyond the current momentum, if the other goals are to be realised by 2015.<sup>1</sup>

Kenya has seen an improved macroeconomic performance during the last years. Growth in real GDP increased by 4.9% in 2004 and increased further to 5.8% in 2005 and further to 7% in 2007. The high level of growth was achieved through on going structural reforms, a stable macroeconomic environment and a more enabling environment for the private sector. At the sectoral level high growth rates were recorded in tourism, transport and communication, building and construction, agriculture, wholesale and retail and the manufacturing sectors. The tourism sector continued to see stable increase of number of international visitors.

The post-election crisis and deteriorating terms of trade have had a negative impact on the economy and GDP growth is expected to slow down during 2008. The tourism sector has been hurt as well as the transport sector. In agriculture, dry weather in some parts of the country together with the crisis will probably slow down growth in the sector. Nevertheless, as outlined in the Medium Term Plan of Vision 2030 the Government plans to sustain and accelerate GDP growth up to 10 percent by 2012 (Republic of Kenya, 2008). The strategy essentially involves macro-economic stability and deepening of various structural reforms including governance, financial sector reforms, restructuring and privatizing state-influenced enterprises, and reorienting expenditures towards priority areas. The main focus of the medium term plan is to move decisively towards the Millennium Development Goals (MDGs). In this context, the strategy involves achieving: rapid and sustainable economic growth in order to reduce poverty on a sustainable basis; and reallocate public resources towards the infrastructure investments and social services.

The policy issue we discuss in this paper is how budgetary re-allocations would achieve the MDGs. We also discuss the impact of additional external resources. The paper is organised as follows: The next chapter explains the model and the data used in the study. In the third section we present and discuss our baseline scenario. Chapter four discusses alternative financing scenarios and the impact of additional resources on the achievement of MDGs. In chapter four we also highlight allocation of public expenditures. The final section concludes. The appendix describes the underlying database in more details.

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<sup>1</sup> On the progress in achieving the MDGs see Republic of Kenya (2003, 2005a)

## 2. Methodology and data<sup>2</sup>

An economy-wide approach is needed in MDG analysis given that many of the key MDG-related policies and required foreign aid flows have effects across the economy that feed back into the processes that determine MDG achievement. In its treatment of the processes that determine achievement for the different MDGs, our approach considers the fact that these outcomes are part of economy-wide processes in which important roles are played by the provision of MDG-related services (including health and education), the social and economic status of the population (including per-capita household consumption and MDG achievements in related areas). In this process, external financing needs depend on economic performance in general, including growth in domestic government revenues.

In this paper we use a version of the MAMS model (Bourguignon et al, 2007) calibrated for Kenya. The model focuses on the MDGs with the greatest cost and the greatest interaction with the rest of the economy: universal primary school completion (MDG 2), reduced under-five and maternal mortality rates (MDGs 4 and 5), halting and reducing the incidence of HIV/AIDS (part of MDG 6), and increased access to improved water sources and sanitation (part of MDG 7). We also address achievements in terms of poverty reduction (MDG 1).

MDG 2 – MDG 7 are covered in an additional set of functions that link the level of each MDG indicator to a set of determinants. The determinants include the delivery of relevant services (in education, health, and water-sanitation) and other indicators, also allowing for the presence of synergies between MDGs, i.e. the fact that achievements in terms of one MDG can have an impact on other MDGs. In education, the model tracks base-year stocks of students and new entrants through the three cycles. In each year, students will successfully complete their grade, repeat it, or drop out of their cycle. Student performance depends on educational quality (quantity of services per student), household welfare (measure by per-capita household consumption), and level of public infrastructure, wage incentives and health status (approximated by MDG 4).

The model includes several links between the MDG module and the rest of the economy. An important link is that the provision of the additional government services needed to reach the MDGs requires additional resources – capital and investment, labour, and intermediate inputs – that become unavailable to the rest of the economy. Increased foreign aid may lead to exchange rate appreciation with economy-wide repercussions, including

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<sup>2</sup> MAMS stands for Maquette for MDG Simulations. This section is based on Lofgren and Diaz-Bonilla (2006)

consumers benefiting from lower prices of imports and a loss of competitiveness for producers of tradables (exporters or producers of import-substitutes). At the same time, the pursuit of the MDGs generates additional resources as it influences the educational composition of the labour force, raising its average level of education. The performance of the rest of the economy will also influence the ease with which different MDGs can be achieved. Higher private incomes provide additional resources that enable private households to draw more benefit from government health and education programs. More rapid growth raises government revenues, strengthening the ability of governments to finance and operate efficient programs.

The Social Accounting Matrix (SAM) used in the Kenyan MAMS application is based on a recently produced SAM for the Kenyan economy (Kiringai et al., 2006). The initial 50 sectors have been aggregated into 15 sectors and the aggregation scheme is shown in Table A.2 (in appendix). As the MAMS model requires a disaggregated government sectors the SAM has been modified accordingly. All private sectors which are not directly involved in any MDG activities have been aggregated into three sectors: agriculture, manufacturing and service. Most of the remaining sectors are producing services related to the MDGs and are divided between private and public suppliers. The public MDG sectors consist of water, public administration, infrastructure, health and education. Except for public administration, developments in each sector will have a positive impact on the MDGs. With regard to education we distinguish between primary, secondary and tertiary education. The health sector has been divided into a public and private sector.

### 3. Policy scenarios

The Medium Plan of Vision 2030 proposed by the Government builds on the recent economic developments and various structural reforms implemented in the recent past (Republic of Kenya, 2007). It is based on continued broad based GDP growth driven by agriculture, industry and service sectors. It is anticipated that higher growth in real GDP in the medium term is predicated on increased savings and investments, and on increasing total factor productivity (TFP). Gross domestic investments are projected to increase from about 20.4 percent of GDP in 2006/07 to 32.7 percent in 2012/13 reflecting an increase in both public and private sector investment. Gross national savings are projected to increase from 16.5 percent of GDP to 27.5 percent over the same period. Therefore, in order to achieve the projected growth targets, external savings, of at least 5 percent of GDP per year will be required. Total expenditures are projected to increase slightly from 23.5 percent of GDP in 2006/07 to 27.8 percent of GDP in 2012/13. Reflecting the plan's objective of restructuring expenditures in favour of infrastructure, the share of capital spending in total expenditures is projected to rise from 4.4 percent of GDP in 2006/07 to 9.8 percent in 2012/13. It is expected that the revenue-GDP ratio would stay constant, around 21 percent of GDP during the period. Arising from these revenues and expenditure measures, the overall fiscal deficit (excluding grants) is projected to increase gradually from about 2.8 percent of GDP in 2007/08 to 6.4 percent in 2012/13. Domestic borrowing requirements are expected to be slightly reduced and, hence the domestic debt-to-GDP ratio should decline gradually from around 22.6 percent in 2007 to about 21.1 percent in 2013. External debt is expected to remain constant at around 22 percent of GDP during the period. Donor support is expected to increase to around 5 percent of GDP already in 2008/09 and stay around this level towards the end of the period.

#### 3.1 Baseline scenario

A baseline scenario has been developed to which alternative scenarios will be compared. Our baseline scenario differs somewhat from the scenario outlined in the Medium Term plan.<sup>3</sup> In the baseline scenario a 7.9 percent average annual growth rate during 2003-2015 has been assumed (Table 3.1).

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<sup>3</sup> In practice it is possible to fine-tune the model so it generates a similar scenario as outlined in the Medium Term Plan for Vision 2030.

Population is growing by 2.3 percent a year, which means that GDP per capita is growing by 5.6 percent a year. Private consumption is growing by 7.8 percent while government real current expenditure is assumed to grow by 6.5 percent. Total investment is assumed to be growing at around 10 percent where public investment is assumed to grow faster than public investment. In real terms government expenditures as a share of GDP remain constant around 24 percent of GDP. However, there is a shift in composition as share of current expenditures is reduced and the share of capital expenditures is increased. Capital expenditures are increasing from around 2 percent of GDP to 6 percent of GDP. Exports are assumed to grow by 7.4 percent while imports are growing by 7.8 percent. The real exchange rate is appreciating over time. Both external and internal debt is assumed decline over the period where external stock of debt is being reduced at a faster rate.

**Table 3.1: Baseline Scenario Macro-economic Developments**

		2003	2010	2015	Annual Growth
Population	(mn)	32.7	38.4	43.0	2.3
Real Gross Domestic Product (GDP)	(bn 2003 Ksh)	1009.8	1668.3	2519.7	7.9
Private consumption	(bn 2003 Ksh)	856.9	1401.4	2115.5	7.8
Government consumption	(bn 2003 Ksh)	213.6	315.0	454.5	6.5
Investment	(bn 2003 Ksh)	179.4	374.6	580.4	10.3
Private	(bn 2003 Ksh)	156.7	283.0	426.5	8.7
Public	(bn 2003 Ksh)	22.6	91.7	153.8	17.3
Exports	(bn 2003 Ksh)	280.8	443.9	660.9	7.4
Imports	(bn 2003 Ksh)	406.5	665.0	1003.1	7.8
GDP per capita	(2003 Ksh)	34879	48723	65303	5.6
Exchange rate	(index, Ksh per dollar)	100.0	92.9	88.4	-2.0
External debt	(% of GDP)	45.9	30.4	21.9	-6.0
Domestic debt	(% of GDP)	25.2	25.0	23.5	-1.0

Source: MAMS model results. Note: all macro-economic aggregates are expressed in real terms.

The fiscal accounts, in nominal terms, are described in Table 3.2. Government spending, as a share of GDP, is assumed to be increasing over time.<sup>4</sup> Tax revenue is also increasing over time and grants and borrowing see a reduction over time. An increasing share of tax revenue comes from personal and corporate income taxes while import duties are becoming less important.

<sup>4</sup> The GDP deflator for government services is increasing at a higher rate than the GDP deflator which implies that in nominal terms government expenditures are increasing as a share of GDP while in real terms it remains constant.

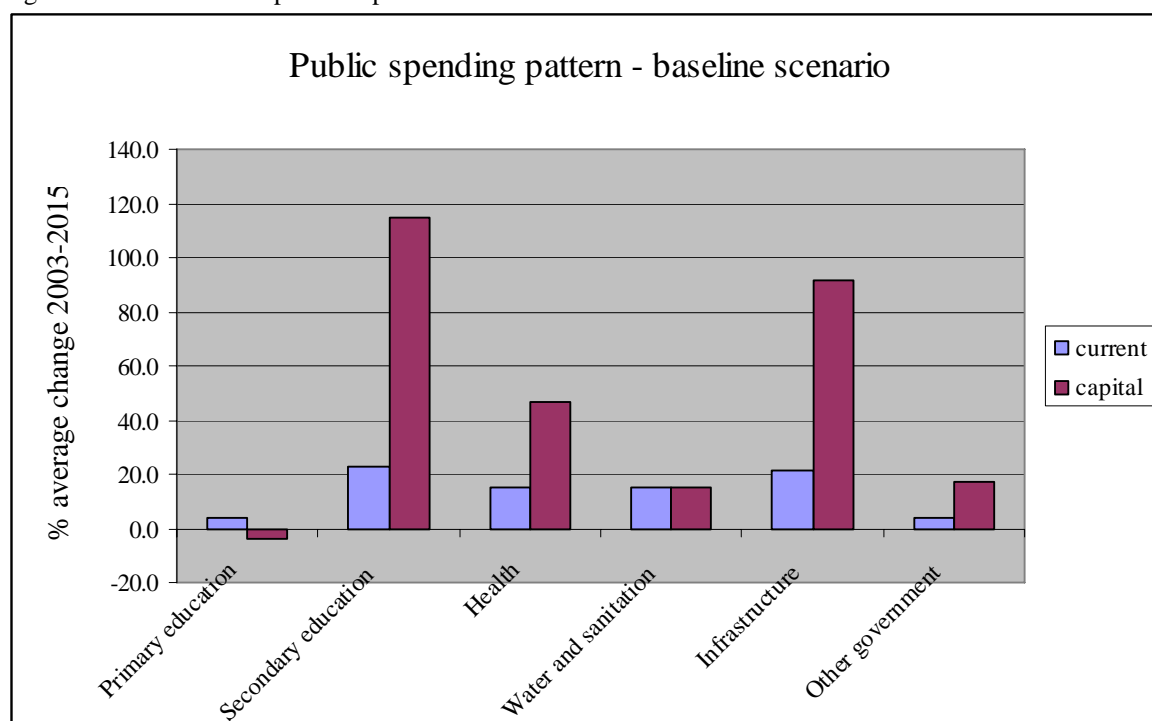


**Table 3.2: Baseline Scenario Fiscal Accounts (nominal terms in percentage of GDP)**

	2003	2010	2015
Government revenue	23.5	27.3	30.5
Direct taxes	7.7	13.4	18.0
Import duties	1.8	1.6	1.4
Other Indirect taxes	9.7	8.5	7.8
Grants	1.4	0.9	0.6
Domestic borrowing	1.4	1.9	1.8
Foreign borrowing	1.4	1.0	0.7
Government spending	23.5	27.3	30.5
Current	18.7	21.4	24.2
Capital	2.0	4.9	5.5
Interest payment	2.8	1.0	0.8
Domestic	2.1	0.5	0.5
Foreign	0.7	0.5	0.3

Source: MAMS model results

The baseline scenario makes some crucial assumptions regarding allocations of public expenditures, which will have an impact on the results. With regard to education expenditures, a higher share is targeted to secondary and tertiary levels. A larger share of public expenditures, both current and capital, is targeted to the health sector, water/sanitation activities and infrastructure investment.

