APPENDIX 2. PROJECTING THE FUTURE IN TANZANIA, UGANDA, AND RWANDA

Detailed projections of the cost and financing of secondary-school expansion have been completed in Tanzania, Uganda, and Rwanda. The estimates have been developed for education sector reviews to shape medium-term expenditure frameworks. In each case the education system has been modeled from school and population census data to generate enrollment projections through to 2015. Primary enrollment growth is shaped to achieve gross enrollment rates in excess of 100 percent by 2015 with reduced repetition and dropout.

The expansion of secondary enrollment is treated as a policy variable and is not linked mechanically to the growing output of primary schooling. The reason is that growth in secondary places will not simply expand to absorb growing proportions of primary leavers. During periods where primary output grows fastest, primary/secondary transition rates in these countries are likely to fall for a period before recovering. The approach adopted in the modeling identifies different plausible rates of growth in the number of lower-secondary places, taking into account historic rates of school construction, capacity of teacher training, and likely changes in budgetary allocation to secondary schooling.

Costs are generated from disaggregated Ministry of Education and Ministry of Finance data that separates costs for different types of teachers, nonteaching staff, and various nonsalary costs including boarding, food subsidies, and learning materials. Unit costs for different school types are then used to generate cost drivers. Development costs are estimated using known school and classroom building costs.

On this basis it is possible to project flows of pupils and costs under different scenarios. This produces estimates of budget shares needed to
finance growth and identifies gaps in financing. As part of the analysis nonfinancial constraints on growth are also noted.

Since the three countries have differently configured education systems, different starting points, and different policy priorities, the projections vary in some of the parameters they model and in the assumptions on which they are based. They illustrate what is possible within affordable levels of financing given clear prioritization and consistent implementation of reform and expansion strategies.

CASE 1: SECONDARY-SCHOOL DEVELOPMENT IN TANZANIA

Tanzania has one of the lowest secondary-school enrollment rates in SSA and a very small proportion of its labor force has completed secondary schooling, with adverse effects on its international competitiveness. Primary enrollments reached high levels in the 1970s but then fell back in the 1980s. Since then a new commitment to achieving universal primary education has seen gross enrollment rates rise to over 100 percent. As a result, the number of primary graduates is set to triple by 2008/9, assuming repetition and dropout fall in line with targets that have been set. Without expansion in secondary schooling the transition rate will fall rapidly. This may have an adverse effect on primary completion rates. For these and other reasons the Secondary Education Development Programme (SEDP) has been agreed with support from the World Bank.

Enrollments at secondary level will not simply grow at the rate of increase of primary graduates. In the past the flow into government schools as been regulated to reflect the number of places available and this will continue to be the case with expansion. The Tanzania Projection Model therefore sets rates of expansion for new enrollments in grade 8 (first year secondary), and derives subsequent enrollments from this form that include assumptions about repetition, promotion, and dropout rates based on Ministry of Education and Culture ambitions to increase internal efficiency and increase GER2. Projected growth rates for the nongovernment sector are based on estimates derived from analysis of recent expansion and the constraints to further growth that arise from affordability and school location.

The central projections presented below are based on a medium-growth variant of the model that responds to the stated intention of increasing participation rates at the secondary level to closer to the average for
Appendix 2

similar SSA countries, which is about GER2 25 percent. In 2003, GER2 in Tanzania was about 7 percent for government schools and 4 percent for nongovernment schools.

ASSUMPTIONS

The main assumptions of the Tanzania projection model are presented in table A2.1.

The medium-growth variant is designed to be financially sustainable and achieve the highest rates of growth in enrollment compatible with the nonfinancial constraints on expansion, which include rates of growth in physical capacity in schools and teacher supply, and the levels of student achievement. A variety of reforms are planned to enhance internal efficiency and encourage more equitable access.

ENROLLMENTS

Total enrollments at primary level will grow until about 2008 and then fall until 2012, after which they should grow again at the rate of population growth. The numbers reaching the end of primary school will rise sharply from 2005 to 2008. They will then fall until about 2014 (figure A2.1). There is unlikely to be a smooth growth in demand for secondary-school places, but rather a sudden increase followed by a period of stability. This arises from the current pattern of enrollment growth through the primary grades in the wake of UPE. Currently many students are excluded from secondary

Table A2.1 Tanzania Projection Model Assumptions

- The number of seventh-grade primary school (P7) leavers will grow in line with the flow of current primary enrollments.
- Secondary form 1 places will grow at a rate determined by the main targets for the participation rate (GER); transition rates will follow a pattern determined by this rate.
- Pass rates for the primary school leaving examination (PSLE) will not restrict entry to an expanded secondary-school system; the form 2 progression examination will not lead to more dropouts than it currently does.
- More growth will be in subsidized government schools as the costs of nongovernment education become an obstacle to the enrollment of students below the twentieth decile of household income.
- Teacher demand will be projected on the assumption that all new teachers (public and nongovernment) will be qualified at the diploma or graduate level, in similar proportions as at present.
- Costs of teacher training will be advanced over annual demand for new teachers to account for lead times in training.
- Attrition among graduate teachers will remain high.
- Primary teacher training will be sufficient to bring PTRs down to 45:1 by 2010.
- The PTR in secondary schools will move from about 22:1 to 30:1 by 2010 and remain at this level.
education because they fail to pass the primary school leaving examination. It is assumed that the examination will cease to restrict entry over time and that by 2010 most will pass, consistent with UPE policy (figure A2.2).

Enrollments at secondary level will be determined by the availability of places. The model allows increases in form 1 entrants of about 20 percent a year over the period until 2008, falling to 10 percent after 2010.

