Controlling the Costs of Education in Eastern Africa

A Review of Data, Issues, and Policies

Laurence Wolff

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ABSTRACT

Eastern Africa has enormous needs for investment in human resources development but limited financial resources available as well as relatively high costs compared to per capita income. This report reviews data and issues on costs of primary, secondary and higher education in Eastern Africa and makes practical recommendations for controlling or reducing these costs while paying due attention to effects on quality and equity. For each level of education the report reviews student-teacher ratios, teacher salaries, non-teaching costs, and cost-recovery. It also reviews effects of population growth on costs as well as needs for improved educational management. The report includes estimates of possible cost savings by country in Eastern Africa.

RESUME

L'investissement dans la mise en valeur des ressources humaines est un besoin crucial des pays d'Afrique de l'Est, mais les ressources financières disponibles sont restreintes et les coûts sont plus élevés par rapport au revenu par habitant. Le présent rapport examine les données et questions relatives aux coûts de l'enseignement primaire, secondaire, supérieur en Afrique de l'Est et formule des propositions qui visent à réduire les coûts en fonction de leurs effets éventuels sur la qualité et en termes d'équité. Le rapport examine également, à tous les niveaux de l'enseignement, les ratios élèves-maîtres, les salaires versés aux enseignants et les dépenses autres que les salaires versés aux enseignants, le recouvrement des dépenses, les effets de la croissance de la population sur les coûts, le besoin d'améliorer la formation des cadres. Le rapport s'efforce de trouver les moyens de réduire les coûts pour les pays d'Afrique de l'Est.

RESUMEN

Africa Oriental necesita de inversiones sustantivas en el campo del desarrollo de recursos humanos. Al mismo tiempo, sus recursos financieros para este propósito son limitados y sus costos elevados en relación a su ingreso per capita. Este informe estudia datos básicos y elementos importantes que afectan la educación primaria, secundaria y superior en África Oriental y propone recomendaciones prácticas para controlar o reducir el gasto prestando debida atención a sus efectos sobre la equidad y calidad de la educación. Para cada nivel educacional, el informe estudia el coeficiente alumno-profesor, sueldos de los profesores, otros costos y la participación de usuarios en el financiamiento de la educación. Estudia también los efectos del crecimiento demográfico sobre el gasto y los requerimientos en términos de mejorar la administración financiera de la educación. El informe incluye estimaciones de posibles reducciones en el costo de la educación para los diferentes países de la región.
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SUMMARY

1. Over the last twenty years countries in Eastern Africa have made great progress in expanding educational opportunities and meeting manpower needs. Nonetheless the region still remains at the bottom of all rankings in educational development, and shortages of trained human resources are one of the main impediments to renewed economic and social development. Despite these needs, slow economic growth will limit the amount of funds available for education and relatively high education costs compared to per capita income will make educational expansion difficult. It is therefore essential for countries in the region to ensure that their limited funds have a maximum impact, that the efficiency of education systems is increased, and that new sources of education financing are made available. To assist in this process, this report reviews, in a comparative framework, data, issues and policies which might lead to greater cost-efficiency and better use of available funds. The report is designed to provide broad guidelines only, since the implementation of specific policies depends on detailed country analysis.

Primary Education Costs

2. The unit costs of primary education in Eastern Africa average US$71 equivalent (1978-1982 data). As a percentage of GNP per capita (a better measure of the “burden” of education costs) they vary from 3% to 63%, with an average of 16%. The major elements which influence primary school unit costs are student-teacher ratios and salaries paid to teachers. In the region as a whole student-teacher ratios average 41:1 and vary from 22:1 to 63:1. There is research evidence available which suggests that within certain limits lower class size does not necessarily result in greater student achievement and the evidence in Eastern Africa appears no different. It may therefore be appropriate for countries with relatively low student-teacher ratios to consider raising these ratios modestly as a means of reducing unit costs. Other cost saving measures which might be considered include eliminating or reducing the number of specialized teachers and non-teaching headmasters in primary schools; requiring that teachers are trained at the upper secondary rather than post-secondary levels; and upgrading untrained teachers through vacation and correspondence courses rather than through formal residential programs.