**Figure 3.1: Allocation of public expenditures – baseline scenario**

Source: MAMS model results

The targets and base-year values for the different MDGs included in the model are shown in Table 3.3. In the baseline scenario there is progress across the board and the health related MDGs will be achieved in 2015. There is also progress in reducing poverty and the target is almost achieved. The targets that will not be achieved are the education target and the water and sanitation targets.

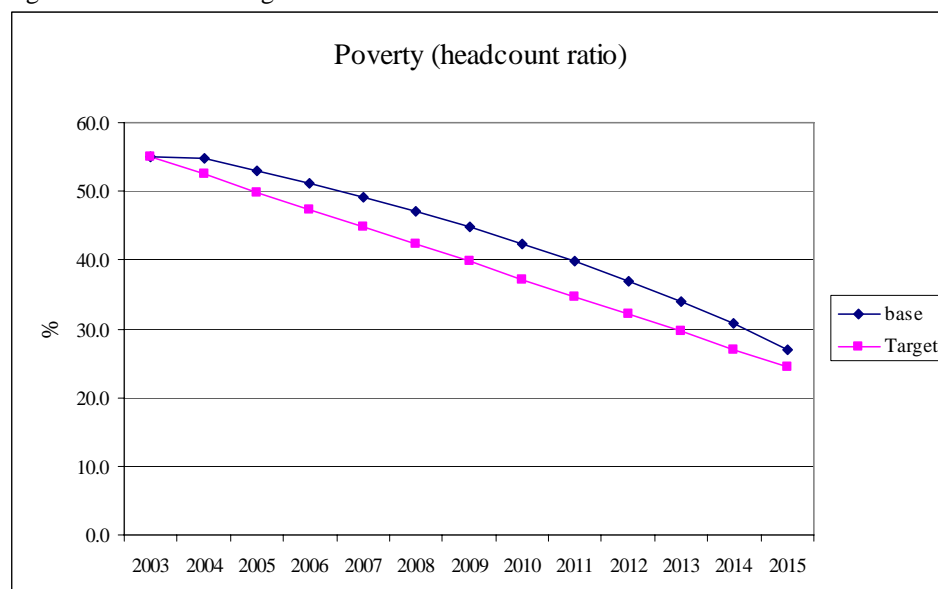
**Table 3.3: Baseline Scenario and MDG targets**

		2003	2010	2015	Target
National Poverty headcount	(percent)	52.0	42.4	27.0	24.5
Primary education completion rate	(percent)	68.3	79.4	90.3	100.0
Under-5 mortality	(per 1000 children)	115.0	70.6	32.1	33.0
Maternal mortality	(per 100,000 births)	414.0	269.1	135.7	167.5
Access to water	(percent)	49.0	53.6	60.0	74.0
Access to sanitation	(percent)	86.0	87.0	88.4	92.0

Source: MAMS model results. Note: Head-count ratio target based on national poverty line. Other MDG targets based on World Bank (2003) and Republic of Kenya (2005a).

Improved economic performance during 2003-2007 has had a positive impact on poverty in Kenya. Although the proportion of people living below the poverty line rose from 44.7 percent in 1992 to 52 percent in 1997 there was a decline to 47 percent in 2005/06.<sup>5</sup> In the latest survey there was a reduction in poverty among rural households.

Figure 3.2: MDG 1: Target and baseline scenario



<sup>5</sup> For a review on poverty incidence in Kenya see Oiro et. al (2004) and Manda et. al (2000).

Poverty in urban areas, except for Nairobi which saw a drastic decline, remained constant around 49 percent. Still, an annual average per capita growth rate of around 1 percent reduced the headcount ratio in rural areas at an annual rate of 3.6 percent. In our baseline scenario with a per-capita growth rate of around 5 percent the target of reducing poverty by half is almost reached (Figure 3.2).<sup>6</sup>

The education sector has recorded substantial improvements in both gross and net enrolment rates at primary levels. Other performance indicators, such as the primary school repetition rate, completion rate and transition rate has improved as well. This is particularly due to a rapid expansion in enrolment in primary education resulting from the introduction of Free Primary Education in 2003. An extra 1.5 million children are now accessing primary education, increasing the enrolments from 5.9 million to 7.4 million in 2004. The Gross Enrolment Rate (GER) stands at 104.8 percent as compared to 93 percent in 2002. Net Enrolment Rates (NER) has shown a significant improvement the last five years increasing from 67.8 percent in 2000 to over 82.0 percent in 2004. Primary education completion rate (PCR) has improved over the years, from 57.7 percent in 2000 to 76.2 percent in 2004. This shows that out of the total number of pupils enrolled in Standard 1 in 1996, slightly more than three quarters of them completed primary education in 2004.

The MDG target is set at full completion in 2015. As primary school lasts 8 years, this target has an 8-year lead time. So achieving the MDG target requires complete enrollment of children by 2008. Figure 3.3 shows projection of enrollment in primary education between 2003 and 2015. Figure 3.4 illustrates the difference between the target and the baseline scenario in achieving MDG2. In our baseline scenario we find that even if there are improvements the target will not be reached, 90 percent of the pupils will complete in 2015.

Figure 3.3: Enrolment in primary education

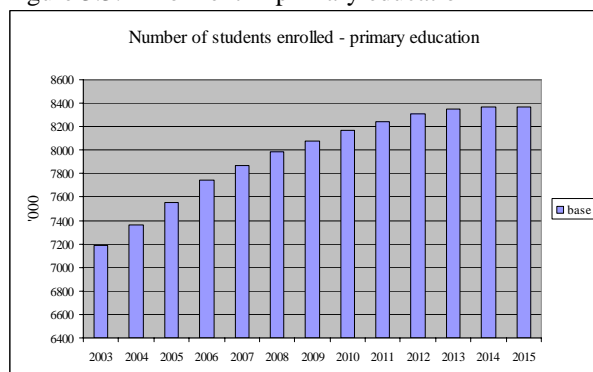
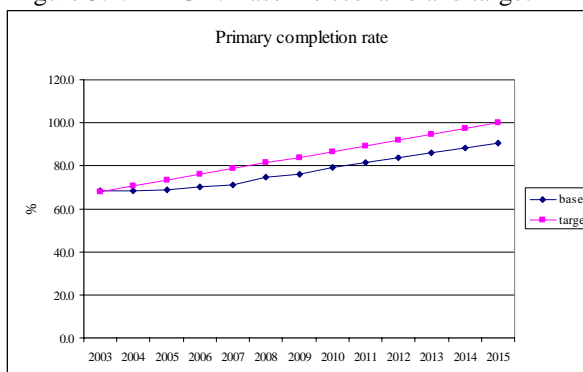


Figure 3.4: MDG 2: Baseline scenario and target



<sup>6</sup> Poverty in the model is derived from an assumed poverty-growth elasticity of 0.58.

Although there is no specific MDG target for secondary education we have included the sector here as it is expected to absorb an increasing number of students graduating from primary level. Indeed, enrolment in secondary schools has increased by 25 percent between 2000 and 2004. Gross enrolment at secondary level is about 30 percent, and the completion rate at the secondary level is about 79 percent. The transition rate from primary to secondary level has recorded an upward trend from the lowest rate of 43.3 percent in 2000 to 50.5 percent in 2004 (Republic of Kenya, 2006). The current level of transition rate is estimated to stand at 57.0 percent. Transition rates are projected to increase to 60 percent by 2006 and 70 percent by 2008. In higher education, enrolments have increased rapidly as a result of an increase in the number of public and private universities, and with the introduction of privately sponsored students in public universities. This trend is likely to continue to put pressure on the ability of universities to deliver quality education, and staff morale has generally been low due to significant resource constraints (World Bank, 2005). However, recent improvements in terms and conditions of service, combined with increased finances from student fees, have had some positive effects. Our projections show both a steady increase at both secondary and tertiary level (Figure 3.5-3.6).

Figure 3.5: Enrolment – secondary education

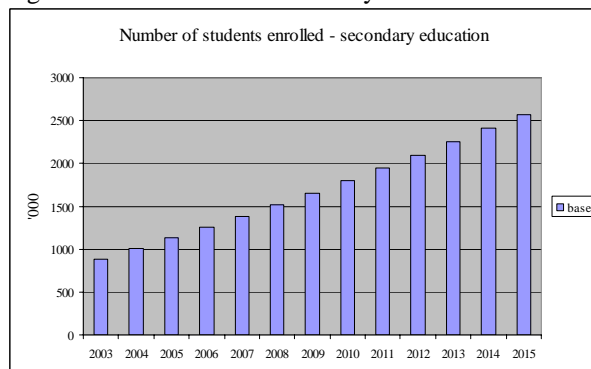
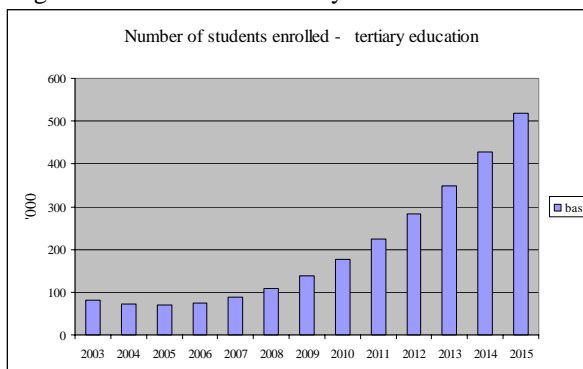


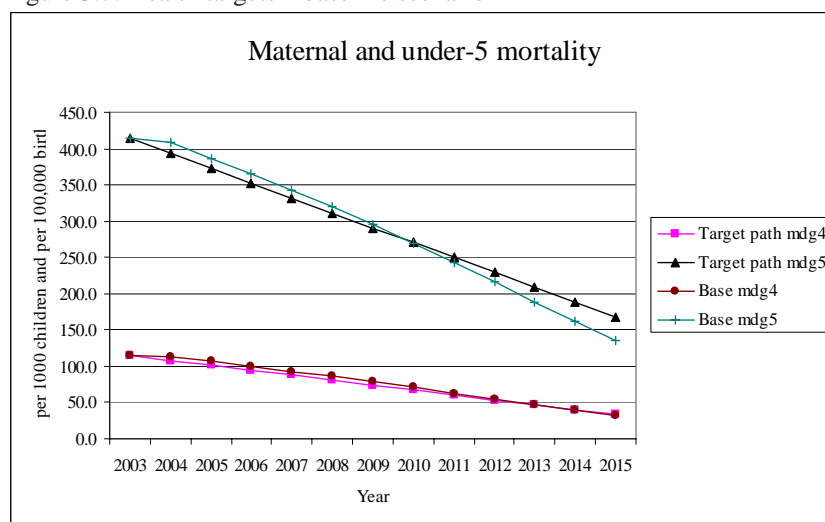
Figure 3.6 Enrolment – tertiary education



Health related targets are in this paper focused on maternal and infant mortality rates. Infant and childhood mortality declined rapidly in Kenya as a result of the global initiatives to improve child health between the 1970s and the 1990s. However, there has been a decline in the level of child immunization, a key indicator of child health (RoK, 2003, 2005a). The result is that the mortality of children under age 5 continued to increase from about 90 per 1000 in 1990 to 112 per 1000 in 1998 and 115 in 2003. During the same period, Infant Mortality Rate increased from about 60 per 1000 in 1990 to 74 in 1998 and 77 in 2003. The major challenge in reduction of child mortality is the continued increase in mortality rates

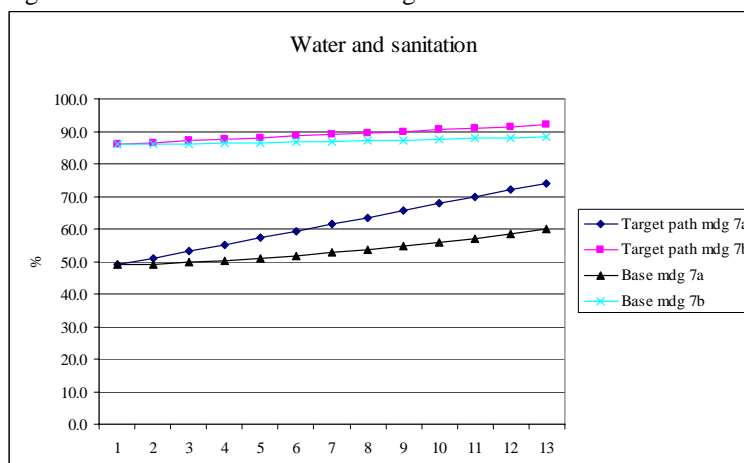
since the 1990s in all regions of the country. Maternity mortality rates did, however, show some progress since the early 1990s as it declined from 590 to 414 per 100,000 in 2003. But it is still far from the target of 148 expected to be achieved in 2015. Our baseline scenario show that it is possible to achieve the targets of MDG4 and MDG5 under the assumption discussed above of increased public spending allocated to the health sector (Figure 3.7).