Figure A2.1  Total Primary Enrollment

Source: Authors’ projections.

Figure A2.2  P7 Enrollment and PSLE Passes

Source: Authors’ projections.
The private sector is assumed to grow at 15 percent, falling to 5 percent after 2010. Its growth will be constrained by the costs of attendance and the economic returns to owners. During the period of high growth, PTRs will increase from about 22:1 to 30:1. This will reduce new teacher demand and costs (figure A2.4).

**Figure A2.3  Total Enrollments at Secondary Level, Forms 1–4**

Source: Authors' projections.

**Figure A2.4  Pupil-Teacher Ratios, Forms 1–4**

Source: Authors' projections.
ENROLLMENT AND TRANSITION RATES

Under the medium-growth scenario GER2 will grow from about 11 percent to nearly 40 percent by 2015 (with a gradual reduction in the number of pupils outside the official age range) (figure A2.5). Transition rates will first increase to 35 percent by 2006, then fall to 23 percent by 2009, before recovering to over 24–50 percent by 2015 (figure A2.6). This fall cannot be

Figure A2.5  GER2, Forms 1–4

Source: Authors’ projections.
Note: Currently, 40 percent of GER2 enrollment is outside the official age range of 14–17 years.

Figure A2.6  Transition Rates from S7 to Form 1—Government and Nongovernment

Source: Authors’ projections.
avoided and results from the expanded wave of primary-school leavers reaching secondary entrance level.

TEACHER DEMAND

The number of new teachers needed is substantial. It will require a tripling or more of training capacity. Trainees will have to be enrolled between one and three years in advance of being needed in schools, depending on the pattern of teacher training (figure A2.7).\(^4\) Even with these reductions in training time, demand is so high that about 20 percent of all upper secondary-school leavers would need to train to be teachers at peak demand (figure A2.8). This may not be realistic given alternate opportunities.\(^5\)

UNIT COSTS

Secondary unit costs are expected to increase initially (reflecting improved quality related inputs) and then stabilize over the projection period (figure A2.9).

Graduate teacher training is very expensive (up to 20 times the costs of diploma training per trained teacher) and currently takes four years (figures A2.10 and A2.11). It seems likely that within five years of

Figure A2.7  Additional Teachers Needed, Graduate and Diploma Training

![Graph showing additional teachers needed from 2003 to 2015](image)

Source: Authors’ projections.

Note: Numbers are not lagged for training time to produce increased output.
graduation, teacher attrition will be least 50 percent. New policy is needed on graduate training and posting to reduce costs and attrition. The model assumes shorter periods for both graduate (three years) and diploma (one year) training.
NEW SCHOOLS AND CLASSROOMS

Substantial numbers of new schools and additional classrooms in existing schools are needed (figure A2.12). Such numbers will require a systematic approach to location, contracting, and site management. Cost sharing with some communities may be feasible.
COSTS

The recurrent annual costs of the whole system, including primary and tertiary sectors, will grow from about T Sh 375 billion to T Sh 1,000 billion by 2015/16. This creates a shortfall of about T Sh 220 billion a year when compared to budget growth at 6.5 percent per year. Therefore, to achieve all the outcomes projected requires additional finance.

The “finance gap” for secondary education (the difference between what is needed and what would be available from the education budget assuming IMF-projected growth) is substantial but could be met through a combination of reallocation within the education budget and additional external support (figures A2.13 and A2.14). Expenditure on primary education will slow for a period after 2007 as total enrollment contracts. This could release resources for investment at other levels.

The projections can be realized by increasing secondary education’s budget share from 7 percent to about 25 percent by 2015 (figure A2.15). Higher education allocations would grow at a slower rate than budget growth and therefore shrink as a proportion of the total (figure A2.16).6 The proportion of GDP allocated to education would rise to just over 4 percent and the percentage of the government budget allocated to education would need to settle at about 30 percent.

CONCLUSION

GER2 in Tanzania can rise to 40 percent with the assumptions of these projections. This enrollment rate requires a less restrictive policy on

Figure A2.12 Number of Schools, Classrooms, and Classroom Rehabilitations Needed

Source: Authors’ projections.
promotion from primary education, substantial school and classroom building, greatly expanded teacher training, and higher PTRs at the secondary level. It also requires reforms in curriculum to increase relevance and achievement that can help reduce repetition and dropout rates.
Figure A2.15  Budget with Allocations Shifted Forward 3+1 for Degree Training and 1+1 for Diploma Training

Source: Authors’ projections.

Figure A2.16  Recurrent Education Expenditure as Percentage of GDP and Government Expenditure

Source: Authors’ projections.
Changes in budget shares and feasible additional financing are needed to achieve these outcomes.

CASE 2: POSTPRIMARY EDUCATION AND TRAINING (PPET) IN UGANDA

Uganda has developed its education system consistently since it returned to stable government. Gross enrollment rates at primary education are over 110 percent and it is thought that over 90 percent of children enter grade 1. After the announcement of free UPE the numbers enrolled in primary increased substantially. The number graduating from grade 7 is set to more than double by 2010 and the selection of students into secondary school is becoming a very visible political issue. Since the late 1990s nongovernment secondary schools have mushroomed, most being run commercially for profit. The non-government sector appears to be reaching the limits of affordability and growth has now slowed. The government of Uganda has developed a new policy on PPET to meet rising demand and increase access to secondary schools and beyond.

