

Fiscal implications of free education: The case of Tanzania

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A growing number of low-income countries are introducing free secondary education policies in order to reduce barriers to access to secondary education. While often highly effective at increasing access, such policies pose a significant fiscal burden on governments. Without planning and calibration of input models, this burden can lead to inconsistent and inequitable expansion, chronic shortages of inputs, and a decline in quality and learning. However, careful choices with regard to minimum services standards and infrastructure models can enable rapid expansion of secondary education to take place in a sustainable manner.

We present simulation of the fiscal implications of the Fee-Free Basic Education Policy in Tanzania, which abolished fees for lower secondary education in 2015. Full implementation of the Policy, with the government simultaneously expanding the secondary school system to accommodate increased enrollment and raising per-student finance to accommodate current planned policies, has the potential to increase the annual cost of lower secondary education from 19 percent of the education budget in 2018 to 35 percent in 2024. We model the fiscal impact of strategic adjustments to the input model of lower secondary schooling, including improved utilization of classrooms and teachers; a move from subject-specific to multi-science laboratories; and a switch to classroom-based libraries. Our projections suggest that these measures could reduce the estimated annual costs of lower secondary education by 2024 by more than half.

The findings presented in this note are based on the simulation tool developed for use by the government; a copy of the tool [is available online](#).

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Introduction

More than half of the countries in sub-Saharan Africa introduced free primary education policies between 1994 and 2015, inspired in part by the commitment in Millennium Development Goal 2 to universal primary education (UNESCO, 2015). These policies have contributed to an unprecedented increase in access to education, with gross primary enrollment in the continent rising by more than 20 percentage points between 1994 and 2015 (World Bank, 2018). With the goal of universal primary education in sight, attention has shifted to the secondary sector. Sustainable Development Goal 4 extends the target of universal education to secondary level, requiring that all male and female children complete “free, equitable and quality primary and secondary education” by 2030. In February 2018, a coalition of more than 60 developing countries committed \$110 billion for the next three years to education in support of this ambitious goal, with donor governments pledging support to the tune of US\$2.3 billion (GPE, 2012a). A number of countries in sub-Saharan Africa have already abolished formal fees for secondary education, including Ghana, Kenya, Rwanda, South Africa, Tanzania and Uganda among others (Brudevold-Newman, 2017; World Bank, 2017a). In 2018 alone, Malawi, the world’s fourth poorest country with a GDP per capita of just \$US 1,200, has announced the abolition of fees for secondary education, while Sierra Leone, the world’s tenth poorest country at \$US 1,610, has announced the abolition of all school fees from pre-primary to upper secondary level (IMF, 2018; Faiti and Khamula, 2018; Thomas, 2018).

The impacts of free secondary schooling for access to education are large. In Kenya, the introduction of free day secondary education in 2008 led to an increase in the net enrollment ratio from 33 percent in 2009 to 51 percent in 2016 (World Bank, 2017b). These gains in access have considerable potential to improve life outcomes, and incomes, for students: in Ghana, an experimental evaluation conducted before the introduction of free secondary education provided scholarships at random to students who were prevented from attending secondary school owing to cost; by age 25, the students receiving scholarships were not only more likely to have completed secondary school, but had significantly higher earnings, adopted more preventative health behavior, and in the case of girls, had fewer children, (Duflo, Dupas and Kremer, 2017).

However, these rapid expansions place significant fiscal and management burdens on government (ibid.). Free education policies may be announced and implemented without full consideration of the costs. At secondary level, in particular, most developing country education systems have historically employed a relatively high-cost approach to schools, where investment per student is substantially higher than that at primary level (GPE, 2012b). Such a model, while inequitable, may be fiscally sustainable in a context where a small proportion of students progress to secondary school; however, to expand such a model to accommodate a large influx of additional students is highly unlikely to be fiscally sustainable in a low-income context.

As a result, the introduction of free secondary education in low-income countries has often been met with inequities of investment, chronic shortages in infrastructure, and declines in learning outcomes. In Uganda, which introduced free secondary education in 2007, the rapid influx of students required the government to establish a partnership with more than 600 private schools to meet demand; by 2016, private schools accounted for 28 percent of all secondary enrollment (Senkasi, 2018). In Kenya, despite the rapid improvement in access to secondary education, significant shortages of staff and infrastructure exist at secondary schools, particularly in the poorest counties (World Bank, 2017b). Learning outcomes are low and inequitable: 90 percent of Form 2 students do not reach minimum competency in algebra and geometry;

boys consistently outperform girls in learning assessments; and urban students are twice as likely to achieve minimum competency as rural students (ibid.). In order to implement free education equitably and provide quality education to all students, there is an urgent need for countries to rationalize policies and carefully calibrate the use of resources to obtain the maximum possible learning from the available finance.

The case of Tanzania

Tanzania became one of the first low-income countries to abolish fees for lower secondary education (grades 8-12) in 2015. One of the pledges of a new, reformist government, the policy built on the country's previous experience of abolishing primary fees in 2002. The new Fee-Free Basic Education Policy (FFBEP) extended the abolition of formal fees to lower secondary education, and prohibited both primary and lower secondary schools from levying informal fees, such as for inspections.

The introduction of FFBEP has already enabled a large increase in the proportion of students entering primary school, and the proportion transitioning to secondary level. Over the next few years more than a million additional lower secondary places will be required to meet the increase in demand. This rapid expansion of lower secondary education is a boon for access and an important step for Tanzania to achieve its goal of attaining middle-income status by 2025. However, such a pace of expansion poses a significant fiscal challenge. Careful planning is required at this stage to develop a model of lower secondary education which can be scaled up in a sustainable way.