Figure 3.7: Health targets – baseline scenario



The final MDG targets discussed in this paper refers to access to water and sanitation. Access to safe water is estimated at 89 percent in urban areas and only 49 percent in rural areas. Over the last thirty years, there has been inadequate funding for rehabilitation, upgrading and expansion of water supply and sewerage facilities. Most of the existing water supply and sewerage collection treatment and disposal systems were constructed 30-40 years ago. As a result both targets have not seen much progress since the early 1990s.

Figure 3.8: Water and sanitation – targets and baseline scenario



In order to achieve the MDGs in water and sanitation sector, 74 percent nationwide coverage of safe water supply and 92 percent coverage of improved sanitation are needed. As illustrated in Figure 3.8 none of the targets will be achieved. More public resources would be needed to achieve both targets.

The model includes several links between the MDG module and the rest of the economy. An important link is that the provision of the additional government services needed to reach the MDGs requires additional resources such as capital, labour, and intermediate inputs. For example, increased demand for a certain labour category will increase the wage rate for that particular labour category. In the baseline scenario labour with higher skills seems to benefit most, even if all labour categories are receiving a higher real wage (Figure 3.9).<sup>7</sup> Recall that the economy is growing at an average rate of 8 percent per year and this drives up demand and has a positive effect on wages across the economy. We initially assumed an unemployment rate of 10 and 20 in the unskilled and skilled labour categories, respectively and in both labour categories unemployment is being reduced significantly to the minimum level set at 5 percent (Figure 3.10).

Figure 3.9: Real wages – baseline scenario

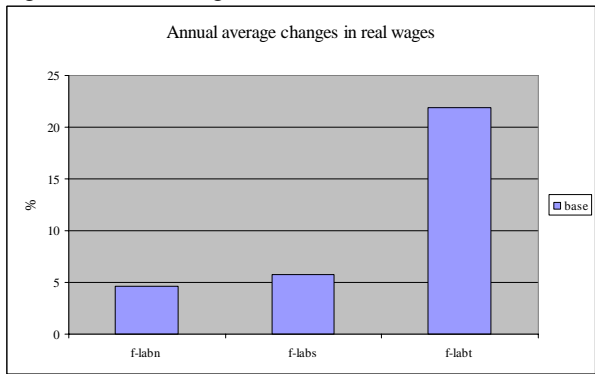
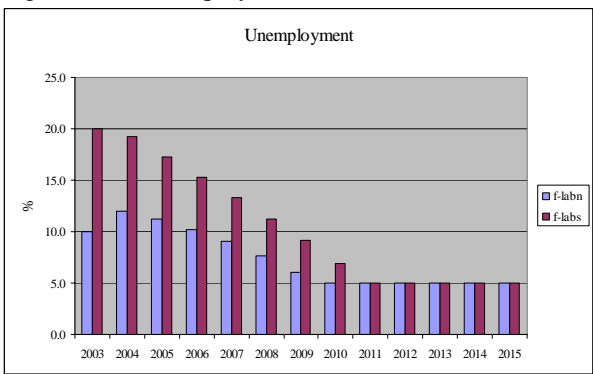


Figure 3.10: Unemployment – baseline scenario



In sum, assuming a close to 8 percent annual increase in real GDP growth and a constant public expenditure-GDP ratio would be able to make some substantial progress in moving closer to the MDG targets, particularly the health-related MDGs. However, the proposed allocation of public expenditures was not efficient to have a significant impact on all MDGs. The next question we ask is how should public expenditures be allocated in order to achieve all MDGs? In addition, what is the additional requirement in terms of resources that is needed to achieve the targets?

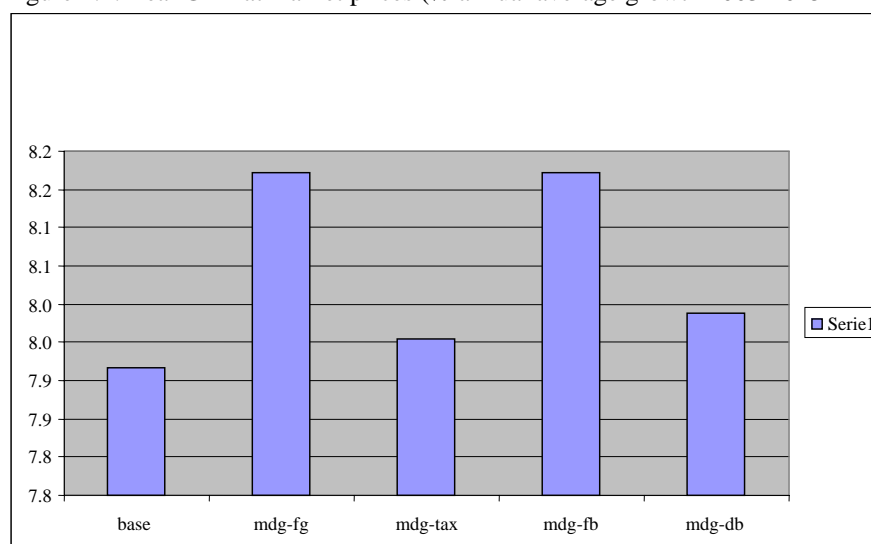
<sup>7</sup> Individuals classified as unskilled has not completed primary education (f-labn), semi-skilled are those that have completed primary education (flab-s) and skilled workers have completed secondary education or higher (f-labt).

## 4. Achieving the MDGs – financing scenarios

In the baseline scenario there is some progress across all MDGs but not sufficient to reach all the targets. Additional resources are required to reach the MDGs and the financing options available to the government are either to increase taxes (mdg-tax), borrow domestically (mdg-db), foreign borrowing (mdg-fb) or grant aid (mdg-fg). In practice a combination of the four financing options is used to finance operations within the public sector. Here we are interested in the amount of resources that would be required and the economy-wide impact of each alternative financing option. Hence, the scenarios reveal the costs and the impact of each financing options separately of achieving either a specific MDG or all MDGs.<sup>8</sup>

The different financing scenarios will have a different impact on GDP performance in the economy. Taxation and domestic borrowing tends to withdraw savings and hence lower investments and hence reduce GDP growth. Figure 4.1 shows the impact on GDP growth of the different financing scenarios. Relying on foreign borrowing or grants would have a stronger impact on growth compared to the taxation and domestically borrowing scenarios.

Figure 4.1: Real GDP at market prices (% annual average growth 2003-2015)



Notes:

Mdg-fg: financed by grants

Mdg-tax: financed by tax revenue

Mdg-fb: financed by foreign borrowing

Mdg-db: financed by domestic borrowing

<sup>8</sup> Figures and tables include labels that are explained as follows: mdg-fg means that all MDGs are achieved and it is financed by foreign grants, mdg2-fg means that MDG 2 is targeted and achieved and it is financed by foreign grants.

Table 4.1 shows the macroeconomic impact of the different financing options which would achieve all the MDG targets in education, health, water and sanitation. Interestingly compared to the baseline scenario public spending does only need to increase slightly in order to achieve all the MDGs. In the case of domestic borrowing the domestic debt-GDP ratio would increase to 68.6 percent in order to finance the necessary interventions. In the case of foreign borrowing the debt-GDP ratio in 2015 would stand at close to 60 percent. Relying on taxation implies that the tax-GDP ratio needs to increase to around 30 percent (Table 4.2).

Table 4.1: Macroeconomic indicators – MDG scenarios

(% of GDP)	Base	mdg-fg	mdg-tax	mdg-fb	mdg-db
Private consumption	65.0	64.5	62.8	64.5	62.9
Public consumption	24.2	26.3	26.7	26.3	26.6
Private investment	15.1	15.3	15.1	15.3	15.1
Public investment	5.4	5.3	5.1	5.3	5.2
Exports	18.9	16.5	18.3	16.5	18.0
Imports	-28.8	-28.0	-28.0	-28.0	-27.7
Foreign savings	0.9	3.2	0.9	3.7	0.9
Gross national savings	19.6	17.5	19.3	17.0	19.4
Gross domestic savings	10.7	9.2	10.5	9.2	10.5
External public debt	22.6	20.9	22.2	58.7	22.2
Domestic public debt	23.5	22.5	23.3	22.5	68.6
(% change)					
Private consumption	7.8	8.2	7.6	8.2	7.6
Public consumption	6.5	7.5	7.6	7.5	7.6
Private investment	8.7	9.3	8.8	9.3	8.8
Public investment	17.3	17.5	16.8	17.5	16.9
Exports	7.4	6.9	7.2	6.9	7.1
Imports	7.8	8.3	7.7	8.3	7.6
GDP at market prices	7.8	8.0	7.8	8.0	7.8
GDP at factor cost	7.9	8.2	8.0	8.2	8.0
Real exchange rate	-2.0	-2.4	-2.1	-2.4	-2.1

Source: MAMS model results

The remaining option would be to rely on foreign grants. In the case of grant-aid it has to increase to a level around 2.8 percent of GDP.<sup>9</sup> The major risk with a significant increase in grant aid (as well in the alternative of foreign borrowing) is the possibility of Dutch Disease.<sup>10</sup> In both externally financed scenarios the real exchange rate appreciates by an

<sup>9</sup> Grant aid here refers to aid that is transferred directly to the government budget.

<sup>10</sup> The empirical evidence to support the interaction between aid flows and Dutch disease effects as well the benefits of aid-financed investment has not been definitive. With regards to the extent to which aid inflows lead



annual average rate of 2.4 percent, which is slightly higher than the alternative scenario where domestic resource mobilization is used. The average annual growth rate of exports slows down to 6.9 percent, which is slightly lower than the baseline scenario or the alternative financing scenarios. But there is no dramatic impact as the amount of aid (or external borrowing) required is not extraordinary high.

Table 4.2: Government expenditures and revenue (% of GDP)

	Base	mdg-fg	mdg-tax	mdg-fb	mdg-db
Transfers from the rest of the world	0.6	2.8	0.6	0.5	0.6
Direct taxes	18.0	18.0	20.5	18.0	17.6
Import duties	1.4	1.4	1.4	1.4	1.4
Other indirect taxes	7.8	7.7	7.6	7.7	7.5
Domestic borrowing	1.8	1.8	1.8	1.8	5.6
Foreign borrowing	0.7	0.7	0.7	3.5	0.7
Total revenue	30.5	32.4	32.6	32.9	33.4
Interest domestic debt	0.5	0.5	0.5	0.5	1.4
Interest rest of the world	0.3	0.3	0.3	0.8	0.3
Government consumption	24.2	26.3	26.7	26.3	26.6
Government investment	5.4	5.3	5.1	5.3	5.2
Total expenditures	30.5	32.4	32.6	32.9	33.4

Source: MAMS model results

Returning to the MDGs, Table 4.3 shows the impact of the different financing strategies on the various MDGs. In the baseline scenario we do see some improvements, the health related targets will be achieved, and poverty would decline significantly. Primary completion rate is increasing but would not reach 100 percent. Access to water and sanitation improves but still below the MDG targets. Table 4.3 also provide some information on the synergies between various MDG targets. For example, achieving full primary completion with domestic resource mobilisation (mdg2-tax or mdg2-db) result in a higher poverty incidence compared to a scenario where external grants or external borrowing is used. Focusing on water and sanitation only would have a positive impact on poverty and the health targets if external borrowing or grants is used to finance the additional public spending. In both cases private sector investment is crowded out by increased public spending if the policy relies on taxation or domestic borrowing only. This is also the case in the scenario where all MDGs are targeted (mdg-tax, mdg-db, mdg-fg and mdg-fb).

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to an appreciation of the exchange rate, the evidence is mixed. There are studies like IMF (2005) that have reported of the absence of Dutch disease effects for five countries (Ghana, Ethiopia, Mozambique, Tanzania and Uganda) that experienced aid surges.