The goals of new investment in Uganda’s PPET can be defined as follows:

• expanding access to populations currently excluded in an equitable way
• improving quality, relevance, and consequently achievement in knowledge, skills, and competencies that are fundamental to subsequent learning, employment, and livelihoods
• providing opportunities to develop higher-level knowledge, skills, and competencies that have utility and are valued
• encouraging values, motives, and behaviors consistent with national aspirations and needs

A framework for policy has been developed through a broad consultation. It identifies achievable policy goals costed to fall within a realistic budgetary envelope. The Uganda baseline projection for PPET contains a number of assumptions and a range of programmatic activities designed to achieve stated government goals at sustainable cost. Specifically, the baseline would allow the UPE “bulge” of enrollments to be absorbed without a serious decline in transition rates, and with increasing GER2. It anticipates the building of secondary-level institutions operating at costs similar to day secondary schools in every subcounty currently without such a facility by 2011. The baseline projection also supports a substantial
program of classroom and institutional rehabilitation to make full use of existing assets.

A package of reforms is envisaged that include those focused on improved access and equity through school and classroom building, pro-poor capitation, fee waivers, and bursary schemes, and new provision in underserved areas. Improved efficiency is needed and can be achieved through management reforms, raising the PTR, increasing teachers’ time on task, reducing repetition, adopting formula funding of schools, improving accountability, using matching grants to generate additional resources, and reducing the number of small schools. Improved quality should arise from a reformed core curriculum with more a concentrated core, a more outcomes-based curriculum linked to attainment targets, much improved textbook provision, more school-based teacher education, and more effective regulation of the private sector.

OUTCOMES ACHIEVABLE WITH AN INTEGRATED PPET POLICY

• increased secondary participation to levels where more than half of all children could complete four years of secondary level education and training
• provision of secondary-level institutions in all subcounties with low fee schools in the poorest areas
• improved access for girls and other disadvantaged groups through an expanded bursary scheme and other measures
• rehabilitation of existing business, technical, vocational, educational, and training (BTVE) institutions
• creation of some specialized science and technology institutions to serve marginalized areas
• improved efficiency through better school management of teachers and other resources
• implementation of a core curriculum focused on basic and generally useful knowledge and skills, relevant both to school leavers and those who continue studying, consisting of a limited number of subjects teachable in all types of schools including the smallest
• provision of curriculum pathways that could include more activity-based work, focused on skills and competencies valued by the labor market, and offered in schools that decided to offer a broader range of options
• development of more competence-based and attainment-target-related curricula and examinations linked to minimum and desirable standards
• realization of the goal that all children have access to textbooks in core subjects
• promotion of outreach activities using school and other facilities to offer short, modularized, skill-based training at the community level and at affordable costs
• integration of school-level PPET provision within a coordinated strategy inclusive of secondary schools and BTVET institutions
• reconfiguration of postsecondary, preuniversity, further education and training into a coherent system
• rationalization of systems of qualifications to recognize equivalences between pathways to certified competence in employment-related skills

THE BASELINE MODEL

The Uganda baseline model assumes that the medium-term budgetary framework (MTBF) will allow growth in resources at 6.5 percent per year and that overall transition rates from primary to secondary can be sustained at 40–50 percent as the wave of increased primary enrollment passes through the system. GER2 will climb from 30 percent to over 45 percent, a level at which gender parity is more likely. Entrants to government schools would grow at 7.5 percent per year for the first five years and then slow to 5 percent per year. It is assumed that private sector growth will continue but begin to slow as price constraints exclude low-income households. Enrollment should climb in government schools to about 610,000 and private schools to 720,000, although the latter figure may be optimistic. This would occur alongside a rise in the PTR from about 23:1 to 30:1. The demand for newly trained teachers would be somewhat less than 1,500 per year for government schools and about 2,000 per year for private schools.

The baseline model requires about 16 percent of total public recurrent expenditure on education to be allocated to secondary and about 4 percent to BTVET. The latter is likely to be an overestimate given the past performance of the sector. Overall about 20 percent of the recurrent education budget would need to be allocated to PPET. The proportion of development expenditure needed would be less. This scenario is plausible, especially if growth in subsidies at the tertiary level was restrained.

Total primary enrollments are likely to grow from about 7 million to a peak of 8 million in 2005. By 2012 they fall back to 7 million as the effects of UPE work their way through (figure A2.17). If dropouts fall then the total enrollment will remain at higher levels. Falling repetition would decrease total enrollments as the cohort moves through the grades more quickly. Age cohort growth is assumed at 3 percent. The number of primary
graduates passing the PSLE peaks in 2005 (650,000) and 2009 (825,000) and then declines (figure A2.18). These graduates constitute the cohort seeking access to secondary form 1 (S1).

In 2002, about 102,000 PSLE holders were selected for entry to S1 in government schools. Private schools provided 131,000 places. High rates

**Figure A2.17  Primary Enrollment**

![Graph showing primary enrollment from 2001 to 2012](source: Authors' projections)

**Figure A2.18  Primary Enrollment in P7 and PSLE Passes**

![Graph showing primary enrollment in P7 and PSLE passes from 2001 to 2012](source: Authors' projections)
of growth in the private sector are unlikely. It seems probable that fee rates for private secondary schools are approaching the limit of affordability for the marginal household. This projection plans for secondary entrants to government schools to grow to about 160,000 by 2010 (figure A2.19).

In 2002 the nominal transition rate into S1 government schools was about 23 percent and into private schools 32 percent (figure A2.20).

**Figure A2.19** Enrollment in S1 Government

**Figure A2.20** Nominal Transition Rate P7–S1 (Percent)

*Source: Authors’ projections.*
The projection illustrates how transition rates will decline and then recover over a 10-year period on current assumptions about growth in resources and places. This is unavoidable unless the secondary-schools system is reformed more radically to provide places at much lower unit costs.