In partnership with the Government of Tanzania, we have developed a simulation model to estimate the fiscal impacts of various policy parameters with relevance to the implementation of FFBEP at lower secondary level.¹ The model enables the user to estimate the additional costs relating to lower secondary which now accrue to government as a result of FFBEP, including tuition fees; additional fees and meals for boarding students, and for students with special needs; and other expenses including sports equipment, classroom and laboratory equipment, among others. The model also provides an estimate of future enrollment under FFBEP, based on recent trends, and the resulting fiscal implications. Furthermore, the model enables the user to estimate the impacts, in terms of both enrollment and cost, of various potential policy reforms currently or recently under discussion with regard to lower secondary education, including the introduction of automatic promotion from primary to lower secondary school, planned for 2021.

Our analysis suggests that expansion of the system to meet the additional enrollment expected as a result of FFBEP, as well as automatic promotion to lower secondary, is likely to lead to an almost three-fold increase in the annual cost of lower secondary education by 2024 if the current model of inputs – for example, current pupil/teacher ratios, levels of capitation grants – is maintained. Such a rapid increase is unlikely to be sustainable and without adjustments to the current input model, it is likely that some schools will lose out on investments, increasing inequities in the system. We present a number of potential policy parameters to help develop a model of lower secondary education which is more likely to be scalable nationwide, to meet demand without compromising quality. These proposals provide a sense of how the expansion of lower secondary can be placed on a sustainable footing without negative impacts on learning.

¹ Tanzania's education system includes two years of pre-primary, seven years of primary, four years of lower secondary, and two years of upper secondary education.

Our projections suggest that strategic policy adjustments could reduce the estimated annual cost of lower secondary in 2025 by more than half, moving Tanzania towards a sustainable model of inputs which may be equitably applied at all new schools.²

Simulation Model

All cost estimates presented in this Note are drawn from the Simulation Model developed in partnership between the World Bank and the Ministry of Education, Science and Technology (MoEST). The tool presents estimates of the cost of primary and lower secondary education to 2025, based on enrollment estimates employing UN population projections and recent trends in promotion and retention; unit costs drawn from MoEST and President’s Office – Regional and Local Government (PO-RALG) documentation; and a model of input provision in line with recent average trends. The model allows the user to easily adjust a range of policy and service parameters in order to estimate the impact on costs, including:

- Automatic promotion
- Teacher-stream ratio
- Pupil-stream ratio
- Stream-classroom ratio
- Share of students who are boarders
- Pupils per toilet
- Number of blocks (forms) per classroom
- Number of science labs per school
- Share of teachers with housing
- Share of schools with admin blocks
- Share of schools with libraries

The Model was presented in a preliminary form to stakeholders from MoEST, PO-RALG, and Ministry of Finance and Planning, in April 2018. Following incorporation of feedback from participants, the final model is expected to be shared with government and mainstreamed for use by policymakers in October 2018.

A copy of the model, as well as a brief user manual, [is available online](#).

Enrollment impacts of FFBEP

FFBEP created a ‘surge’ of new students entering primary education. The introduction of FFBEP was associated with a one-off boost to primary intake. The intake of students into Standard 1 rose from 1.5 million in 2014/15 to 2.1 million in 2015/16 and 2.0 million in 2016/17, as large numbers of overage students entered the system in response to the policy. This wave of students will enter lower secondary from 2022/23 on, leading to rapid expansion of enrollment and a peak in costs.³

FFBEP also increased transition to secondary school. Following the announcement of FFBEP in December 2015, the share of students transitioning to secondary from Standard 7 has increased from an average of 55 percent over the preceding years to 70 percent in 2016/17. It is likely that under FFBEP, this transition rate will continue to improve: we estimate a scenario where the transition rate rises to 80 percent by 2025. Our projections suggest an increase in enrollment in government lower secondary schools from 1.67 million in

² Key findings are summarized in a presentation (Annex 1) and summarized in this note. World Bank task team members will provide training to representatives of MoEST and PO-RALG on the use of the tool during a Dissemination Mission for the ASA in May 2018.

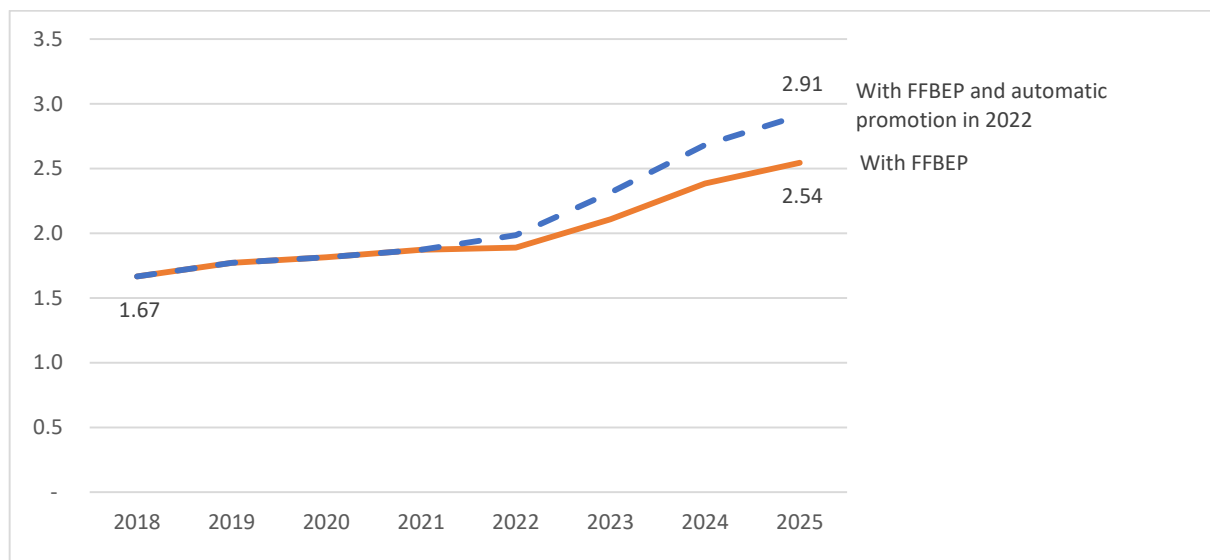
³ Model and graphs label school years according to end calendar year: e.g. 2021/22 is referred to as “2022”

2018 to 2.54 million in 2025.