The conclusion so far is that it is possible to achieve the MDGs under certain assumptions on GDP growth and enhanced public spending. But is it a feasible strategy, what is the macroeconomic impact of a scaling-up strategy or can the government create the necessary fiscal space?<sup>11</sup> In principle, there are different ways in which a government can create such “fiscal space” (Heller, 2005). As discussed above the macroeconomic impact of enhanced public spending in order to meet the MDGs was not extremely large. Still, undertaking a strategy which would increase the domestic debt-ratio to close to 70 percent or alternatively a strategy relying on foreign borrowing seems not to be a viable strategy. Foreign grants would be the preferred option and the amount of resources is not extremely high. In addition, the additional resources would not have any major impact on the real exchange rate.

Table 4.3: Policy scenarios and MDG targets

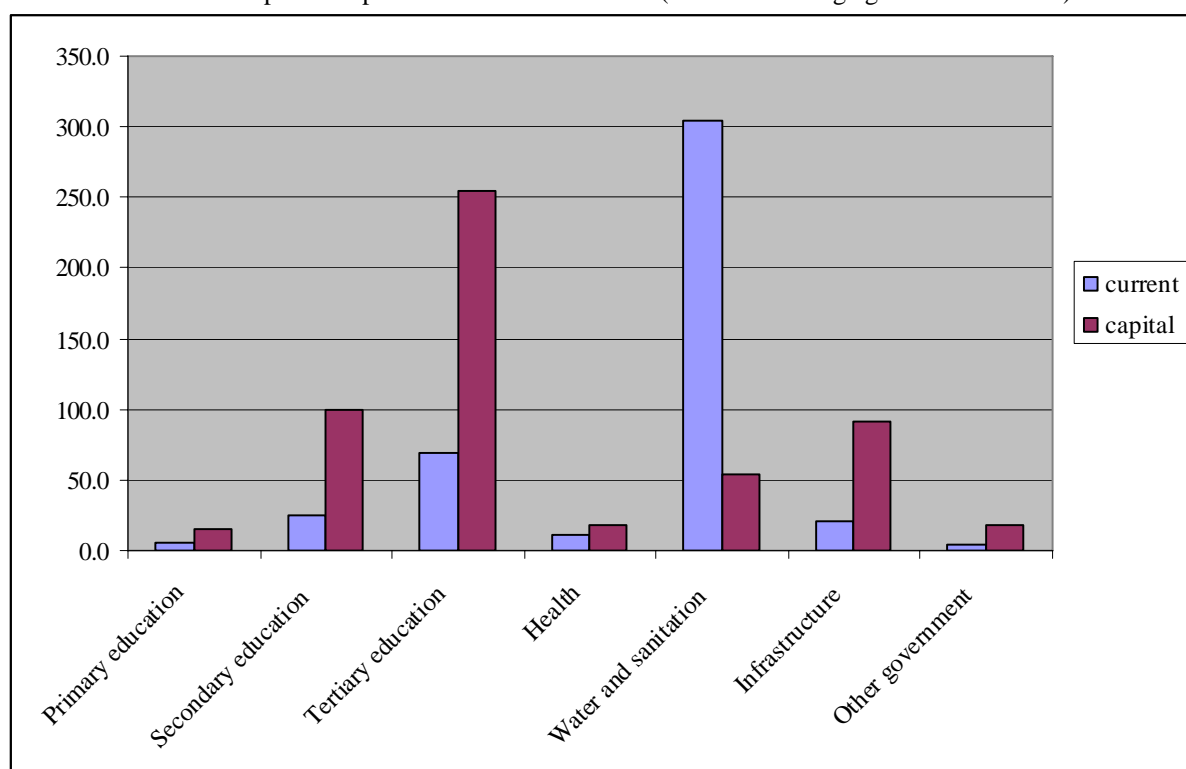
	Poverty headcount (%)	Primary completion rate (per 1000 children)	Under-five mortality (per 1000 children)	Maternal mortality (per 100,000 births)	Access to water (%)	Access to sanitation (%)
Baseyear	55	68.3	115.0	414.0	49.0	86.0
Base-scenario	27.0	90.3	32.1	135.8	60.0	88.4
<b>MDG targets</b>	<b>24.5</b>	<b>100</b>	<b>33.0</b>	<b>148.0</b>	<b>74.0</b>	<b>92.0</b>
Mdg2-fg	24.7	99.1	30.4	129.1	60.7	88.6
Mdg2-tax	27.3	99.1	32.7	137.9	60.1	88.5
Mdg2-fb	24.7	99.1	30.4	129.1	60.7	88.6
Mdg2-db	27.2	99.1	33.1	139.6	60.1	88.5
Mdg45-fg	26.9	90.5	33.0	139.1	60.1	88.5
Mdg45-tax	26.4	90.5	33.0	139.1	60.1	88.5
Mdg45-fb	26.9	90.5	33.0	139.1	60.1	88.5
Mdg45-db	26.4	90.5	33.0	139.1	60.1	88.5
Mdg7-fg	26.6	90.6	27.5	126.3	75.8	92.0
Mdg7-tax	29.0	90.4	29.2	133.4	75.7	92.0
Mdg7-fb	26.6	90.6	27.5	126.3	75.8	92.0
Mdg7-db	28.9	90.4	29.3	133.9	75.7	92.0
Mdg-fg	24.6	99.1	32.8	148.0	75.9	92.0
Mdg-tax	28.2	99.1	32.8	148.0	75.7	92.0
Mdg-fb	24.6	99.1	32.8	148.0	75.9	92.0
Mdg-db	28.1	99.1	32.8	148.0	75.7	92.0

Source: MAMS model results

<sup>11</sup> In a broad sense “fiscal space” can be defined as the availability of budgetary room that allows a government to provide resources for a desired purpose without any prejudice to the sustainability of a government’s financial position (Heller, 2005).

Let us return to the scenario where all the MDG targets are achieved. A strong result coming out from this analysis is that an efficient and an optimal allocation of public expenditures seem to be very important whether Kenya will achieve the MDGs or not. The amount of resources needed does not seem to be extraordinary high. How should public expenditures be allocated across functional categories in order to achieve the MDG targets? Figure 4.2 illustrates public spending across functional categories in the scenarios where all MDGs are achieved. Increased allocations in all sectors are needed but some sectors would require a higher share of public resources. In the education sector both current and capital expenditures needs to increase significantly at both secondary and tertiary level. This will not only achieve 100 percent completion at primary level but also satisfy the increasing demand at higher levels. Significant amount of resources are needed in the water sector, in order to achieve the targets. Continued high investments in infrastructure will be important, in particular to increase total factor productivity and growth, which in turn will reduce poverty.

Table 4.2: Allocation of public expenditures across functions (% annual average growth 2003-2015)



The time-profile differs between the various MDGs. For example, with regard to MDG 2 the target is set at full completion in 2015. As primary school lasts 8 years, this target has an 8-year lead time. So achieving the MDG target requires complete enrollment of children by 2008 which means that educational expenditure, investments in particular, would need to be

front-loaded before 2008. Figure 4.3 illustrates how investment expenditures are changing over time in the education sector. In primary education investment is increasing during the first years and up to 2008. Beyond 2008 no additional investments is needed to achieve the goal. In the other sector there is huge increase in investments as both secondary and tertiary education services is expanding quiet dramatically in order to accommodate an increasing number of pupils graduating at each level. Investment in the health sector is increasing in the first year and then remains constant at around 10 billion Kenya shillings a year (Figure 4.4). Investments in infrastructure and in the water sector show a steady increase over the years.

Figure 4.3: Capital expenditures – education sectors (billions of 2003 Ksh)

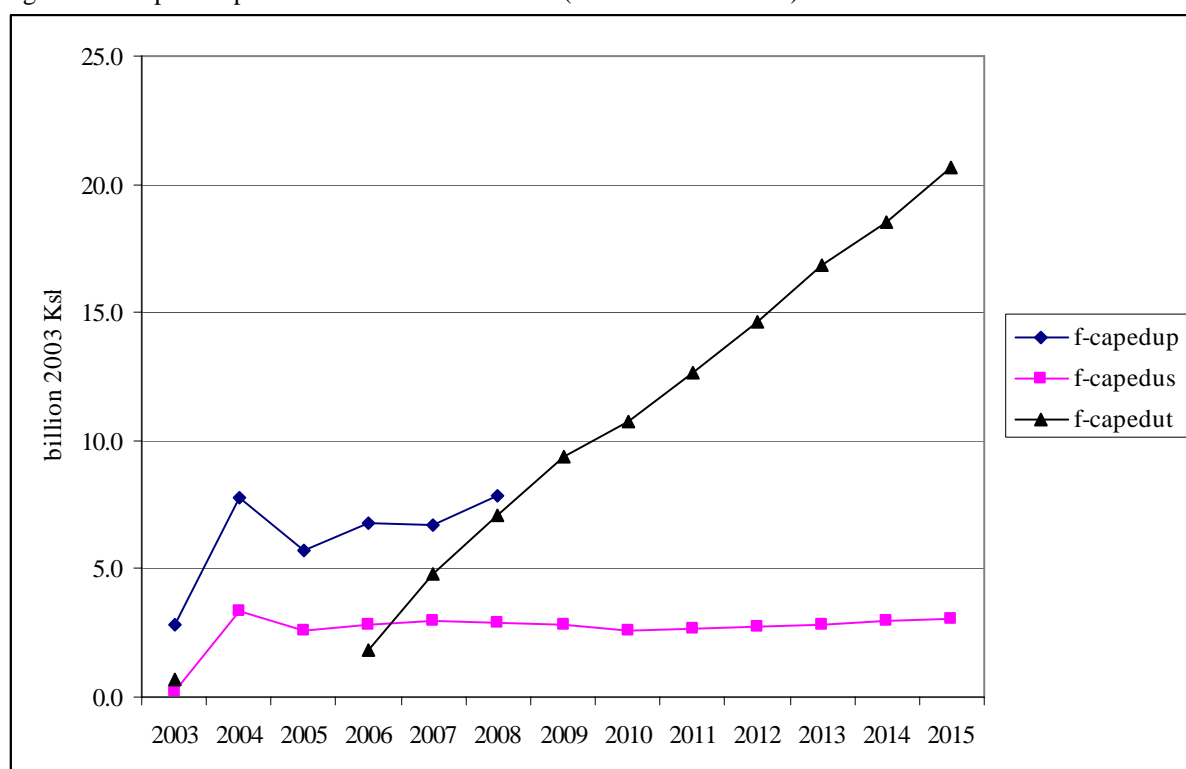


Figure 4.4: Capital expenditures – Health, water and Infrastructure (billions of 2003 Ksh)

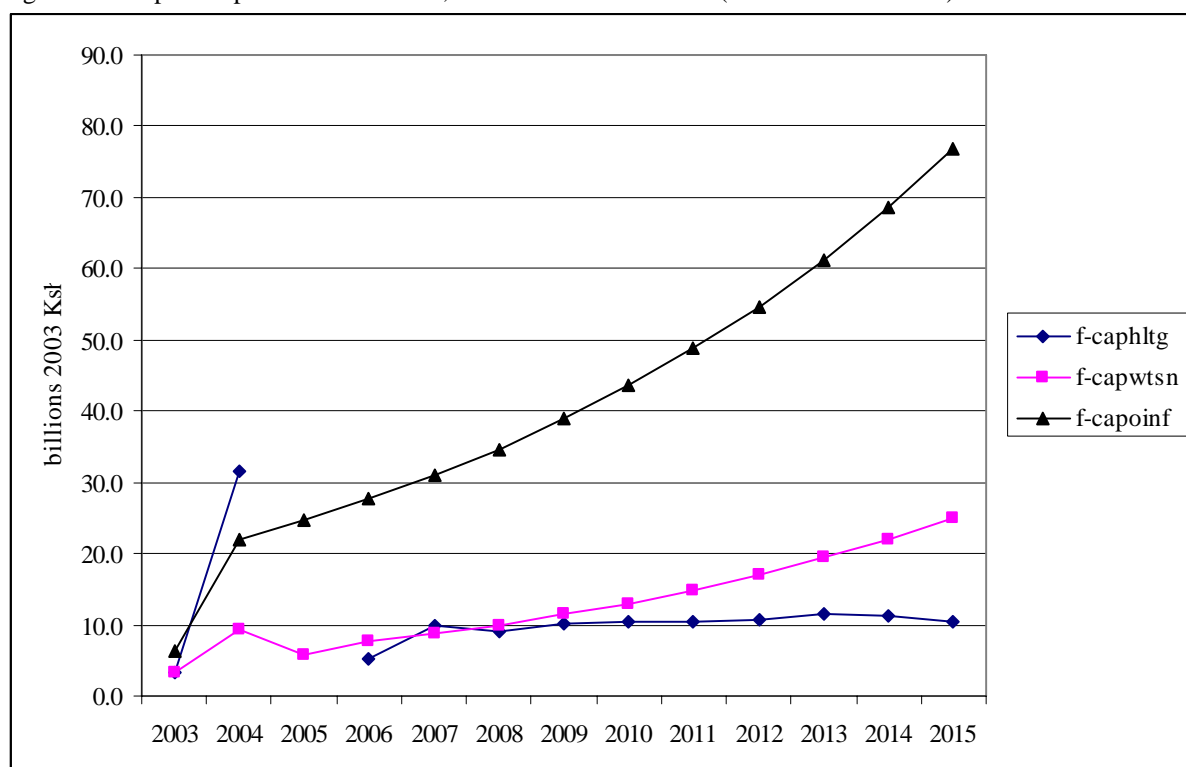


Table 4.4 provides some estimates on the amount expenditures by government function required to reach the MDGs. The figures are the total amount of resources for the whole period 2003-2015, and thus reflect the amount of public resources required to reach the MDGs. Table 4.5 shows the average shares for the different functional categories. In order to compare our results with current expenditure patterns it is difficult to match exactly as some investments in our scenario needs to be front-loaded and this does not usually appear in budget estimates where investment expenditures typically shows a smooth pattern over time.