ENROLLMENT GROWTH

Secondary-school enrollments in government schools will increase from about 375,000 to over 620,000 and private schools are likely to grow from perhaps 420,000 to over 625,000 over the projection period to 2012 (figure A2.21). Technical/farm schools and technical institutes are likely to enroll less than 20,000 by 2012. The level may be even lower given the current pattern of preference for such schools. A total of 3,400 candidates applied for technical/farm school in 2002 and less than 2,000 were accepted on the basis of the lowest grade of PSLE pass. This is less than 1 percent of P7 enrollment.

Enrollment patterns in secondary schooling are assumed to remain static in terms of repetition (which is already low), and dropout. If dropout rates are reduced, enrollment should increase, but this seems unlikely unless direct-to-households costs fall. Fees and other costs could be reduced in government schools. Most obviously, increased PTRs would reduce salary costs per child and some of the benefit might be

Figure A2.21  Total Enrollment, Government and Private

Source: Authors’ projections.
passed on in the form of reduced fees. Other cost-saving measures might also be possible, assuming management systems were introduced that were sensitive to costs and efficiency.

The output from the national teacher colleges (NTCs) is above that justified by new demand, and does not take into account the stock of trained teachers who have recently graduated and have not been employed as teachers—these may number as many as 20,000. NTC enrollment should therefore fall. However, the cost implications of this cannot be simulated until a decision is made on what would be done with the staff of these institutions. Enrollments and the costs in the NTCs have been held constant in the baseline model.

Enrollments in the BTVET system assume that enrollments in the post-school colleges, technical institutes, and technical schools/farm schools grow at 5 percent per year (figure A2.22). These BTVET colleges have high unit costs, which constrain growth. Their enrollment should grow faster than 5 percent under different arrangements whereby their structures, governance, and financing are substantially reformed and cost recovery applied to areas of effective demand. The current projections only account for fully subsidized places. There is considerable uncertainty about the numbers of privately financed students actually enrolled. Publicly supported enrollment should increase by about 60 percent over the projection period to over 40,000 (including NTCs and 14 new community polytechnics).

Figure A2.22 Enrollment in BTVET

Source: Authors’ projections.
DEMAND FOR TEACHERS

The proposed increases in PTR from about 22:1 to 33:1 by 2012 are central to the affordability of increases in the supply of government school places. If these increases do not occur then public costs will escalate and participation rates will not rise fast without large budgetary increases for PPET.

In 2002 employment of on-payroll teachers was estimated at about 14,400. This may be slightly optimistic: at the end of 2001 about 13,000 were employed. Since then an uncertain number have been taken onto the payroll as some grant-maintained schools have been taken over. The number of teachers employed rises in the simulation to about 17,000 by 2012. This ceiling is necessary to stay within the resource envelope.

About 15 percent of teachers in government schools are not on the payroll but are financed from other income including school fees (figure A2.23). It has been assumed that this proportion stays constant. This does not preclude these teachers joining the payroll as teachers retire or leave the service and being replaced by others.

The model assumes that the proportion of graduate teachers increases at 2 percent per year from current levels. The indications are that less than 1,400 new teachers are required in government schools per year as a result of expansion, attrition at 5 percent, and an increasing PTR (figure A2.24). This is well below the output of the NTC system and the output of other providers of teachers at tertiary level, which appears to exceed about

![Figure A2.23 Teachers On and Off Payroll](Government Schools)

Source: Authors' projections.
7,000 per year. Even if new demand from private schools is considered the totals are still within current training capacity. When including the stock of unemployed teachers (perhaps 20,000 or more) available from previous years’ training as a result of recruitment freezes, the real demand for newly trained teachers diminishes to very low levels.

**UNIT COSTS**

Figure A2.25 shows unit costs for different subsectors for 2001. This indicates that public unit costs for secondary-level provision vary from about U Sh 145,000 to over U Sh 700,000 and that colleges often exceed U Sh 1 million. University costs usually exceed U Sh 3 million per student (not shown). Community polytechnics have been costed at two levels—that proposed in the last BTVET development plan, and that suggested by the constrained figures used to define the low-cost pilot suggested in this report.

General secondary schools are relatively cost effective in providing additional places to expand access. Pass rates are also higher in secondary schools than in technical/farm schools and technical institutes, raising the differential for costs per successful graduate to over 4:1—that is, four secondary-school places cost as much as one technical/farm school place. Simply put, the mix of school types chosen for expansion will determine the number that can be afforded within the resource envelope in a ratio similar to that of their recurrent costs.
DEVELOPMENT ACTIVITIES

The resource envelope created by assumed growth of 6.5 percent per year in the MTBF is sufficient to allow the construction of up to 300 new classrooms per year accommodating 50 pupils at a cost of U Sh 8 million per classroom; rehabilitation of up to 140 unusable classroom spaces per year at U Sh 2.5 million; up to 60 new schools per year at a cost of U Sh 140 million; and construction of up to 40 laboratories/workshops per year at about U Sh 20 million. It would allow the construction of 14 community polytechnics at U Sh 200 million. This would allow the increased enrollments in government schools indicated in previous figures. Changing the cost assumptions would change the volume of activity that could be sustained. If cost management could successfully reduce building costs, more structures could be provided.