Under FFBEP we expect lower secondary enrollment to increase by more than 50 percent by 2025. We estimate enrollment employing average values from recent years for intake into Standard 1 relative to population and promotion in each grade of primary and lower secondary school, as well as for the share of total lower secondary enrollment which is in government schools.

Automatic promotion will increase enrollment by a further nine percent. While FFBEP itself has already driven increased transition, the greatest impacts will come from automatic promotion to lower secondary, currently planned for 2021/22. We estimate that following the introduction of automatic promotion, the transition rate to lower secondary will immediately rise to 90 percent. By 2025, this leads to an increase in enrollment of 15 percent over FFBEP alone, with lower secondary public enrollment reaching 2.91 million in 2025.

Figure 1: Lower secondary enrollment with and without automatic promotion, 2018-2025
Lower Secondary Public Enrollment (million)



These are conservative estimates, and the increase in enrollment will be significantly larger if government goals are met. The government's Education Sector Development Plan (ESDP) 2017-21 sets ambitious targets for improvements in promotion and dropout rates: for example, for promotion rates in primary Standard 1 to rise from the recent average of 89 percent to 95 percent, and transition rates from primary to lower secondary to rise to 90 percent, by 2021. In a scenario where these goals are achieved, and the increased promotion rates are maintained until 2025, public lower secondary school enrollment would rise still further.

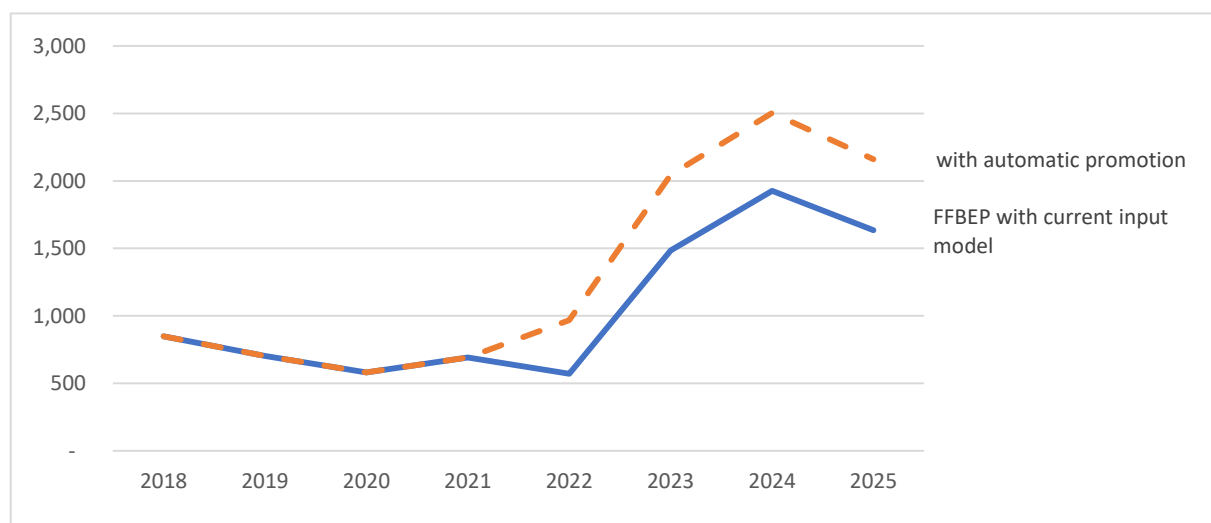
Fiscal sustainability of FFBEP

Implementing FFBEP and maintaining current input model

Absorbing the enrollment increases driven by FFBEP while maintaining the current model of inputs in schools is likely to cost at least US\$ 840 million per year by 2024. We employed data from Basic Education Statistics Tanzania and Basic Education Management Information System as well as other sources to develop a picture of the current model of inputs in Tanzania's schools: the numbers of available teachers, classrooms, teacher and student housing units, capitation grants, and so on.⁴ Maintaining this model and allowing for the additional enrollment as a result of FFBEP, as well as the additional costs already shouldered by government as a result of the policy, increases the cost of providing lower secondary education to US\$ 840 million (TSh. 1,926 billion) in 2024; costs fall to US\$ 720 million (TSh. 1,634 billion) in 2025.⁵ (For reference, Tanzania's entire education budget for 2017/18, including pre-primary, primary, lower and upper secondary, vocational, and tertiary education, is approximately US\$ 2.06 billion [TSh. 4,700 billion].)

Automatic promotion increases the cost further. Maintaining the same input model, but allowing for the additional increase in enrollment from FFBEP *and* a further increase from automatic promotion, the overall cost of lower secondary education rises to US\$ 1.1 billion (TSh. 2,504 billion) per year by 2024.⁶

Figure 2: Lower secondary costs with and without automatic promotion, 2018-2025
Lower Secondary Cost (TSh billion)



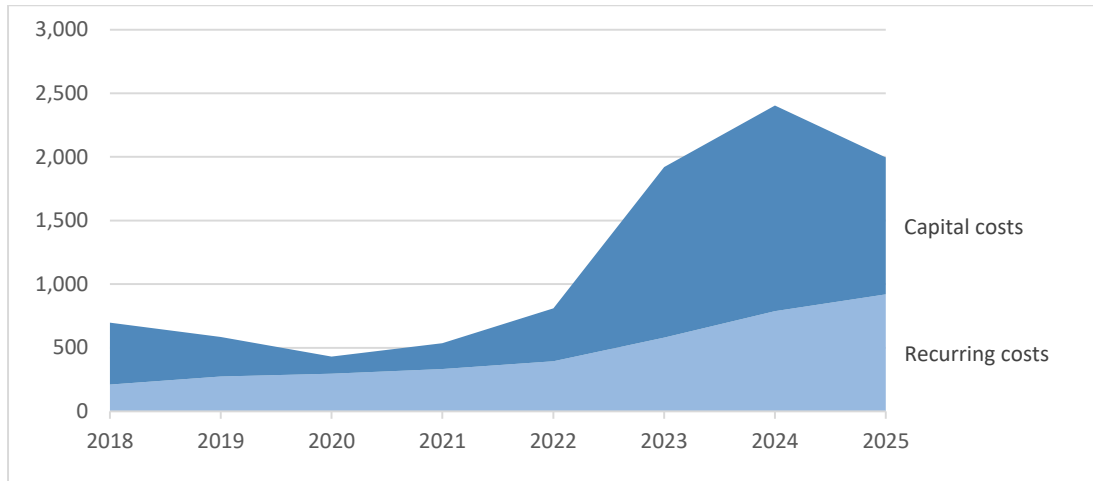
⁴ See Annex 2, Table A2 for values for parameters of current input model.