Table 4.4: Public spending – current and capital expenditures (billion 2003 Ksh.)

	Current	Capital	Total
Primary education	911.2	37.7	948.8
Secondary education	423.4	34.6	458.0
Tertiary education	519.9	117.8	637.7
Health	342.2	133.8	476.0
Water and sanitation	218.0	167.8	385.8
Infrastructure	277.7	538.6	816.3
Other government	1632.5	166.5	1799.0
Total	4324.8	1196.7	5521.5

Source: Republic of Kenya (various issues)

Table 4.5: Share of government expenditures by category

	Current	Capital	Total
Primary education	21.1	3.1	17.2
Secondary education	9.8	2.9	8.3
Tertiary education	12.0	9.8	11.5
Health	7.9	11.2	8.6
Water and sanitation	5.0	14.0	7.0
Infrastructure	6.4	45.0	14.8
Other government	37.7	13.9	32.6
Total	100.0	100.0	100.0

Looking at some historical record on public investments in Kenya the “MDG-sectors” have seen an increasing share over time (Table 4.6). Starting in 2003 infrastructure investment has increased its share and has been around 16 percent of the total investment budget. Education takes around 8-9 percent of the budget where priority has been on primary education. Comparing this recent allocation with our model based investment pattern the following suggestions can be made: scale up investment to the education sectors and increase investment levels at higher levels of education; scale-up investment in the health sector; significantly increase investments in the water sector; scale-up investments in infrastructure; scale-down investments in the other government sectors.

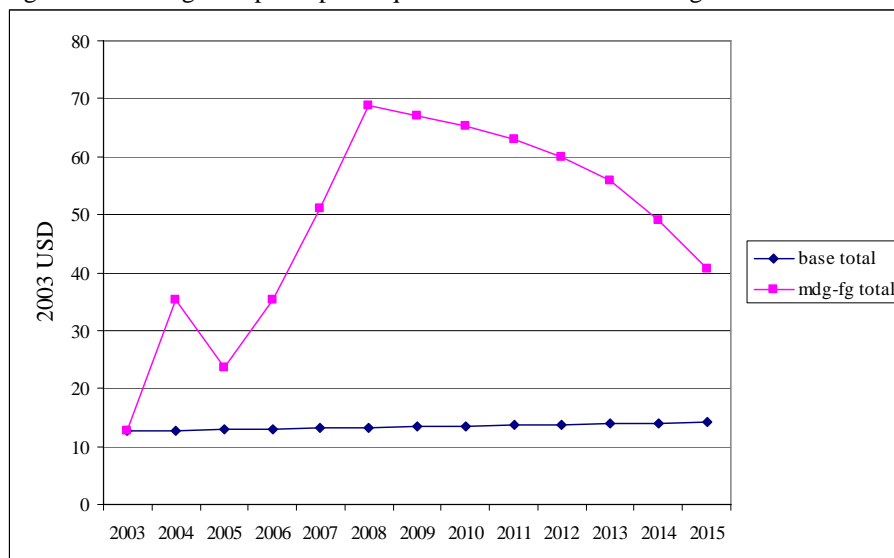
Table 4.6: Public investment (percentage share of total capital expenditures)

	1998	1999	2000	2001	2002	2003	2004	2005
Primary Education	7.2	2.9	1.9	3.9	5.4	6.7	7.2	6.1
Secondary education	0.3	0.1	0.1	0.2	0.3	0.3	0.3	0.4
Tertiary education	1.5	0.6	0.4	0.8	1.2	1.4	1.5	1.7
Total education	9.0	3.6	2.3	4.9	6.8	8.4	9.0	8.2
Health	6.2	4.4	3.1	9.2	3.0	3.4	3.5	9.8
Infrastructure	13.9	13.5	7.9	5.3	4.7	15.6	16.5	15.9
Water and sanitation	3.9	1.8	3.8	4.8	3.6	8.0	6.2	4.6
Total MDG sectors	33.0	23.3	17.1	24.3	25.0	43.8	44.2	46.6
Other government	67.0	76.7	82.9	75.7	75.0	56.2	55.8	53.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Republic of Kenya (various issues)

Finally, the amount of aid required to achieve the MDGs is shown in Figure 4.5. As discussed above MDG 2 requires some substantial investments up to 2008 if the target is to be achieved. This is also reflected in a financing strategy relying on foreign grants where the peak in terms of aid per capita is reached in 2008. The amount of aid required is close to 70 USD per capita but then tempers off over time.

Figure 4.5: Foreign aid per capita required to reach the MDG targets



## Conclusions

Kenya has ascribed to the Millennium Declaration and is already in the process of mobilising resources and instituting measures to achieve Millennium Development Goals (MDGs). A MDGs status report on Kenya indicates that significant progress has been made towards achieving the goal of universal primary education. However, the Government will need to scale-up its efforts beyond the current momentum, if the other goals are to be realised by 2015. Reallocating public expenditures towards sectors producing MDG- services will be of crucial importance in meeting the MDG targets.

In order to achieve all non-income MDGs, public spending, as a share of GDP, needs to increase to a level around 32 percent. If the financing strategy relies completely on domestic borrowing the domestic debt-GDP ratio would increase to 70 percent. In the case of foreign borrowing the debt-GDP ratio in 2015 would stand at close to 60 percent. Relying on taxation implies that the tax-GDP ratio needs to increase to around 30 percent. In the case foreign financing the aid-GDP ratio has to increase to a level around 2.8 percent of GDP. In both externally financed scenarios the real exchange rate appreciates by an annual average rate of 2.4 percent. This will have a slight negative impact on export growth.

A preliminary conclusion is that the resource requirements are not extremely large to reach the MDGs in Kenya. If the Government succeeds in deepening its reform efforts this could trigger additional aid-flows. If the resources are effectively used and targeted to MDG sectors they could have a substantial impact on whether Kenya would reach the MDGs or not. Some targets seem to be easier to reach than others. The target of 100 percent completion in primary school can be achieved with some additional resources targeted to the primary sector. However, a substantial increase of resources is needed at secondary and tertiary level of education to reach other goals set by the Kenyan government. Even if higher investment in all MDG-sectors is needed the water sector seems to be requiring a substantial increase compared to what have been invested in the past. Important is also to scale-down investment in the other government sector and increase investments in MDG-sectors. A clear prioritization would be needed from the Government.

With regard to poverty our results show that annual average real GDP growth rate of around 8 percent would be enough to meet the poverty target of reducing the number of poor by half. Additional grant-aid would have a positive impact on poverty. A strategy financed mainly by grant-aid would be better option than a strategy relying on domestic



resources. However, there is a trade-off between enhanced public spending and achievement of other social goals and reaching the poverty target. An issue worth to explore is the trade-off between public spending on infrastructure and spending on social sectors. The MAMS model used in this paper can be improved in several ways. The first is to update the SAM and improve the household section of the model. One can either include a number of representative households or alternatively a micro-simulation module, either alternative would improve the poverty estimates derived from the model. Another avenue for research would be to regionalise the model and include regional MDG targets. This would also require a disaggregation of public expenditures by function and location. This would be a useful exercise as it would be able to shed some light on regional inequalities in Kenya.

## References

A. Ali, Mwabu. G, and Thorbecke E. (2002), Poverty Reduction in Africa: Challenges and Policy Options, AERC Special Paper 36. AERC Nairobi.

Bourguignon, F., C. Diaz-Bonilla and Hans Lofgren (2007), Aid, service delivery and the MDGs in an economy-wide framework, mimeo, World Bank, Washington D.C.

Bourguignon, François, Maurizio Bussolo, Luiz A. Pereira da Silva, Hans Timmer and Dominique van der Mensbrugghe. 2004. “MAMS – MAquette for MDGs Simulation: a simple Macro-Micro Linkage Model for a Country-Specific Modeling of the Millennium Development Goals or MDGs”. Mimeo. World Bank.

Bruns, B., Mingat, A. and Rakotomalala, R. (2003), Achieving Universal Primary Education by 2015 – A Chance for Every Child, Completion, World Bank, Washington D.C.

Heller, P. S. (2005). Pity the Finance Minister: managing a substantial scaling up of aid flows. Processed, Fiscal Affairs Department, International Monetary Fund, Washington, DC.

IFPRI and KIPPRA (2006), A 2003 Social Accounting Matrix (SAM) for Kenya, mimeo.

IMF (2005) ‘The Macroeconomics of managing increased aid inflows: Experience of low income countries and policy implications. Processed, August, Policy Development and Review Department, International Monetary Fund, Washington, DC.

Lofgren, Hans, Rebecca Lee Harris, and Sherman Robinson, with assistance from Moataz El-Said and Marcelle Thomas. 2002. *A Standard Computable General Equilibrium (CGE) Model in GAMS*. Microcomputers in Policy Research, Vol. 5. Washington, D.C.: IFPRI (<http://www.ifpri.org/pubs/microcom/micro5.htm>)

Kakwani and Son (2006), How Costly is it to Achieve the Millennium Development Goal of Halving Poverty between 1990 and 2015?, Working Paper 19. 2006, International Poverty Centre UNDP.

Kiringai, J., Thurlow, J. and Wanjala, B. (2006), A 2003 social accounting matrix for Kenya. IFPRI, Washington D.C.

Manda, D. K, Kimenyi, M. S., and Mwabu, G. (2000), A Review of Poverty and Antipoverty Initiatives. Social Sector Division, KIPPRA.

Oiro, M. W, Mwabu, G. And Manda, D. K. (2004), Poverty and employment in Kenya, Social Sector Division, KIPPRA Discussion Paper No.33, Nairobi.

Republic of Kenya (2006), “The Medium-Term Budget Strategy Paper 2006/07 – 2008/09”, Ministry of Finance, Nairobi Kenya.

Republic of Kenya (2006), “The Medium-Term Budget Strategy Paper 2006/07 – 2008/09”, Ministry of Finance, Nairobi Kenya.

Republic of Kenya (2006), Education Sector Report, Republic of Kenya

Republic of Kenya (2005b), A Needs and Assessment Report – Costing the MDGs, Ministry of Planning and National Development and UNDP, Nairobi Kenya

Republic of Kenya (2005a), MDG Status Report for Kenya 2005, Ministry of Planning and National Development, Nairobi Kenya

Republic of Kenya (2003), MDG Progress Report for Kenya 2003, Ministry of Planning and National Development, Nairobi Kenya

Republic of Kenya (2002) – Labour force survey

World Bank (2005), Education Support Project, Project Information Document, No. AB1578, Africa Region. Washington D.C.

World Bank (2003), Country Assistance Strategy for the Republic of Kenya, Africa Region. Washington D.C.

## **Appendix: A MAMS database for Kenya**

The data needed for the Kenyan MAMS study is divided into three parts. The first part deals with the Social Accounting Matrix (SAM). The second part deals with data in the MAMS model, which includes data related to the MDGs. The third part is non-core data, which include data on external and domestic debt, labour force growth and other exogenous variables. The fourth part deals with technical data which is mainly various parameters and elasticities used in the MAMS model.