In sum, these activities would result in the development of 470 new schools and 14 community polytechnics by 2012, which is more than enough to ensure that every subcounty currently lacking a secondary school acquired one, over 2,300 new classrooms could be added to existing schools, about 1,200 classrooms could be rehabilitated, and over 350 laboratories or workshops could be built (figure A2.26). This substantial rate of construction could be afforded, along with the recurrent cost burden it creates, but it would require efficient procurement.
and quality assurance systems, and adherence to planned PTR increases if recurrent costs were to be sustainable. There are a range of other activities that are included in the projection that would incur costs. These include U Sh 25 billion over the plan period for targeted textbook support programs in addition to capitation and normal nonsalary recurrent support; U Sh 14 billion for equipment and learning infrastructure; and up to U Sh 3 billion per year for about 10,000 targeted bursaries. Each of these inputs is designed to be focused on improved access and equity and is not intended as a flat-rate addition across the system.

In addition to the 14 community polytechnics currently included, BTVET development funding includes rehabilitation costs for technical/farm schools (U Sh 3 billion) and technical institutes (U Sh 5 billion). These figures may be unnecessarily large. They assume that the institutions continue as they are and are not integrated into the general school-level system and operate at lower costs, which is an option. U Sh 20 billion development expenditure is available across the college system over the framework period on the assumption that it could be wisely used in rehabilitating space; improving learning resources; and revitalizing the post-school provision of programs under a restructured system of governance, management, and accountability. In advance of a focused review of this level of provision, the amounts included are speculative but within the envelope.
PROJECTIONS

Under this projection scenario GER2 would increase from about 35 percent to over 45 percent by 2012. Enrollment should be distributed between government and private schools in similar ratios to those that currently exist. For reasons mentioned above, it is not realistic to expect private sector enrollment to continue to grow faster than in government schools because of cost constraints related to the distribution of household incomes. The GER2 for four years of secondary is shown below (figure A2.27). These estimated GERs might be higher if census data establish that population growth rates are falling. At the end of the projection period they reach about 45 percent. Faster progress is not possible within the resource envelope.

RECURRENT AND DEVELOPMENT EXPENDITURE

It is assumed that the MTBF grows at 6.5 percent from baseline levels in 2002. Secondary recurrent expenditure tracks the MTBF with little more than a 5 percent overspend over the period. Secondary development expenditure is in greater proportional deficit on a much smaller base as a result of the substantial investment in construction to create capacity. This should not be problematic and is an investment that will be repaid in future years as enrollment rate growth falls and development needs

Figure A2.27  Nominal GER2, 2001–12

Source: Authors’ projections.
diminish. Construction to appropriate standards should be discounted over the lifetime of buildings, which should be at least 50 years. If growth was as low as 5 percent in the government budget, then larger deficits would appear over 10 percent of the recurrent budget that would need addressing.

The BTVET recurrent budget is in surplus even when the recurrent cost of the 14 pilot community polytechnics is included (the polytechnics are costed at U Sh 200 million to build, 24:1 PTR, and U Sh 50,000 per pupil (that is, three times normal secondary-school capitation). The surpluses are a little less than the projected secondary deficits.

The balance of expenditure varies over time when projected expenditure is compared with the MTBF growing at 6.5 percent. Although both general secondary and BTVET parts of the budget are close to balance, they deliver different levels of access and participation per Ugandan shilling because of their related unit costs. The secondary-school system currently costs about U Sh 65 billion per year, and enrolls an estimated 370,000 pupils (2002). The BTVET technical/farm schools and technical institutes appear to enroll about 12,000 at a recurrent cost of about U Sh 5 billion (see figures A2.28–A2.31).

The proportion of the recurrent education budget that would be needed to sustain the projection and its activities is shown in figure A2.32. Secondary would require about 17 percent of the education budget and BTVET 3 percent. This totals 20 percent—more than allocations in recent years, which have totaled about 18 percent.

**Figure A2.28  Recurrent and Development Expenditure, Secondary Education**
The baseline projection requires an increase in the allocation to secondary and BTVET if it is to be realized. The following actions can reduce the shortfall:

- Initial teacher training in NTCs and for community polytechnic teachers is scaled down.
- BTVET recurrent costs are overestimated as a result of projecting enrollment growth from baseline enrollment figures and unit costs that are themselves overestimates.
Faster progress towards PTR targets is achieved, which would reduce growth in teachers’ salaries.

New arrangements are made for medium-term strategic development of the post-school colleges, which involve greater cost recovery for those in demand and redeployment for those with few students.
CONCLUSION

Uganda can increase participation at the secondary level and substantially stay within affordable levels of financing. The financial shortfall is about U Sh 8 billion a year for recurrent and development costs for secondary and BTVET, and is less than 10 percent of the total education budget over the projection period. Increased secondary participation can only be achieved if PTRs increase, curriculum reform takes place to adapt to the needs of expanded groups of pupils, and expansion is concentrated in general secondary schools rather than high-cost BTVET institutions. Scaling down teacher training to reflect demand could create savings that would reduce financing gaps.

CASE 3: NINE YEAR BASIC EDUCATION IN RWANDA

The government of Rwanda has committed itself to providing nine years basic education to meet its aspiration to expand access to lower-secondary education for all Rwandan children. At the heart of this commitment is the desire to ensure that all children, irrespective of socioeconomic background, have access to a minimum level of education that provides basic skills and knowledge for useful citizenship, and provides the foundation for postbasic education. According to the Education Sector Strategic Plan 2002 (amended April 2003), “The government’s primary objective in vision 2020 for education is to provide Universal Primary Education (UPE—grades 1 through 6) by 2010 and subsequently Basic Education (grades 1 through 9 for all by 2015.” The government also sees the move towards 9-year basic education as part of its poverty reduction strategy, designed to build on and complement the achievement of gender-equitable primary schooling.