3. Teacher salaries average US$1,859 per year (1978-82 data). Salaries as a ratio of GNP per capita range from 1:1 to 10:1 and average 5:1 and as a ratio of manufacturing salaries average 1.2:1. Based on all these data, it appears that some countries may be paying a premium to teachers in comparison with their available resources, and it will be very difficult for these countries to continue to expand their education system while maintaining relative salary levels. On the other hand some countries have combined relatively low teacher salaries with equally low student-teacher ratios and it might be appropriate to increase both elements. Any proposed changes in teacher salaries must take into account relationships to civil service and other salaries, possible adjustments in annual salary increments, salary differentials based on level of training, possible recruitment of teachers with lower levels of qualifications, and the effects of all these measures on teacher morale and teacher recruitment.
Historically communities and parents in Eastern Africa have paid much of the costs of primary education. Over the last thirty years governments have gradually taken on a higher share of these costs. However governments no longer can continue on this path, and it may be necessary to return to a system of cost sharing by the community, to allow governments to provide services to those it was previously unable to reach or to improve the quality of its services.

Teacher salaries generally account for 85-99% of costs to governments. Some countries devote significant portions of their budgets to financing textbooks, operating expenses, feeding, and administration. Information is scanty on community, student, and family costs for primary education. Among the countries for which information is available, school fees range from 0 to about 30% of total unit costs. Parents spend a significant amount per year for uniforms, books, pencils, paper, transportation, food, and school construction. These non-fee costs may adversely affect school attendance among poorer and rural families.

Based on the above information some governments may consider cutting back on their support of certain non-teacher salary items, provided quality is not adversely affected. In order to minimize the possible detrimental effects of such cutbacks, assistance could be provided to ensure that textbooks are rented at the lowest possible cost, that headmasters are trained in the management of school funds, and that self-help construction is done in the most cost-efficient manner. Fees at the primary level could be used as "enforced quality improvement measures", e.g. to provide textbooks, or to implement specific policies such as restricting the number of students repeating the final year of primary schooling, but significant increases in fees will more than likely have adverse effects on school attendance.

It is possible to undertake an exercise to estimate unit cost savings assuming certain policies are adopted. For example if student-teacher ratios were increased to 40:1, teacher salaries restricted to no higher than a 5:1 ratio to GNP per capita, and government support of non-teacher salary items restricted to no more than 10% of total costs, then on average unit costs to Governments in Eastern Africa could be reduced by 23% with a range of savings between 10 and 60%. For some countries it might be appropriate to lower student-teacher ratios or increase teacher salaries with resulting increases in unit costs. An alternative is to trade off savings in one area of education for expenditures in areas with greater possible returns in terms of student achievement. For instance it might be possible to utilize savings in teacher costs for support of textbook, school library or school radio programs which have been shown to improve student achievement significantly. Whether any of these policies is appropriate to a specific country can only be determined through in-depth country analyses.
8. All governments in the region are committed to achieving universal primary education (UPE) in the shortest possible time. About half the countries already enroll 90% or more of primary age children, but enrollment ratios in other countries in the region are as low as 30%. The achievement of UPE by these countries will therefore be very difficult given present financial stringencies. The problem is compounded by high rates of population growth. Implementation of programs to reduce population growth would reduce the size of the school age population, and in most cases the resulting savings would dwarf the possible savings in unit costs described above.

9. Another measure of unit costs is that of the cost to produce one graduate. In Eastern Africa high drop out and repetition rates result in very high costs per graduate compared to the theoretical costs if all children proceeded smoothly through the system. Efforts to improve the flow of students through the system could include establishing regulations to reduce the number of times a child could sit for the primary school completion examination, improving examination systems, improving teacher quality, producing adequate textbooks, and reforming curriculum.

Secondary Education Costs

10. Unit costs at the secondary education level average US$340 equivalent and as a percentage of GNP per capita average 85%. Secondary education unit costs average seven times primary education costs. As enrollment increases, unit costs tend to decline, mainly because of reduced boarding and lower teacher salaries.