### **A MAMS Social Accounting Matrix**

The Social Accounting Matrix (SAM) used in the Kenyan MAMS application is based on a recently produced SAM for the Kenyan economy. The construction of the 2003 SAM (hereafter the KSAM) was a collaborative initiative between the Kenya Institute for Public Policy Research and Analysis (KIPPRA) and the International Food Policy Research Institute (IFPRI). It formed part of a broader research project to identify potential sources of growth in Kenya.<sup>12</sup>

In order to transform the original SAM into a MAMS-SAM (hereafter the MSAM) several steps have been taken. The first relates to aggregation of sector and accounts in the original SAM. The initial 50 sectors KSAM was aggregated into seven sectors. All private sectors which are not directly involved in any MDG activities have been aggregated into the following three sectors: agriculture, manufacturing and services. Most of the remaining sectors are producing services related to the MDGs and are divided between private and public suppliers. The public MDG sectors consist of water, public administration, health, infrastructure and education. Except for public administration, developments in each sector will have an impact on the MDGs. The enterprise account has been merged with the capital account. Savings, net payments to the rest of the world and taxes paid by enterprises have been distributed to the households. Table A.1 shows the production structure across the sectors included in the seven-sector aggregated KSAM.

The service sector is the most important in terms of output and value-added shares. The agriculture sector has become less important but a large share of labour receives their factor incomes from the sector. The government sectors are less involved in production activities reflecting a change in its role in the development process. However, production activities within the education sector are quite substantial in the Kenyan economy. Public

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<sup>12</sup> See IFPRI and KIPPRA (2006) for detail on construction of the 2003 SAM

spending is mainly allocated between education and other government services including infrastructure. Next step will be to disaggregate the education sector as well as incorporating infrastructure in the SAM.

Table A.1: Economic Structure – 7- sector KSAM

	Output	Intermediate use	Labour earnings	Capital earnings	GDP at factor cost	Public spending
Agriculture	18.1	8.5	25.9	26.7	26.4	3.1
Industry	21.7	31.4	8.9	16.7	13.3	0.0
Private services	47.0	50.6	37.3	48.7	43.8	3.9
Health	2.2	1.3	3.9	2.3	3.0	7.6
Education	5.5	3.1	17.0	0.5	7.6	39.5
Water & sanitation	0.8	0.2	0.5	2.1	1.4	0.5
Other government	4.7	4.9	6.5	3.1	4.6	45.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Kenya SAM 2003

Table A.2 describes the MDG sectors in the SAM, both private and public. The original SAM distinguished three government sectors: education, health and other government services. In order to capture a richer array of public services the MSAM has extended the number of public sectors. The education sector has been disaggregated into primary, secondary and tertiary. The health sector has been sub-divided into private and public. Finally, a public sector providing infrastructure, which was part of the other government sector in KSAM, is now a sector on its own.

Table A.2: SAM classification

Sector in MAMS-SAM	Sectoral aggregation from original SAM
<b>Private non-MDG sectors</b>	
Agriculture	Maize, Wheat , Rice, Barley, Cotton, Other cereals, Sugarcane, Coffee, Tea, Roots & tubers, Pulses & oil seeds, Fruits, Vegetables, Cut flowers, Others crops, Beef, Dairy, Poultry, Sheep, goat and lamb for slaughter, Other livestock, Fishing and Forestry
Industry	Mining, Meat & dairy, Grain milling, Sugar & bakery & confectionary, Beverages & tobacco, Other manufactured food, Textile & clothing, Leather & footwear, Wood & paper, Printing and publishing, Chemicals, Metals and machines, Non metallic products and Other manufactures, Petroleum
Services	Trade, Hotels, Transport, Communication, Finance, Real estate and Other services, Construction, Electricity
<b>Public sector classification</b>	
Primary education	Constructed using national accounts and education sector in original SAM
Secondary education	Constructed using national accounts and education sector in original SAM
Tertiary education	Constructed using national accounts and education sector in original SAM
Health	Constructed using national accounts and health sector in original SAM
Water and sanitation	Water and sanitation sector in the original SAM
Other government	Adjusted from original SAM
Infrastructure	Public expenditures and other government sector in original SAM
<b>Private MDG sectors</b>	
Primary education	Constructed using national accounts and other services sector in SAM
Secondary education	Constructed using national accounts and other services sector in SAM
Tertiary education	Constructed using national accounts and other services sector in SAM
Health	Constructed using national accounts and health sector in SAM

### The education sector

According to Table A.3 the public sector is the main provider of education services in Kenya. The private sector is still rather small as number of pupils enrolled is around 4 percent at primary level and increases slightly to 5 percent at secondary level. Its importance is increasing at the higher level, where private universities enrolled around 15 percent of the students in 2003. In order to disaggregate the education into six sectors outlined above we need to split both the private and the public sector into three levels: primary, secondary and tertiary. Information on output, intermediate consumption and value added at tertiary level is already available in Table A.3, what remains to be done is to separate primary and secondary education. For the public sector one option would be to use total amount of government expenditures spent at each level.

However, it has been difficult to get information on the expenditures separating primary and secondary level of education. Instead we have used the total wage bill in primary and secondary education and calculated the share for each sector. In primary education sector the wage bill is around 64 percent while the remaining part of 36 percent accrues to the secondary education sector. Variables, such as output, use of intermediates and value added, are then distributed between the two sectors according to the wage share. A similar problem

occurs when disaggregating the private education sector. As a proxy to distinguish primary and secondary education we have used number of classrooms at each level. The share of classrooms at primary level is about 80 percent and the remaining 20 percent is the share of classrooms used at secondary level. These shares have been used to distribute output, use of intermediates and value added across primary and secondary level of education in the private sector.

Table A.3: National income account - education

<b>Secondary and primary education</b>	<b>Public</b>	<b>Private</b>	<b>Total</b>	<b>% Public</b>	<b>% Private</b>	<b>Total</b>
Output at basic prices	90166.7	8472.3	98639.0	91.4	8.6	100
Intermediate consumption	16025.9	1955.2	17981.0	89.1	10.9	100
Value added at basic prices, gross	74140.8	6517.2	80658.0	91.9	8.1	100
Compensation of employees	72023.0	6517.2	78540.1	91.7	8.3	100
Operating surplus/mixed income, gross	2117.8	0.0	2117.8	100.0	0.0	100
Private consumption	11842.0	8 472	20314.3	58.3	41.7	100
Public consumption	78324.6					
<b>Primary education</b>						
Number of pupils, '000	5894.3	219.5	6113.8	96.4	3.6	100
Trained teachers	177752.0		177752.0	100.0	0.0	100
Untrained teachers	2719.0		2719.0	100.0	0.0	100
Number of schools	17544.0	1357.0	18901.0	92.8	7.2	100
<b>Secondary education</b>						
Number of pupils, '000	754.7	42.8	797.5	94.6	5.4	100
Trained teachers	43002.0					
Untrained teachers	1853.0					
Number of schools	3232.0	389.0	3621.0	89.3	10.7	100
Total number of schools	20776.0	1746.0	22522.0	92.2	7.8	100
<b>Tertiary and teachers training</b>						
Output at basic prices	8344.4	1351.0	9695.4	86.1	13.9	100
Intermediate consumption	2330.9	323.9	2654.9	87.8	12.2	100
Value added at basic prices, gross	6013.5	1027.0	7040.5	85.4	14.6	100
Compensation of employees	6013.5	1027.0	7040.5	85.4	14.6	100
Operating surplus/mixed income, gross	0.0	0.0	0.0			
Public consumption	7927.2		7927.2	100.0	0.0	100
Private consumption	417.2	1351.0	1768.2	23.6	76.4	100
Enrolment (full time)						
Teacher training	17838.0	2511.0	20349.0	87.7	12.3	100
Technical shoools	30555.0		30555.0	100.0	0.0	100
Universities and colleges	45139.5	8212.0	53351.5	84.6	15.4	100

Source: Ministry of Finance – National Accounts Database

The next step has been to disaggregate each sector further to derive the amount of inputs used in production of education services. The original SAM includes an aggregated public education sector with input-output coefficients as well as information on the mix of labour categories included in the sector. Assuming that the technology is similar at the different

levels, intermediate inputs and factors inputs have been distributed across the public education sectors. Table A.4 shows the results for the public sector.

Table A.4: Education by level and service provider (million Ksh)

	a-edupg	a-edusg	a-edutg	a-edupng	a-edusng	a-edutng	Total
Output	58054.3	32112.4	11999.0	6671.1	1801.3	1351.0	111989.0
Intermediate consumption	10318.3	5707.5	4020.0	1539.5	415.7	323.9	22325.0
Value added	47735.9	26404.8	7979.0	5131.6	1385.6	1027.0	89664.0
Compensation of employees	46372.4	25650.6	7979.0	5131.6	1385.6	1027.0	87546.2
Operating surplus	1097.9	607.3	226.9	0.0	0.0	0.0	1932.0
Private consumption	9876.4	1965.6	600.0	6671.1	1801.3	1351.0	22265.3
Public consumption	65323.7	13001.0	7927.2	0.0	0.0	0.0	86251.8

Note: a-edupg: primary education, public sector, a-edusg: secondary education, public sector, a-edutg: tertiary education, public sector, a-edupng: primary education, private sector, a-edusng: secondary education, private sector, a-edutng: tertiary education, private sector

In the original Kenyan 2003 SAM private education is included in the other services sector. Inputs and factor use across private education sectors have been derived using coefficients from that sector. This implies that adjustments have been made in the other service sector account. Cost for private education has to be deducted from the service sector.

When it comes to demand of education services a three-step approach has been used. First, national accounts data distribute public and private consumptions expenditures between private and public education services (Table A.2). Second, distribution of household expenditures across primary and secondary education is in the private sector distributed using shares of number of schools as an approximation. In the public sector it is assumed that all household expenditures are spent on secondary education (Table A.5).

Table A.5: Consumption expenditures on education services

	Rural households	Urban households	Government spending	Total
<b>Public sector</b>				
Primary education	0.0	0.0	58073.4	58073.4
Secondary education	9404.9	13582.9	9135.2	32122.9
Tertiary education	0.0	0.0	13032.9	13032.9
<b>Private sector/NGO</b>				
Primary education	1067.4	5603.7		6671.1
Secondary education	288.2	1513.1		1801.3
Tertiary education	216.2	1134.8		1351.0
Total Education	10976.7	21834.4	80241.4	



## The health sector

National accounts data have been used to disaggregate provision of health services. Table A.6 shows the importance of the private sector in the health sector. The health sector is divided into three-levels and as with the education sector the public and private sector is treated separately. Interestingly the private sector is quite important when it comes to provide health services in Kenya. Almost 60 percent of health services provided originate from the private sector. It is also clear from the national accounts that private expenditures are mainly related to private services provided.

Table A.6: Health and social work services by agent 2003 (million Ksh)

	Public sector	Private sector	% private	Total
Output at basic prices	16503.8	24082.6	59.3	40586.4
Intermediate consumption	3372.6	7043.9	67.6	10416.5
Value added at basic prices, gross	13131.2	17038.7	56.5	30169.9
Compensation of employees	9870.0	9987.7	50.3	19857.7
Operating surplus/mixed income, gross	3261.1	7051.0	68.4	10312.2
Private consumption	679.8	24082.7	97.3	24762.4
Public consumption	15824.0	0.0	0.0	15824.0
Total consumption	16503.7	24082.7	59.3	40586.4

In the next step we divide the health sector into three levels as follows; high-tech health services which include Kenyatta hospital and the Moi Teaching and Referral hospital; medium-tech health services which includes curative services including provincial and district hospitals; and finally low-tech health services including rural health services (including preventative and promotive services). General administration, health training and research have been distributed across the three levels. Based on the MTEF for the Health Sector expenditure shares for the three levels is approximated to 20 percent for low-tech health services, 60 percent for medium-tech services and 20 percent for high-tech services (GoK, 2006). In the private sector the expenditure shares is assumed to be 50, 20 and 30 percent for low-tech, medium-tech and high-tech services, respectively.

Some of the basic aggregate production indicators are shown in Table A.8 for the various sub-sectors. What remains to be done is to disaggregate these numbers further to capture the input-output structure at the various levels. The only information available regarding the input-output structure is the coefficients of the aggregated health sector included in the recent SAM. Using the IO coefficients from the SAM we derive demand for inputs and composition of the labour force for each of the six sectors (Table A.7).

Table A.7: Health and social work services (million Ksh)

	a-hlt1g	a-hlt2g	a-hlt3g	a-hlt1ng	a-hlt2ng	a-hlt3ng
Output at basic prices	3300.8	9902.3	3300.8	12041.3	4816.5	7224.8
Intermediate consumption	674.5	2023.5	674.5	3522.0	1408.8	2113.2
Compensation of employees	1974.0	5922.0	1974.0	4993.8	1997.5	2996.3
Operating surplus/mixed income, gross	652.2	1956.7	652.2	3525.5	1410.2	2115.3
Private consumption	136.0	407.9	136.0	12041.3	4816.5	7224.8
Public consumption	3164.8	9494.4	3164.8	0.0	0.0	0.0
Total consumption	3300.7	9902.2	3300.7	12041.3	4816.5	7224.8

Notes: a-hlt1g: Low-tech health services, public sector, a-hlt2g: Med-tech health services, public sector, a-hlt3g: High-tech health services, public sector, a-hlt1ng: Low-tech health services, public sector, a-hlt2ng: Med-tech health services, private sector, a-hlt3ng: High-tech health services, private sector

Finally we have to distribute demand for health services across institutions. Household demand for health is derived in three steps: first, information on private consumption of public and private sector health services is available in the national accounts (Table A.8): second, private and public consumption is distributed across sub-sectors using expenditure shares: third, household demand of health services is split between urban and rural households using expenditure shares in the SAM.