The Ministry of Education gives priority to the development of primary education in the Education Sector Strategic Plan. Much remains to be achieved. Repetition and dropout in primary education is a very serious problem and may not fall as planned, quality and achievement are very varied and far from satisfactory, classrooms and learning material need further investment, and double-shift schools constitute over 85 percent of schools at grades 1–3. The development of Nine Year Basic Education must protect the gains made so far and ensure that improvements in access, participation, and completion continue. This implies continued prioritization of the sector, including the following actions:

• Make about 50 percent of educational resources available for primary education.
• Diminish PTRs to allow reductions in double shifting.
• Make investments in learning material to increase the number of books per child to at least 1:3 in core subjects within a developmental curriculum.
• Enhance teacher training and support in-service.
• Improve quality and quantity of physical infrastructure.

Double shifting is a particular issue because it is concentrated among the youngest pupils. They are most at risk of premature dropout and repetition, and may also experience the least-qualified teachers at a time when their learning needs, and their capacity to learn, are probably greatest. Double shifting may have a different impact on boys and girls whose responsibilities outside the school vary. This is both a curriculum issue (curricula have to be such that they can be taught successfully to at least 80 percent of pupils under the conditions that actually exist), and one of physical capacity. Previous plans have assumed double shifting continues at current levels. If it does, repetition and dropouts are unlikely to fall, and the least-qualified teachers will continue to have the highest workloads. If the PTR can be lowered to 45:1 and feasible investment in classroom buildings made over a 10-year period, double shifting could be considerably reduced, with benefits for time on task, more attention to learners’ needs, and higher-quality learning, leading to less repetition (see Appendix 5). Total numbers of children in primary schools are likely to fall between 2005 and 2015, after which they will begin to increase again at the rate of population growth among six year olds. This is a window of opportunity to improve the quality of access.

Expansion at Tronc Commun (lower secondary) level depends on the quality and quantity of primary school graduates. Thus the rate at which Tronc Commun should grow has to be balanced against the continuing needs for development at primary level. Very rapid growth at Tronc Commun in advance of secure gains in primary schooling may not be the best option. Growth rates have to be matched to realistic assessments of priorities and benefits related to exclusion and poverty reduction. Tronc Commun will grow, not least in response to the rising number of primary graduates. It should not grow so fast that resources are diverted from primary education or that management capacity is overstretched and quality undermined.

Baseline data have been drawn from government statistics and stated policy. The projection takes the following issues into account:
• The need to reduce the primary PTR from 67:1 to 45:1 to reduce double shifting in primary 1–3, and to maintain investment in primary education at or about 50 percent of the recurrent budget.
The changing flow of primary pupils completing grade 6, assuming repetition and dropout fall.

The demand for new secondary teachers, and the need to find an alternative method of training to the high-cost, four-year Kigali Institute of Education (KIE) program.

The costs of fee-free Tronc Commun, interpreted as a subsidy to schools of RF 11,000 per child to replace the element currently paid privately.

Reductions in boarding at rates consistent with protecting vulnerable children and orphans.

Private secondary schooling growing at no more than 5 percent per year as a result of limited demand for unsubsidized places. Higher growth would not be constrained and may occur, but it would do so without further public subsidy.

Gradual reduction in the share of the budget absorbed by higher education. This would limit the number of publicly sponsored students but would not inhibit the growth in the number of off-budget students financed in other ways.

Classroom construction/new schools at an average of RF 4, RF 5, and RF 6 million per furnished classroom at primary, Tronc Commun, and upper secondary, respectively.

A ceiling of 30 percent of government resources allocated to education.

The need to consider the nonfinancial constraints on growth.

The central projection creates a sustainable financing framework designed to maintain progress towards universal primary education. Elements of progress will include increasing completion rates and reducing repetition and dropout; increasing Tronc Commun GERs from 20 percent to more than 45 percent, thus tripling enrollment by 2015 from 130,000 to over 400,000; and achieving transition rates into Tronc Commun above 75 percent by 2015. The costs of teacher training, a major constraint on growth at Tronc Commun, have been included. The assumption is that KIE enrollments will remain at current levels, which will be sufficient to meet demand for upper-secondary teachers. Most training of new Tronc Commun teachers is planned to be conducted through colleges of education operating at less than RF 300,000 per trainee per year, with one year training in college and one year in school. It has been assumed that subsidized boarding will be reduced to below 10 percent at Tronc Commun and below 20 percent at upper secondary. This creates savings of up to RF 8.5 billion a year by 2015.
Investment to improve quality at primary level will continue to bring the PTR down to 1:45. This is sufficient to minimize double shifting in grades 1–3 to below 15 percent, which is necessary to reduce repetition and dropout in the early grades. An additional RF 1,500 capitation for learning materials has been included from 2005 to enhance quality improvement and move towards acceptable ratios of textbooks per child. The primary GER will fall to about 100 percent as overage pupils and repeaters are reduced.\textsuperscript{9} Completion rates should improve over the period but need to be interpreted with caution.\textsuperscript{10} Classroom construction costs to achieve these outcomes at primary would be between RF 4–6 billion a year, at costs per classroom of RF 4,000,000. The number of new primary teachers needed falls from about 3,000 in the early years to average about 300 from 2011–15. This will release capacity that may be used to train Tronc Commun teachers.