⁵ For all cost estimations, we employ unit cost estimates from recent MoEST and other government documents (See Table A3). For construction costs, we model GDP growth based on long-term projections by the IMF and calculate GDP per capita employing population projections developed by the World Bank. We then maintain unit costs as a constant share of GDP per capita. Teacher salaries, capitation grants, and tuition fees are not scaled.

⁶ Cost estimates assume investment in 2017/18 in line with projections and baseline input model. Under- or over-investment in current year would affect overall cost curve. Simulation Model enables modelling of annual budget shortfalls.

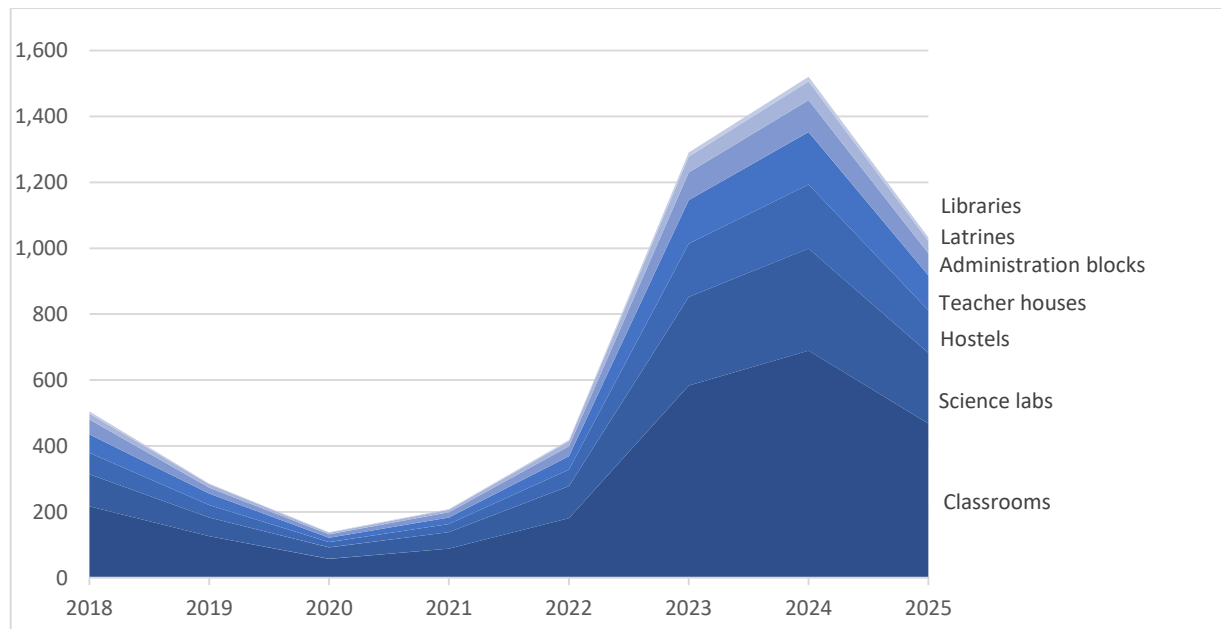
The costs of FFBEP and automatic promotion come primarily from capital costs, which accelerate particularly rapidly from 2022 as the ‘FFBEP wave’ begins to enter lower secondary and peak in 2024; recurring costs, including teacher salaries, increase more steadily and continue to grow in 2025.

Figure 3: Breakdown of lower secondary recurring and capital costs, 2018-2025
Lower Secondary Cost (TSh billion)



Focusing on construction, we find that new classrooms represent 45 percent of the additional construction cost, and new laboratories an additional 21 percent.⁷

Figure 4: Breakdown of construction costs: FFBEP and automatic promotion (current model), 2018-2025
Cost of Construction (TSh billion)



⁷ Capital costs included in model are for construction only. Fittings, repair and maintenance not included.

Implementation of FFBEP with the fulfillment of policy considerations

Fully implementing FFBEP, ESDP, and other policies requires raising certain inputs above current levels, further increasing the cost. An estimation based on the current model of inputs does not capture the full cost of current and proposed policies which mandate increases in input provision in the coming years:

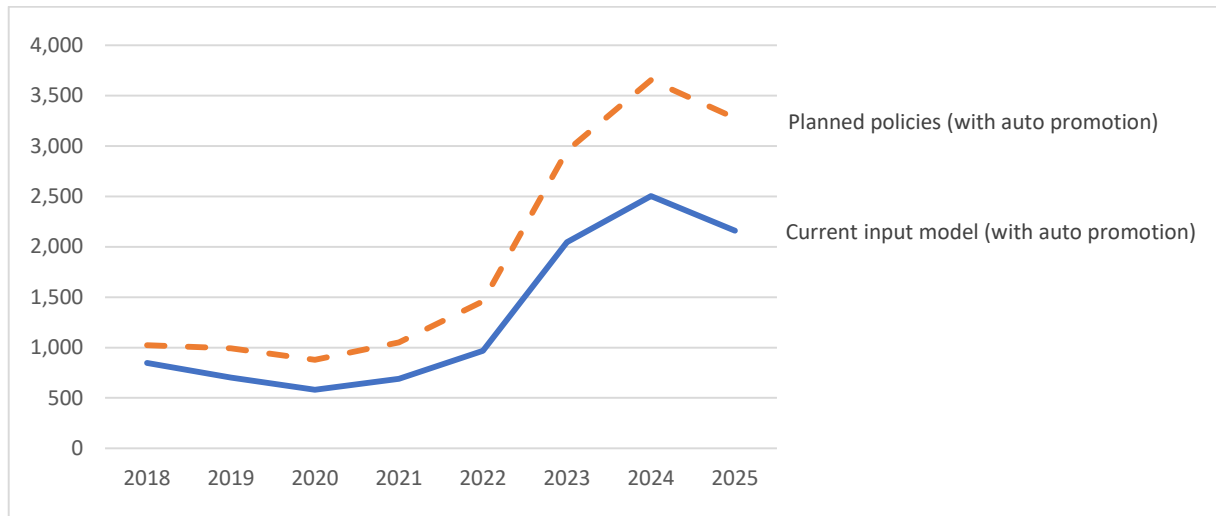
- FFBEP requires the government to take over certain school costs – including sports equipment and classroom materials - requiring an increase in cash capitation grants paid to schools on a per-student basis.
- FFBEP also gives government responsibility for the provision of textbooks. The current government target is to move from the current average pupil-textbook ratio of 4:1 to a ratio of 1:1 in core subjects, requiring a large increase in the supply of textbooks to schools.
- New government guidelines for school construction and infrastructure, currently in draft, establish a minimum infrastructure package for new schools, including requirements for libraries, laboratories, teacher housing, and toilets.
- ESDP includes a commitment to improving the quality and availability of teacher housing.

We estimate the cost of lower secondary education to 2025, based on the inclusion of FFBEP and automatic promotion, with input levels increasing to meet these requirements.⁸ The results are striking: we find that the annual cost of lower secondary education in this scenario would rise to US\$ 1.6 billion (TSh. 3,654 billion) by 2024, 46 percent more than in the scenario where the current input model was maintained.

Such a rapid increase in costs is unlikely to be achievable, and poses a threat to quality. We project the government education budget to 2025, employing World Bank/IMF growth estimates and assuming that the budget maintains a constant share of GDP. Based on these estimations, the projected cost of lower secondary education in this scenario rises from 19 percent of the education budget in 2018 to 35 percent in 2024. Annual per-student investment in lower secondary would increase from US\$ 270 (TSh. 615,000) in 2018 to US\$ 596 (TSh. 1,362 million) in 2024. Such a rapid rise is likely to severely impact service provision in other sectors and raises questions of equity. Furthermore, to achieve such an expansion would require the government to hire a further 75,000 teachers, and construct 30,000 additional classrooms, by 2025, which is likely to present challenges of implementation as well as financing.

⁸ See Annex 2, Table A4 for values for policy parameters.

Figure 5: Lower secondary costs: current vs. planned input model
Lower Secondary Cost (TSh billion)



Potential cost reductions

In order to help develop a more scalable model for lower secondary education, the World Bank simulated the cost implications of a number of potential policies and alterations to the input model for lower secondary. The policy parameters modeled were identified from international best practice, as well as the findings of workshops held in April and May 2018 in Dodoma, Tanzania, with key government stakeholders.

Construction parameters

MoEST is currently developing a revised School Infrastructure Strategy which will set out policies and plans to meet the physical infrastructure needs of schools for the next decade. The Strategy provides an opportunity to review the ‘standard package’ of facilities expected to be included with each new school. In order to make it possible to expand lower secondary education at the required pace in a sustainable way, the standard package can be focused on those facilities that offer the best value in terms of learning.

We model four examples:

1. *Reduced use of boarding schools.* Boarding schools pose significant costs, not only in terms of construction but also in terms of ongoing costs – particularly in the context of FFBEP, under which government provides finance for tuition and meals costing an additional US\$ 253 (TSh. 578 thousand) per year – in comparison to day students. Evidence from Kenya, China, France, and the United States suggests that while boarding schools are associated with limited gains in learning, the large extra costs mean that boarding schools are less cost-effective than day schools overall (Bashir et al., 2018). The government is discussing a move away from boarding schools as the standard model in Tanzania, in favor of smaller day schools closer to primary schools. To estimate the impacts of this approach, we model the cost impact of holding the number of boarding students constant while overall enrollment expands, reducing the share of students who are boarders from

the current 15 percent to seven percent by 2025.

2. *Provide teacher housing only when most necessary.* Our estimates suggest that to maintain current pupil-teacher ratios, Tanzania will require an additional 54,000 lower secondary teachers by 2025. With housing for a teacher costing a similar amount to a new classroom, providing housing for more than a small proportion of these is likely to pose significant costs. Rigorous international evidence is lacking for the effectiveness of teacher housing as an incentive to better staffing of schools, and alternative measures such as enhanced hardship allowances or local hiring of teachers may be a more cost-effective approach to attracting teachers to rural schools (see [Asim et al., 2017](#)). We model the impact of ceasing government-funded construction of new teacher housing, allowing the national share of teachers with housing to decline from the current 15 percent to 7.8 percent by 2025.
3. *Introduce multi-science laboratories.* The current norm of three laboratories per school, one each for physics, chemistry, and biology, poses a significant fiscal challenge. Recent experience from the Tanzania Social Action Fund (TASAF) suggests that equipping a school with three laboratories costs a similar amount to providing four additional classrooms ([Theunynck, 2017](#)). The Dodoma workshop discussed the potential for an alternative model employing a single, multi-science classroom in each school. To estimate the impact of this approach, we model the cost of building only one laboratory at new schools.
4. *Employ classroom libraries, rather than dedicated library buildings, in new schools.* Equipping a school with a dedicated library building carries a similar cost to the addition of three classrooms. An alternative model, currently employed in a small number of ‘satellite’ schools in Tanzania, employs ‘classroom libraries’ to place books within easy access of readers within classrooms. We model the cost impact of expanding this approach to all new schools in place of constructing new dedicated library buildings.⁹