Table A.8: Consumption of health services

	Industry	Household	Rural households	Urban households	Government	Total
c-hlt	191.5	25251.5			15443.9	40887.0
c-hlt1g	15.6	103.8	27.3	76.5	3088.8	3208.2
c-hlt2g	46.7	311.5	81.9	229.6	9266.3	9624.5
c-hlt3g	15.6	103.8	27.3	76.5	3088.8	3208.2
c-hlt1ng	56.8	12366.2	3250.8	9115.4		12423.0
c-hlt2ng	22.7	4946.5	1300.3	3646.2		4969.2
c-hlt3ng	34.1	7419.7	1950.5	5469.2		7453.8
Total	191.5	25251.5	6638.1	18613.5	15443.9	40887.0

Notes: c-hlt1g: Low-tech health services, public sector, c-hlt2g: Med-tech health services, public sector, c-hlt3g: High-tech health services, public sector, c-hlt1ng: Low-tech health services, public sector, c-hlt2ng: Med-tech health services, private sector, c-hlt3ng: High-tech health services, private sector

In the current model version the health sector has been aggregated into two sectors only, a public and a private. This has been done by aggregating the above classification.

## Infrastructure

An important sector in the MAMS framework is the sector providing infrastructure. This is also a sector, which typically is not included in a standard SAM. The original SAM does not include any information on provision of infrastructure services. According to Economic Survey 2004 recurrent and capital expenditures targeted to the road sector in 2003 was Ksh million 7008.5 and 5089.0, respectively (Republic of Kenya, 2004). The approach to construct the infrastructure sector in the MAMS SAM has been the following; first, government

recurrent and capital expenditures in the road sector has been included in the appropriate government accounts in the MAMS-SAM; second, as the original SAM includes infrastructure expenditures in the other government sector deductions have been made from this account. The production technology, household and investment expenditures on infrastructure follows a simple rule: the share of government recurrent expenditures on infrastructure of total other government expenditures have been used to distribute demand of inputs and commodities between infrastructure and other government services.

## **Labour market**

The SAM distinguishes between unskilled, semi-skilled and skilled labour. Individuals classified as unskilled has not completed primary education, semi-skilled are those that have completed primary education and skilled workers have completed secondary education or higher. Employment and average wages in the SAM has been estimated using the 1998/99 Labour Force Survey (Republic of Kenya, 2002). Table 2 shows average wages and employment across sectors. As it is difficult to get reliable data on average wages across sectors and by skill categories adjustments have been made in some sectors.<sup>13</sup>

Average wages are, as expected, lowest in the agriculture sector and below the average minimum wage, which in 2003 was 30348 Ksh per annum.<sup>14</sup> Average wages in manufacturing and service sectors was around 70,000 Ksh per annum. Sectors providing social services such as education and health have significantly higher average wages. The reason is that agricultural, manufacturing and the service sectors has a high share of informal sector workers with low average wages.

Stock of labour for the different sectors is described in Table 3. Number of workers by skill category and sector has been derived given information on average wages and factor incomes from the SAM. Total number of workers is around 12.0 million workers, which is close to estimates of the labour force survey. The population in the base-year is estimated to 32.7 million and the population in the 15-64 age groups is around 18 million individuals. Assuming similar participation and unemployment rates as in the 1998/99 Labour Market Survey this implies a labour force of approximately 12.1 million workers.

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<sup>13</sup> Average wages in the public education sectors have been adjusted to mimic the average wage reported in Republic of Kenya (2006). The average wage rate in private education sectors is in the skilled group 10 percent higher than the public sector.

<sup>14</sup> Average wages in the agricultural sector has been scaled down by 50 percent in order to get a more realistic number of individuals employed in the sector.

Table A.9: Average annual wages by sector and skill category

Average wages per year	None-educated	Primary education	Secondary education and higher	Total average
Agriculture	9890.0	12315.6	43470.0	13156.1
Industry	30252.0	41736.0	128724.0	69346.0
Services	29772.0	40596.0	114516.0	69362.1
Health, public sector	18502.8	74562.0	171666.0	154627.2
Health, private sector	31454.8	126755.4	291832.2	262866.2
Primary education, public sector	62136.0	165912.0	182016.0	178815.0
Secondary education, public sector	68349.6	319380.6	370230.0	356974.1
Tertiary, public sector	82019.5	328505.8	682344.0	614059.4
Primary education, private	68349.6	182503.2	200217.6	184034.2
Secondary education, private	75184.6	351318.7	407253.0	344621.5
Tertiary education, private	82019.5	328505.8	750578.4	456748.2
Water and sanitation	45980.6	122774.9	134691.8	105827.9
Infrastructure	45980.6	122774.9	134691.8	130683.8
Other government services	45980.6	122774.9	134691.8	130683.8

Source: Own calculations based on 1998/99 Labour Force Survey

Table A.10: Stock of labour by sector and skill category

	None-educated	Primary education	Secondary education and higher	Total
Agriculture	2068336.1	6071967.1	391194.6	8531497.8
Industry	37309.1	336363.6	180968.5	554641.2
Services	160412.7	1220485.1	918178.2	2299076.0
Health, public sector	3783.0	3479.7	46573.3	53835.9
Health, private sector	2251.8	2071.3	27722.6	32045.6
Primary education, public sector	4260.6	15700.3	218587.8	238548.7
Secondary education, public sector	2142.5	4511.5	59443.2	66097.1
Tertiary, public sector	555.4	1364.4	10032.8	11952.5
Primary education, private	534.6	2077.0	4017.8	6629.4
Secondary education, private	131.2	291.3	533.3	955.9
Tertiary education, private	90.2	233.7	217.0	540.9
Water and sanitation	6429.5	4521.7	10676.2	21627.3
Infrastructure	462.6	2413.7	14539.3	17415.6
Other government services	5275.6	27526.6	165810.1	198612.3
Total	2291974.9	7693006.9	2048494.7	12033476.5

Source: Own calculations based on 1998/99 Labour Force Survey

A broad classification into agriculture, informal and formal sectors implies that around 8.5 million workers are employed in the agriculture sector, 0.5 million workers are employed in the modern sector and 2.3 millions are employed in the informal sector. The drawback of assuming average wages is that the number of employees does not match exactly what is found in other government statistics. For example, the estimated number of primary teachers employed in the public sector is higher than expected while number of teachers in private schools is lower than expected. Total number of teachers at primary level based on the Labour

Force survey with some adjustments is around 240,000 while the number of teachers at primary level in other documents is estimated to around 180,000.

### **Government expenditures and deficit financing**

Government revenue in the KSAM is made of various taxes, profits from public enterprises and dividends from the Central Bank (f-capprv, gov). The enterprise account has been merged with the capital account and compensation for capital has been transferred to the direct tax account.<sup>15</sup> Interest payments by the government to domestic financial institutions is shown in the (ent,gov) cell and amounts to 41296.6 millions of Ksh. Interest payments have been transferred to the urban household and been revised.<sup>16</sup> Savings in the capital account (f-capprv) has been moved to household accounts assuming fixed savings shares. Adjustments have also been made in factor income to households in order to keep the same column totals of capital. In order to balance the government current account direct tax revenue has been adjusted upwards considering that urban households pay capital income tax on domestic interest payments.

Table 4 shows the pattern of government spending, sources of revenue and how the deficit was financed according to Economic Survey 2004 (Republic of Kenya, 2004). Table 5 describes the same variables derived from the MSAM and there is some deviation compared to the official statistics. The following changes have been made: first foreign aid reported as government revenue has been adjusted upwards from 5677 Ksh million to close to those reported in Table 4. After this adjustment foreign aid is contributing to around eight percent of government revenue.<sup>17</sup> Value-added tax is the largest source of income for the government followed by revenue from direct taxes.

Public investment expenditures are less in the MSAM compared to the official statistics. Investment expenditures in the MSAM are based on public investment reported in the national accounts and not on the government accounts.<sup>18</sup> Current expenditures in the SAM are slightly higher than official statistics. As a result the current and the overall deficit are slightly higher than the official.

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<sup>15</sup> In the 3-sector original KSAM this is 4279.171 in the (gov,f-capprv) cell and 7331.5664 in the (gov,ent) cell.

<sup>16</sup> Revised numbers on interest payments are based on those reported in Economic Survey 2004 Table 6.9.

<sup>17</sup> In the original SAM foreign aid was not consistent with government revenue in Table 6.1 in Economic Survey. The updated number is three times the original. Government payments to abroad have been transferred to government revenue account, reflecting net flows.

<sup>18</sup> Government accounts data on investment are very different from the national accounts numbers. National accounts data seems to be more reliable than government accounts.

Table A.11: Government revenue, spending and deficit financing – official statistics

	2002/03	2003/04	2003
Current revenue	210029.8	236893.6	223461.7
Current expenditure	213785.5	261495.3	237640.4
Current deficit	-3755.7	-24601.7	-14178.7
Capital revenue	2538.3	768.1	1653.2
Capital expenditure	33606.4	44452.4	39029.4
Net lending	247.3	1054.5	650.9
External grants	15866.4	21102.3	18484.3
Overall deficit	-20974.9	-48521.3	-34748.1
External loans	16393.3	14752.4	15572.9
Domestic borrowing	46923.0	7696.0	27309.5
Changes in cash balances	-42341.4	26072.9	-8134.3
Public Debt Redemption			
External debt	22784.5	24793.7	23789.1
Internal debt	33250.1	56323.1	44786.6

Source: Republic of Kenya (2004) Table 6.1

Table A.12: Government revenue, spending and deficit financing – MSAM

	Revenue	Current expenditures	Capital expenditures	Deficit financing
Agriculture		6275.9		
Services		7896.1		
Health – low tech		3088.8	3261.1	
Health –med- tech		9266.3		
Health – high – tech		3088.8		
Primary education		58073.4	969.2	
Secondary education		9552.4	375.6	
Tertiary education		12615.6	773.0	
Water and sanitation		1069.3	3343.9	
Other government		91986.7	6575.7	
Infrastructure			5089.1	
Rural households		3107.6		
Urban households		8492.3		
Interest – domestic		27207.0		
Interest – rest of the world		8088.3		
Total current expenditure		249808.4		
Current deficit				-17477.6
Total capital expenditure				20387.7
Overall deficit				-37865.2
Domestic borrowing				22292.3
Foreign borrowing				15572.9
Total				0.0
Grant aid	18308.2			
Tax – VAT	110966.3			
Tax – Direct taxes	82266.7			
Tax – Import duties	20789.7			
Total	232330.9			

## Investment

Investment data used in the SAM and the MAMS model is based on Republic of Kenya (2004). Table 6 shows the amount of investment across public sectors.

Table A.13: Public investment (constant 2003 prices)

	1998	1999	2000	2001	2002	2003	Average 98-03
Primary	826.9	847.7	889.8	882.2	936.6	969.2	3.4
Secondary	320.5	328.5	344.9	341.9	363.0	375.6	3.4
Tertiary	659.5	676.1	709.7	703.6	747.0	773.0	3.4
Health	2320.1	2620.9	2778.9	2763.7	3151.5	3261.1	8.1
Water	2798.4	2934.4	3028.9	3193.3	3231.6	3343.9	3.9
Infra.	4258.8	4465.8	4609.5	4859.9	4918.0	5089.1	3.9
Other gov.	5502.9	5770.4	5956.2	6279.6	6354.8	6575.7	3.9
Total	16687.2	17643.9	18317.8	19024.2	19702.6	20387.7	4.4

Source: Own calculation based on MoF National Accounts Data

## MDG data

The model is intended to capture key interactions between the pursuit of the MDGs and economic evolution. It focuses on the MDGs with the greatest cost and the greatest interaction with the rest of the economy: universal primary school completion (MDG 2), reduced under-five and maternal mortality rates (MDGs 4 and 5), increased access to improved water sources and sanitation (part of MDG 7) and poverty reduction (MDG 1). The base year values and the goals for the MDGs have been compiled from various policy documents.