The resources available for the central projection are financed by (i) 30 percent of government resources allocated to education and (ii) external resource flows. The projection identifies the gaps between recurrent domestic resources and expenditure with and without fee-free Tronc Commun. Fee-free subsidies at RF 11,000 per pupil at Tronc Commun account for about RF 1 billion, rising to RF 4 billion by 2015. The overall funding gap is about RF 16 billion for most of the projection period and fall towards 2015. This gap, however, does not take into account needs to invest in learning materials at Tronc Commun and above, or the possible impact on salaries of radically reducing the numbers of untrained teachers in secondary schools. The gap also assumes that subsidized boarding is reduced as planned and that the number of administrators is frozen at current levels. The gap also depends on government revenues growing as anticipated in macroeconomic projections which indicate sustained increases at 5 percent a year that may not be realized.

Construction costs increase from RF 6 to RF 14 billion\textsuperscript{11} for the full program and would be less if more modest targets for growth and the reduction of double shifting were adopted. If classroom building and furnishing costs were less than RF 4, RF 5, and RF 6 million at primary, Tronc Commun, and upper secondary respectively, the amounts would fall correspondingly. Alternatively if high-cost science, technology, and vocational institutions were created then much more funding would be required.

The main assumptions of the central projection are summarized in table A2.2.
The number of primary grade 6 leavers will grow in line with the flow of current enrollments through primary school. These will rise sharply until 2010 as the wave of expanded numbers passes through. After this the number of grade 6 completers will stabilize.

Primary teacher training needs to be sufficient to bring PTRs down from 67:1 to 45:1 before 2015. This would reduce the need for double shifting, assuming new classroom space is created. Double shifting diminishes to below 15 percent by 2015.

Secondary form 1 places will grow at a rate determined by affordability within the resource envelope and the nonfinancial constraints of growth. Expansion from 2005 increases entrants at between 8 percent a year, rising to 15 percent over the projection period for government and fee-free schools and 5 percent for private schools.

Transition rates into Tronc Commun will rise from their current levels to reach over 70 percent by 2015. In the short term they may fall as a result of the rapid increase in grade 6 completers in advance of expanded capacity. Transition from Tronc Commun to upper secondary will stabilize just below 40 percent as a result of limiting growth at this level in favor of expanded Tronc Commun.

GERs at Tronc Commun will rise from below 20 percent to about 48 percent by 2015, and from 11 percent to 14 percent at upper secondary. This would require enrollment of 410,000 (a three-fold increase) at Tronc Commun and 114,000 (a 60 percent increase) by 2015.

Most growth is assumed to be in government and fee-free schools as the costs of unsubsidized private education become an obstacle to the enrollment of those with low household incomes. The model assumes the sector grows at 5 percent.

Teacher demand is projected on the assumption that all new teachers will be qualified, and that unqualified teachers will be upgraded over time. This cannot be achieved at KIE training costs per trained teacher. It has therefore been assumed that KIE continues to recruit about 400 trainees a year (350 a year after four years), and that four colleges of education are established for secondary teacher training and staffed appropriately. This could take 3–5 years to come on stream before the period of high growth in Tronc Commun numbers, depending on recruitment of staff and availability of facilities. Without expanded capacity offering shorter (1+1 years) of training, the proportion of untrained teachers will rise to over two-thirds of all teachers at Tronc Commun, and class sizes will become excessive. Eighty percent of secondary teachers are male and the proportion should be reduced.

The costs of teacher training have been advanced over annual demand for new teachers to account for the time it takes to produce a trained teacher (at least four years in KIE and 1+1 in a reformed system with colleges of education).

Attrition among secondary teachers is assumed at 5 percent, but may be higher and should be monitored.

The PTR will remain at about 30:1 (class size 45) at Tronc Commun and 25:1 (class size 40) at upper secondary.

The number of secondary administrators has been frozen at current levels.

Each secondary child has been budgeted RF 5,000 for learning materials above other costs in high cost projections; RF 3,000 in mid-cost projections and RF 1,500 in low-cost projections. Mechanisms should be established to ensure the ratio of books per child in core subjects falls to acceptable levels.

The cost of fee-free Tronc Commun has been estimated separately on the basis of a RF 11,000 capitation per child to schools, which would enable them to waive the equivalent of the day school fee. Boarding costs in excess of this would be met privately, though current food subsidies would continue for reduced numbers of boarders.

Higher education expenditure has been stabilized until 2015. This assumes that expansion will be financed off-budget and that the number of publicly sponsored students will be restricted to an affordable level. Per-student costs at university level appear to exceed those at school level by factor of 100 or more, making sustaining universal primary education expansion at lower-secondary level contingent on budgetary restraint at the higher education level.

Classroom building and furnishing costs have been estimated at RF 3, RF 4, and RF 5 million in the base year for primary, Tronc Commun, and upper secondary. The procurement system needs to identify where additional classrooms are needed and where new schools need to be established on the basis of school mapping. Although some expansion may be accommodated in converted buildings, this option will be exhausted in two or three years, and such buildings may not be located where they are needed. Therefore, new building on a substantial scale is needed in the medium term. Many primary classrooms will also need constructing.

(continued)
ENROLLMENTS

Total primary enrollment is projected to remain stable until about 2009, after which it will fall as a result of reduced entry rates into grade 1, and reduced repetition (figure A2.33). After 2015 growth will return to the rate of population growth for 6-year-olds—about 2.2 percent a year. Gross enrollment rates at primary will fall as overage and repeating pupils diminish (figure A2.34).

It will be possible to reduce double shifting in primary to less than 15 percent by 2015 if the assumptions of the central projection are realized (figure A2.35).