Other potential policy parameters

5. *Use teachers more effectively.* Tanzania’s roster of lower secondary teachers has doubled in size since 2012, and the current ratio of 2.5 teachers per class suggests a low level of utilization of teachers, while evidence from the Service Delivery Indicators survey indicates that teachers in Tanzania spend less than half their time actually teaching.¹⁰ Our projections suggest that to maintain the current ratio to 2025, Tanzania would have to hire a further 75,000 teachers. This would entail significant expense, accounting for more than one-third of projected costs in 2025. Furthermore, evidence from Uganda suggests that to rapidly expand the teaching workforce may mean hiring more teachers who lack the requisite knowledge, skills, and motivation ([World Bank, 2016](#)). Improving the distribution of teachers between schools, and improving utilization of teachers, is a more cost-effective way to support additional enrollment than to hire enough additional teachers to

⁹ We model a reduction in the share of schools with libraries to 4.6 percent by 2025, approximately equivalent to zero construction of new dedicated library buildings.

¹⁰ Remainder of time spent absent from school; in school, but not in class; or in class but not teaching (e.g. doing paperwork). See [SDI, 2014](#). While the SDI is focused on primary schools, findings from a Mobile Phone Public Services Monitoring Survey, among others, suggest similar issues at secondary level (see [Twaweza, 2012](#)).

maintain the current staffing level. We model a scenario where the ratio of teachers to streams reduces to 2.0 by 2025, reducing the need for additional teachers from around 75,000 to 44,000.

6. *Make better use of existing infrastructure.* Tanzania faces the daunting prospect of building more than 30 thousand new classrooms by 2025.¹¹ However, the current stock of classrooms appears to be under-utilized: the ratio of classes per classroom is only 0.88, meaning that the equivalent of more than 5,000 classrooms are not in use. The number of new classrooms required can be reduced, without negative impacts on learning, through better utilization of infrastructure. Multiple shifts are a key tool employed by other countries which have undergone a rapid expansion of secondary education, particularly in Latin America. Evidence from countries including Brazil, Chile, and Guinea suggests that multiple shifts can provide significant cost reductions and, if carefully implemented, need not pose a threat to the quality of teaching (Bray, 2008). Double shifts are in use in some of Tanzania’s largest urban schools, but the generally low level of utilization of teachers nationally suggests that there is scope to expand this approach without a significant reduction in per-student teaching time. We model the impact of increased utilization of unused classrooms and introducing double shifts at ten percent of schools, increasing the stream-classroom ratio from 0.9 to 1.1 from 2019 onwards. Given that urban schools typically have the largest enrollments, one likely path to achieving this level would be to introduce double shifts at to one-third of urban schools.¹²

We model the impact of these policy levers on the total annual cost of lower secondary education, starting from the scenario of implementation of current policies, with automatic promotion. We find that each of these policy levers reduces the overall annual cost by between US\$ 56 million (TSh. 128 billion) and US\$ 283 million (TSh. 646 billion). The largest impact is from reducing the share of boarding students, which has impacts both on capital costs (from the reduced cost of hostel construction) and recurring costs (from reductions in fees and food finance).

Table 1: Annual cost of lower secondary education under different cost scenarios (TSh billion)

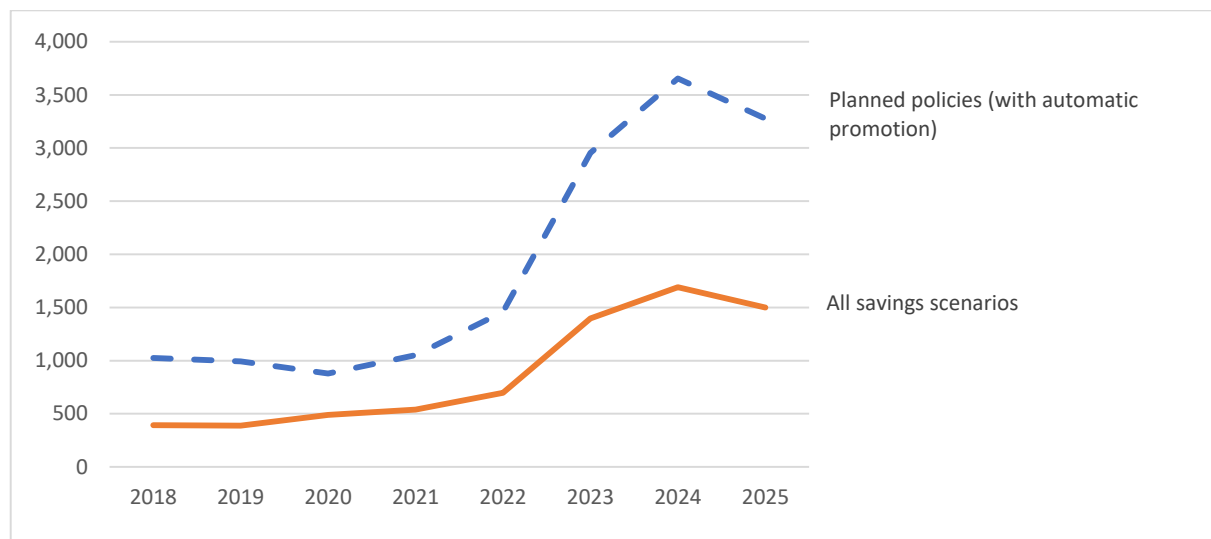
	2018	2019	2020	2021	2022	2023	2024	2025	Annual saving, 2025
<i>Current policies (with AP)</i>	1,025	992	879	1,052	1,459	2,954	3,654	3,278	1,025
New schools day only	922	853	731	859	1,189	2,483	3,023	2,631	646
New schools one laboratory	981	915	832	984	1,328	2,588	3,233	2,986	291
Zero new teacher housing	962	914	817	975	1,345	2,693	3,323	3,000	277
Classroom libraries only	997	959	843	1,009	1,402	2,852	3,523	3,149	128
Double shifts 10% of schools	622	682	838	996	1,357	2,676	3,325	3,039	239
Teacher-stream ratio to 2.0	984	915	783	928	1,297	2,716	3,332	2,896	382
<i>All savings scenarios</i>	393	388	488	539	697	1,397	1,691	1,499	1,779

¹¹ Projections suggest additional 31,363 classrooms required by 2025, assuming maintenance of existing stream/classroom and pupil/stream ratios and automatic promotion from 2022.