Table A.14: Targets of MDGs

	1990	2003	2015
Mdg 1 – poverty reduction	0.490	0.550	0.245
Mdg 2 – universal primary completion	0.630	0.680	1.000
Mdg 4 – reduced under-five mortality rates	0.099	0.115	0.033
Mdg 5 – reduced maternal mortality rates	0.590	0.414	0.148
Mdg 7a – water	0.480	0.490	0.740
Mdg 7b – sanitation	0.840	0.860	0.920

Source:

MDG1: Head-count ratios based on national poverty line

MDG2: 1990 figure from World Bank (2003) and base-year from Republic of Kenya (2005)

MDG4 and MDG5: Republic of Kenya (2005)

MDG7ab: Republic of Kenya (2005) for 2003 and 2015

Table 6 shows the amount of resources required to achieve the MDGs in Kenya. Projections are based on a needs assessment and costing (Republic of Kenya/UNDP, 2005). The interventions indicated in the table have costs that relate directly to the MDGs Goals 2, 4, 5,

7a and 7b. For Kenya to achieve these goals, total investments of US\$ 13,509 million are required (Table 6).

Table A.15: Costing of the MDGs (millions of US)

	Estimated annual average costs 2005-2015 (millions of \$)/ <sup>1</sup>	Government current expenditures 2003/ <sup>2</sup>	Private sector provision
Mdg 2 – universal primary completion	309.4	155.3	14.5
Mdg 4 – reduced under-five mortality rates	25.0	13.0	6.5
Mdg 5 – reduced maternal mortality rates	5.9	2.1	6.5
Mdg 7a – water	51.1	6.2	
Mdg 7b – sanitation	23.2	9.3	
Hiv, AIDS and Malaria	248.3	118.0	
Total costs (Mdg 2 – Mdg 7ab)	414.5		
Total (including health)	662.8		
Total government expenditures		530.2	
Total private sector			27.5

Source: Republic of Kenya/UNDP (2005) and own calculations

2/ Education expenditures committed already include current expenditures excluding wage payments, and core program expenditures in primary education and private education expenditures.

However, the Government under its current fiscal framework, executes core poverty programmes and other programmes, that can be directly linked to the above four MDGs. Reducing the total costs by projected expenditures for core poverty programmes, which has been estimated to US\$ 530 million, gives an indication of additional resources required to achieve the MDGs. Additional resources required to achieve the five MDGs during 2005-2015 will be in the order of US\$ 4.6 billion.

Core poverty programme expenditures were, in 2003, around 14 percent of total expenditures (Republic of Kenya, 2005). Approximately half of development expenditures have been identified as core poverty programme expenditures and approximately 10 percent of current expenditures. There is some difference between sectors. For example, projections in the education estimate core poverty programme expenditures to about 70 percent of total investment expenditures (Republic of Kenya, 2006). Other sectors, such as the health sector, only provide estimates for the most recent years. Allocation of core programme expenditures across MDG producing sectors the following have been assumed:

- 70 percent of total primary capital expenditures are defined as core poverty programme expenditures.
- In other sectors producing MDG services 50 percent of the development budget is assumed to include core poverty programme expenditures.



- Across the board 10 percent of current expenditures are assigned as core poverty programme expenditures.
- Water and sanitation has been split. According to Republic of Kenya (2005) during the 1990s and early 2000 the share of development expenditures targeted to water supply services has been around 38 percent while sanitation has been around 62 percent. Assuming the same shares in current expenditures generates the total expenditures spent on water and sanitation, respectively.
- Core poverty programme expenditures on MDG4 and MDG5 have been split according to budget shares reported in Republic of Kenya (2005).

## Education<sup>19</sup>

One of the Government's highest priorities is education, and spending in the education sector as a share of GDP is substantial, at about 7 percent. The absolute numbers of pupils and students enrolled is described in Table 9 shows number of pupils/students enrolled.

Table A.16: Number of pupils/student enrolled ('000)

	1996	1997	1998	1999	2000	2001	2002	2003
Primary	5567.590	5760.882	5828.163	6064.100	6078.024	6081.854	6131.049	7185.706
Secondary	658.253	687.473	700.538	722.668	758.967	817.657	836.521	879.956
Tertiary	55.938	72.874	59.827	69.692	69.952	78.221	79.6	81.0

Source: Economic Survey (2004)

The introduction of Free Primary Education (FPE) impacted positively on the enrolment of both boys and girls. An extra 1.5 million children are now accessing primary education, increasing the enrolments from 5.9 million to 7.4 million in 2004. The GER stands at 104.8 percent as compared to 93 percent in 2002. Net Enrolment Rates (NER) have shown a significant improvement the last five years increasing from 67.8 percent in 2000 to over 82.0 percent in 2004 (Table 9). Access to primary school education is almost reaching gender parity but the boys have a slight edge over the girls. Enrolment however continues to experience sharp regional disparities, being particularly low among girls in arid and semi-arid regions. Primary education completion rate (PCR), at National level has improved over the years, from 57.7 percent in 2000 to 76.2 percent in 2004 as shown in Table 10. This shows that out of the total number of pupils enrolled in Standard 1 in 1996, slightly more than three quarters of them completed primary education in 2004. However, although the completion rate has improved in recent years it has been rather stagnant since the 1990s. Primary completion in 1990 was around 63 and declined to 58 in 1995 (Bruns et al., 2003).

<sup>19</sup> This section is based on Republic of Kenya (2006)

Table A.17: Primary Schools Net Enrolment by Province, 1999-2004

Province	2000		2001		2002		2003		2004	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Coast	52.6	46.1	60.1	52.4	58.2	53.2	66.9	60.1	72.8	67.7
Central	77.4	80.1	80.5	83.0	83.5	87.8	83.6	84.2	81.4	81.8
Eastern	77.9	80.8	83.5	86.2	87.7	91.6	90.4	90.3	91.4	91.5
Nairobi	24.2	28.1	37.8	44.3	25.4	29.5	35.5	40.3	35.9	41.1
Rift Valley	70.2	68.8	75.0	74.3	81.1	81.5	84.1	82.0	87.8	85.4
Western	78.4	75.3	91.8	87.2	95.4	91.7	97.5	93.2	99.3	97.2
Nyanza	80.2	79.8	90.9	89.2	88.9	89.6	96.2	95.4	96.9	96.2
North Eastern	19.3	11.0	18.8	11.3	19.6	14.1	26.1	16.2	23.6	14.9
<b>Total</b>	<b>67.7</b>	<b>67.8</b>	<b>75.0</b>	<b>75.0</b>	<b>76.5</b>	<b>76.3</b>	<b>80.8</b>	<b>80.0</b>	<b>82.2</b>	<b>82.0</b>
<b>Grand Total</b>	<b>67.8</b>		<b>75.0</b>		<b>76.4</b>		<b>80.4</b>		<b>82.1</b>	

Source: Republic of Kenya (2006)

Table A.18: Primary Completion Rate by Gender and Province, 1999-2004

Province	1999		2000		2001		2002		2003		2004	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Coast	47.5	37.5	48.3	33.6	52.6	36.2	54.0	36.6	59.5	40.2	69.2	47.3
Central	76.5	82.7	75.9	77.7	74.8	77.3	78.7	80.0	82.5	84.4	91.5	92.1
Eastern	58.1	63.1	59.8	58.8	62.8	61.4	65.8	65.2	73.2	71.3	83.5	79.1
Nairobi	63.0	56.0	35.4	37.4	35.0	37.3	37.4	40.1	39.3	42.5	43.3	46.6
Rift Valley	59.1	53.0	60.8	54.4	65.0	57.5	69.1	64.0	75.1	69.8	84.1	76.6
Western	49.0	50.1	59.6	56.7	63.7	60.5	65.3	60.3	72.2	66.9	84.5	75.5
Nyanza	67.5	54.3	70.8	57.8	69.2	55.7	73.6	59.3	80.2	63.7	88.0	69.8
North Eastern	16.0	6.6	20.2	7.2	24.6	9.0	28.5	11.3	32.7	14.2	39.0	14.8
<b>TOTAL</b>	<b>59.1</b>	<b>56.2</b>	<b>60.2</b>	<b>55.3</b>	<b>62.2</b>	<b>56.8</b>	<b>65.5</b>	<b>60.1</b>	<b>71.3</b>	<b>65.2</b>	<b>80.3</b>	<b>72.1</b>
<b>National</b>	<b>57.6</b>		<b>57.7</b>		<b>59.5</b>		<b>62.8</b>		<b>68.2</b>		<b>76.2</b>	

Source: Republic of Kenya (2006)

The increased numbers of pupils at the primary level is putting increased pressure on the limited secondary school places available. The transition rate from primary to secondary level has recorded an upward trend from the lowest rate of 43.3 percent in 2000 to 50.5 percent in 2004 (Table 11). The current level of transition rate is estimated to stand at 57.0 percent. Transition rates are projected to increase to 60 percent by 2006 and 70 percent by 2008. This would be done through an expansion of existing secondary schools to an average of three streams, the establishment of new secondary schools especially in deficit areas, the development of day secondary schools to reduce the cost of secondary education, and the refurbishing of existing secondary schools to enhance the quality of the learning environment. Gross enrolment at secondary level is about 30 percent, and the completion rate at the secondary level is about 79 percent.

Table A.19: Transition from Primary to Secondary School, 2000-2004

Year in Std 8	Year in Form 1	Enrolment in Std 8 ('000)			Enrolment In Form 1 ('000)			Transit to Form 1 (percent)		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
1999	2000	246.6	228.0	474.6	108.1	97.2	205.3	43.8	42.6	43.3
2000	2001	235.6	227.8	463.4	112.2	103.4	215.6	47.6	45.4	46.5
2001	2002	261.7	246.6	508.3	116.2	105.2	221.5	44.4	42.7	43.6
2002	2003	296.9	244.5	541.3	129.4	121.7	251.1	43.6	49.8	46.4
2003	2004	280.8	267.5	548.3	147.1	130.0	277.1	52.4	48.6	50.5

Source: Republic of Kenya (2006)

Table A.20: Secondary Schools Net Enrolment Rate by Province, 1999-2004 Percent

PROVINCE	1999		2000		2001		2002		2003		2004	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Coast	7.5	7.8	7.3	7.8	8.2	8.4	9.6	9.4	12.2	11.4	14.3	12.2
Central	18.1	23.6	20.1	24.6	22.9	26.9	27.4	30.7	25.2	30.3	27.0	29.5
Eastern	13.4	15.0	13.1	14.4	14.9	15.7	17.8	17.9	19.9	21.8	20.9	21.4
Nairobi	15.1	8.2	10.5	7.1	11.7	7.5	13.6	8.3	11.6	6.4	22.1	16.2
Rift Valley	11.9	11.6	11.7	11.5	13.1	12.3	15.4	13.8	17.0	17.1	17.7	17.3
Western	13.6	14.9	15.3	16.4	17.3	17.7	20.4	20.0	16.9	20.7	19.2	20.3
Nyanza	17.3	14.9	18.8	15.6	21.4	16.9	25.4	19.2	23.3	21.4	22.3	17.6
North Eastern	3.3	1.8	3.2	2.0	3.4	2.0	3.7	2.1	2.9	2.0	3.1	1.8
<b>TOTAL</b>	<b>13.5</b>	<b>13.9</b>	<b>13.9</b>	<b>14.0</b>	<b>15.7</b>	<b>15.2</b>	<b>18.5</b>	<b>17.1</b>	<b>18.2</b>	<b>18.9</b>	<b>19.7</b>	<b>19.1</b>
<b>GRAND</b>		<b>13.7</b>		<b>14.1</b>		<b>15.5</b>		<b>17.8</b>		<b>18.6</b>		<b>19.1</b>

Source: Republic of Kenya (2006)

### Macroeconomic variables and other exogenous variables

A number of exogenous growth rates are assumed in the model. When it comes to GDP growth the target for 2008/09 is a growth rate of 6 percent. Improvements in TFP are expected to be an important source to achieve the target. Table 15 decomposes GDP growth since 1960. While Kenya in the 1960s achieved significant improvements in TFP it has, however, in recent decades been quite erratic and disappointing.

Table A.21: Growth decomposition

Period	Growth in real			
	GDP per worker	Physical capital per worker	Education per worker	TFP
1960-64	0.38	-1.03	-0.02	1.43
1965-69	3.67	-0.12	0.12	3.67
1970-74	4.85	0.98	0.12	3.76
1975-79	1.62	0.10	0.74	0.78
1980-84	-0.76	-0.48	0.57	-0.85
1985-89	1.99	-0.66	0.48	2.17
1990-97	-1.83	-0.72	0.28	-1.39

Under the assumption that the government continues with its reform efforts it is, however, not unlikely that substantial improvements in TFP could be achieved. Higher GDP growth rates

would have a positive impact on poverty but a very unequal income distribution also implies that the impact would be less compared to a case of more equal distribution. The growth-poverty elasticity has been estimated to -0.58 (Ali, et al, 2002).