The number of pupils completing grade 6 (enrollment – repeaters) will rise rapidly until 2010 if repetition and dropout rates fall. Entrants into S1 of Tronc Commun are projected to grow between 7–12 percent a year.

Figure A2.33  Total Primary Enrollment

Source: Authors’ projections.
year (figure A2.36). Higher rates would require a much greater supply of teachers and classrooms and face nonfinancial constraints. Transition rates will fall then recover.

Enrollments in Tronc Commun in all schools will rise three times to reach 410,000 by 2015. Upper secondary is planned not to expand substantially until after 2015 (figure A2.37).
The number of new primary teachers needed to keep pace with this growth and reduce the primary PTR to 45:1 averages 2,800 a year until 2010, after which it falls to less than 1,000 once 45:1 has been achieved (figure A2.38).
At Tronc Commun level significant growth in teacher output is needed that cannot be achieved through the KIE programs at current cost levels (figure A2.39). The projection assumes that KIE output remains at about 350 a year, and national colleges of education are established to train Tronc Commun teachers.

The cost of training secondary teachers is mostly in KIE (RF 1.5–2 billion per year) though the output is only about 350. National colleges

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**Figure A2.38 Number of New Teachers Needed**

![Figure A2.38 Number of New Teachers Needed](image1)

*Source: Authors’ projections.*

**Figure A2.39 Trained Secondary Teachers Needed Each Year**

![Figure A2.39 Trained Secondary Teachers Needed Each Year](image2)

*Source: Authors’ projections.*
of education could provide the numbers needed for Tronc Commun expansion at much lower costs with much greater output—by 2015 eight times the KIE output for a little over half the cost (figure A2.40).

Cost per pupil at primary would rise, reflecting reduced PTRs and quality inputs. Costs at Tronc Commun and upper secondary would fall as subsidized boarding was reduced. The ratio of unit costs of Tronc Commun to primary would fall from about 5:1 to 2:1, making expanded secondary more affordable (figure A2.41).

Figure A2.40  Number and Cost of New Teachers

Source: Authors’ projections.

Figure A2.41  Public Costs Per Pupil Per Year

Source: Authors’ projections.
Recurrent expenditure on primary would rise to about RF 35 billion by 2015. Higher education public expenditure would be stable. By 2015 Tronc Commun would approach the value of the higher education budget at about RF 12 billion (and exceed it if it were fee free) (figure A2.42).

Budget shares for primary would be maintained at about 50 percent. Higher education would decline from over 30 percent to less than 20 percent. Tronc Commun and upper secondary would rise from 16 percent to 23 percent, dependent on large reductions in nonteaching salary costs at secondary. KIE would continue to absorb most expenditure on teacher education, with a small output (figure A2.43).

Education would take about 30 percent of domestic resources by 2015 and about 5 percent of GDP. This assumes GDP growth of 5 percent and revenue growth to 14 percent of GDP (figure A2.44).

Overall educational expenditure would reach RF 72 billion, of which as much as RF 70 billion might be available from domestic resources, assuming economic growth remains on track. However, there would be a financing gap averaging about RF 16 billion until 2010. Fee-free Tronc Commun would add between RF 1 and RF 4 billion to the recurrent cost gap (figure A2.45).

The number of new classrooms needed per year would be about 1,100 at primary, assuming double shifting is to be reduced. At Tronc Commun 250 classrooms a year would be needed initially, rising to about 1,000 by 2015 if class sizes are not to rise above 45 (figure A2.46).
Development expenditure to sustain the central projection needs to rise from RF 6 billion to RF 14 billion by 2015. Less would be needed if classroom construction costs were less than RF 4, RF 5, and RF 6 million for primary, Tronc Commun, and upper secondary, respectively (figure A2.47). The expenditure needed averages about 20 percent of recurrent expenditure.
Figure A2.45  Expenditure and Gaps (Recruent Only)

Source: Authors’ projections.

Figure A2.46  Number of Classrooms Needed

Source: Authors’ projections.
CONCLUSION

The broad conclusion is that the assumptions of the central projection lead to a financially sustainable outcome with considerable progress on universalizing primary education and substantial expansion of access to Tronc Commun by 2015. Achievement of the outcomes depends on whether the projected pattern of allocation of resources is realized, and whether the nonfinancial constraints on growth can be managed. Success also depends on concerted action to reduce unit costs at the secondary level, without which expansion will be financially unsustainable.

NOTES

2. Only selected scenarios are included in these summaries.
3. Falling total enrollment results from reductions in overage enrollment and repetition.
4. The intention is that training at diploma level will be reduced from two years to one, and at degree level from four years to three.
5. Currently (2004) there are enough places in higher and further education to enroll all leavers who complete secondary school successfully.
6. Higher education currently consumes more public resources than all secondary schooling. The proportion is therefore planned to fall.
8. The standard definition of the transition rate is as follows: (Number in grade 6 – repeaters)/(entrants to S1 the following year).
   This definition can create misleading results. The rate is likely to fall before increasing unless S1 grows faster than primary output, which is unlikely before 2010. To prevent the transition rate falling, S1 would have to grow at over 30 percent a year in some years.

9. The primary GER can fall as the number of repeaters reduces. The net enrollment rate should continue to increase.

10. The completion rate is defined as follows: (the number enrolled in grade 6 – repeaters)/(number of 12 year olds).
    This rate can fall as the mix of overage pupils in grade 6 changes. This standard method of calculation can produce ambiguous results. An alternative completion rate definition is as follows:
        (the number enrolled in grade 6 – repeaters)/(number of new entrants six years before).

11. This global figure does not separately account for rehabilitation of existing stock, which would be an additional cost.