¹² 30 percent of Tanzania’s lower secondary schools are in urban areas (Annual Education Sector Performance Review 2017).

Combining all of these policy levers could reduce the annual cost of lower secondary education by US\$ 781 million (TSh. 1,779 billion) by 2025, a 54 percent reduction, according to our projections.

Figure 6: Potential reductions in the fiscal implications of FBEP
Lower Secondary Cost (TSh billion)



Conclusion

In order to achieve Sustainable Development Goal 4, the majority of developing countries are expected to adopt free secondary education over the coming decade. Free secondary education offers significant benefits for access and is likely to drive rapid expansion in enrollment. However, without careful calibration of input models, this expansion is unlikely to be fiscally sustainable. In the case of Tanzania, full implementation of the Fee-Free Basic Education Policy – with the government simultaneously expanding the secondary school system to accommodate increased enrollment and raising per-student finance to accommodate current planned policies – would cost US\$ 1.6 billion (TSh. 3,654 billion) by 2024 for lower secondary alone and require the hiring of 75,000 extra teachers and construction of 30,000 additional classrooms. Such a rapid increase in costs is unlikely to be sustainable and is likely to lead to inconsistent implementation and inequitable outcomes.

However, careful choices at this stage, particularly with regard to construction, can significantly reduce the cost curve. Our modelling suggests that introducing strategic adjustments to the input model of lower secondary schooling, to improve utilization of classrooms and teachers and adopt a streamlined minimum package for new school construction, could reduce the annual cost of lower secondary education by 2024 by more than half.

In addition to modelling this specific package of policies, the simulation tool created as part of this analysis enables government officials to simulate the fiscal impact of a number of key sector policy and demographic parameters, supporting the evaluation of a wide range of potential policy levers to devise the most suitable package of reforms. The model enables policymakers to update factual parameters on an ongoing basis to adjust to changing realities on the ground, and to adjust targets to reflect evolving policy prerogatives. There is scope for expansion of the model to include pre-primary and primary education, where significant

expansion is also expected over the next ten years, to develop a holistic model of basic education financing.

With more countries enacting or planning free secondary education policies with a view to achievement of SDG 4, there is a need for proactive decision-making at this stage to ensure that implementation can be carried out in a sustainable manner. The simulation tool is already being adapted for use in other countries in sub-Saharan Africa.

Free secondary education is an imperative for equitable access for all students, with significant implications for the earnings and wellbeing of young people. Adequate foresight and the correct tools can help to ensure that all young people can experience lower secondary education of a high standard.

References

- Asim, S., Chimombo, J.; Chugunov, D.; Gera, R.** 2017. “Moving Teachers to Malawi's Remote Communities: A Data-driven Approach to Teacher Deployment.” Policy Research Working Paper; no. WPS 8253. Washington, D.C.: World Bank Group.
- Asim, S., Gera, R., and Wang, X.** 2018 (Forthcoming). *Creating Equal Opportunities for Malawi's Children: Insights from a Longitudinal Schools Survey*. Washington, D.C.: World Bank Group.
- Bashir, S., Lockheed, M. Ninan, E. and Tan, J.** 2018. *Facing Forward: Schooling for Learning in Africa*. Washington, D.C.: World Bank Group.
- Bray, M.** 2008. *Double-shift schooling: design and operation for cost-effectiveness (third edition)*. Paris: UNESCO International Institute for Education Planning. Mimeo.
- Brudevold-Newman, A.** 2017. “The Impacts of Free Secondary Education: Evidence from Kenya.” Mimeo.
- Duflo, E., Dupas, P. and Kremer, M.** 2017. “The Impact of Free Secondary Education: Experimental Evidence from Ghana.” Available at: https://www.povertyactionlab.org/sites/default/files/publications/118_77_The-Impact-Of-Free-Education-Experimental-Evidence-from-Ghana_Dupas_Feb2017.pdf [7 October 2018]
- Faiti, O. and Khamula, O.** “Malawi abolishes Secondary School tuition fees: ‘Full free education by Jan 2019’”. *Nyasa Times*, 25th September 2018. Available at: <https://www.nyasatimes.com/malawi-abolishes-secondary-school-tuition-fees-full-free-education-by-jan-2019/> [7 October 2018]
- Global Partnership for Education (GPE). 2012b.** “What happened at the GPE Financing Conference in Dakar?” Available at: <https://www.globalpartnership.org/blog/what-happened-gpe-financing-conference-dakar> [7 October 2018].
- Global Partnership for Education (GPE). 2012a.** “Education Costs per Child.” Available at: <https://www.globalpartnership.org/funding/education-costs-per-child> [28 June 2018]
- International Monetary Fund (IMF). 2018.** “IMF DataMapper: GDP per capita, current prices.” Available at: <https://www.imf.org/external/datamapper/PPPPC@WEO/THA> [7 October 2018]
- Senkasi, H.** 2018. “What has Universal Secondary Education achieved in Uganda?” *Daily Monitor*, 29th June 2018. Available at: <http://www.monitor.co.ug/OpEd/Commentary/Universal-Secondary-Education-Uganda-private-schools/689364-4637320-3vx1mm/index.html> [7 October 2018]
- Service Delivery Indicators. 2014.** *Education Service Delivery in Tanzania*. Washington, D.C.: World Bank Group.
- Thomas, A. R.** “Sierra Leone launches free school education.” *Sierra Leone Telegraph*, 19th August 2018. Available at: <https://www.thesierraleonetelegraph.com/sierra-leone-launches-free-school-education/> [7 October 2018]
- Theunynck, S.** 2017. “School Construction in Tanzania, with focus on the second phase of the Second Secondary Education Development Program (SDEP II) In the context of the ICR mission.” Technical Note: mimeo.

Twaweza. 2012. “Students Say: Teachers absent from school too often.” Available at: <http://twaweza.or.tz/go/students-say-teachers-absent-from-school-too-often> [20 May 2018].

United Nations Educational, Scientific and Cultural Organization (UNESCO). 2015. “Education for All 2000-2015: Achievements and Challenges.” Paris: UNESCO Publishing.

World Bank, 2016. *Project Information Document, Concept Stage: Uganda Secondary Education Improvement Project.* Washington, D.C.: World Bank Group.

World Bank, 2017a. *Learning to Realize Education’s Promise: World Development Report 2018.* Washington, D.C.: World Bank Group.

World Bank, 2017b. *Project Appraisal Document: Kenya Secondary Education Quality Improvement Project.* Washington, D.C.: World Bank Group.

World Bank. 2018. World Bank Data: “School enrollment, primary (% gross)”. Available at: <https://data.worldbank.org/indicator/SE.PRM.ENRR?locations=ZF> [7 October 2018]

Annex. Policy parameters and estimations

Table A1: Enrollment Assumptions

Parameter	Modelled value
Primary Intake	96%
Promotion rate	
Grade 1 → 2	89%
Grade 2 → 3	91%
Grade 3 → 4	89%
Grade 4 → 5	89%
Grade 5 → 6	96%
Grade 6 → 7	82%
Grade 7 → Form I (Transition)	70%, rising by 2025 to 80% (without automatic promotion) or 90% (with automatic promotion)
Form 1 → 2	97%
Form 2 → 3	80%
Form 3 → 4	91%
Share of students in government schools	87%

Table A2: Current Input Model

Parameter	Modelled value	Source
Teacher-stream ratio	2.5	BEST*
Pupil-stream ratio	45.1	BEST
Stream-classroom ratio (shifts)	0.9	BEST
Cash grants to schools, TSh per student	12,500	Current policy
Textbooks to schools, TSh per student	12,500	Current policy
Tuition fees to schools, TSh per student (day)	20,000	Current policy
Tuition fees to schools, TSh per student (boarding)	50,000	Current policy
Examination fees, TSh per Form IV student	50,000	Current policy
Share of students who are boarders	15.4%	BEST
Pupils per toilet	30.5	BEST
Number of science labs per new school	1.5	BEST
Share of teachers with housing	15.1%	BEST
Share of schools with admin blocks	46.2%	BEST
Share of schools with libraries	8.9%	BEST

*Basic Education Statistics Tanzania, 2016-2017.

Table A3: Unit Costs

Item	Cost 2016/17 (TSh)	Source	Notes
Teacher salary	8,650,000	Government ESDP Simulation Model, 2017	
Classroom	39,215,735	MoEST Construction Guidelines Unit Cost Analysis, 2017	Average cost per classroom for multiple block styles
Administration block	133,841,894	MoEST Construction Guidelines Unit Cost Analysis, 2017	
Hostel (per students)	1,825,208	Second Secondary Education Development Program (SEDP II) documentation, 2017	
Science lab	123,750,000	Second Secondary Education Development Program (SEDP II) documentation, 2017	
Teacher housing, per teacher	26,707,330	MoEST Construction Guidelines Unit Cost Analysis, 2017	Average cost per teacher for multiple block styles
Latrines	2,711,112	MoEST Construction Guidelines Unit Cost Analysis, 2017	Average cost per cubicle/ urinal for multiple styles
Library block for 80 readers	94,392,860	MoEST Construction Guidelines Unit Cost Analysis, 2017	

Note: 2016/17 unit costs calculated as a share of GDP per capita and scaled annually based on IMF and World Bank GDP/population projections. Teacher salaries not scaled.

Table A4: Input Increases in Planned Policy as Modeled

Item	Official policy target	Source/Policy	Modeled estimate
Libraries	One in each new school	Draft Secondary Construction Guidelines	Modeled in full
Administration blocks	One in each new school	Draft Secondary Construction Guidelines	Modeled in full
Laboratories	Three per school (one for each of physics, biology, chemistry)	Draft Secondary Construction Guidelines	Modeled in full for new schools
Latrines	20-25 pupils per latrine	Draft Secondary Construction Guidelines	Modeled to be achieved by 2025
Boarding schools	All LSS to have boarding facilities	Draft Secondary Construction Guidelines	25% of students to be boarders by 2025 (from 15% now)
Teacher housing	All schools to have housing for at least eight teachers Improve availability of teacher housing	Draft Secondary Construction Guidelines ESDP	25% of teachers to have school housing by 2025 (from 15% now)
Cash grants to schools (Capitation Grants)	FFBEP transfers costs to schools: Sports equipment, ID cards, lab and classroom materials. Decline in value of CG of around 50% since introduced	FFBEP	Doubles from TSh 12,500 to TSh 25,000 per student/year from 2019
Textbooks	Official target of 1:1 pupil:textbook ratio in all subjects	MoEST	Doubles from TSh 12,500 to TSh 25,000 per student/year from 2019

Table A5: Potential Cost Reductions as Modeled

Employ classroom libraries, rather than dedicated library buildings, in new schools.	Share of schools with libraries declines to 4.6% by 2025. Equivalent to zero new construction of libraries.
Reduce the use of boarding schools.	Share of students who are boarders declines from 15% in 2016/17 to 7% in 2025.
Reduce the use of teacher housing.	Share of teachers with school housing declines from 15.1% in 2016/17 to 7.8% in 2025. Equivalent to zero new teacher house construction.
Reduce the use of standalone laboratories.	New schools are constructed with one laboratory.
Allow Teacher-Stream ratios to decline to 2.0.	TSR declines to 2.0 by 2025.
Introduce 'double shifts' in ten percent of schools.	National Stream/Classroom ratio increased to 1.1 from 2019.