11. The average student-teacher ratio in secondary education is 22:1, and the range is from 13:1 to 41:1. This figure masks differences between lower and upper secondary education in a number of countries which have differentiated curriculum and enrollment levels between these two levels. It is possible to increase student-teacher ratios to 24:1 through increasing the number or length of teacher contact hours per week or through increasing the number of students per class. In order to implement such changes, governments would have to establish and enforce guidelines on teacher hiring and utilization practices. The introduction of technical and vocational subjects into the general secondary education curriculum increases capital costs and recurrent costs significantly. It is therefore appropriate to scrutinize very carefully the value of this curriculum reform to determine whether the additional cost can be justified. In most countries secondary teachers are trained both in post-secondary non-university "diploma" level courses and in university level degree granting courses. Costs of university level training are two to fifteen times the cost of non-university diploma level training.

12. Teacher salaries average US$4,400, and as a ratio of GNP per capita average 11:1 and range from 2:1 to 26:1. In some countries teachers may be paid a premium for their services which will make it
difficult to expand enrollment. On the other hand, some countries seem to be paying teachers very low salaries which may result in low morale and recruitment problems.

13. Several governments require that before students enter the university they complete a period of national service as junior secondary school teachers. This has the effect of reducing teacher costs, but to be effective it must be accompanied by adequate pedagogical training and supervision. In addition, the hiring of more "diploma" level rather than degree level teachers would significantly lower the salary bill; this would also require good training and careful supervision. It may also be appropriate to review annual step increases and salary differentials to determine what if any savings can be made without significant morale or recruitment problems.

14. Expenditures other than teacher salaries make up on average 35% of total governmental expenditures on secondary education and range from less than 1% to over 50% of total costs. On average provision of boarding doubles both construction and running costs. Countries with large boarding enrollments should begin now to gradually switch to a day school system through streamlining curriculum, establishing minimum catchment areas for day schools, and providing for local rather than national assignment of students. Day schools are also conducive to the establishment of double shifting, which should be introduced to urban and some densely populated rural areas as a means of reducing capital investment costs.

15. Governments in the region cover varying levels of school operational costs, maintenance, equipment, textbooks and teaching aids. In many countries this assistance is inadequate and individual schools require fees and/or donations from parents ranging from a few dollars to over US$200 equivalent. It is appropriate for governments to cover a portion of non-teaching costs, since the proper operation of a secondary school requires adequate equipment and teaching aids. However, a portion of these costs, especially those for textbooks and boarding, should be devolved to students.

16. In most of Eastern Africa there is "excess demand" for a limited number of secondary school places and students and parents are apparently willing to make great financial sacrifices to ensure attendance in secondary schools. Kenya is probably the country in which the highest percentage of costs are borne by students, parents and the community, but enrollment in secondary education is a high 19% of the school age population. Costs borne by students in public institutions account for as much as 50% of total costs and enrollment in purely private (non-government aided) institutions is as much as 37% of total enrollment.

17. Based on the facts above most countries should be able to mobilize additional community, student, and parent-financed resources for secondary education. The exact form of such mobilization would vary from
country to country, and might include shifting the costs of boarding and textbooks to students, as well as putting aside a significant portion of all school fees for provision of scholarships to needy students. The development of private schools could be encouraged through setting up appropriate rules, regulations, and inspection systems.

18. As in the case of primary education, it is possible to undertake a cost reduction exercise for secondary education. If the following policies are implemented -- (a) an increase in the student-teacher ratio to 24:1; (b) government financing of no more than 80% of total public school costs; and (c) restriction of teacher salaries to no more than twelve times GNP per capita -- then every country surveyed could make savings in unit costs varying from 13 to 79% and averaging 38%. Overall the possible cost savings in secondary education are much higher than in primary education.

19. A way of increasing access to secondary education at a relatively low cost is to strengthen non-traditional correspondence or radio schools. Research has shown that such institutions in Lesotho and Malawi are lower cost alternatives to traditional education and other countries could profit from the experience.

20. It is difficult to establish an "appropriate" or adequate enrollment ratio in secondary education. The region as a whole has the world's lowest secondary enrollment ratios and in general it would not be wise to restrict enrollment growth at this level.

Higher Education Costs

21. The unit costs of higher education in Eastern Africa average US$4,100 and range from US$895 to US$11,081. This figure is equivalent to 10.4 times per capita income, which is higher than all other regions in the world, and is more than 50 times average primary school costs in Eastern Africa. It is therefore especially urgent to review costs at this level. In some countries it may be worthwhile to shift a portion of higher education costs to lower education levels, especially when primary enrollment ratios are low.

22. Student-teacher ratios in Eastern Africa average 7.4:1. Ethiopia is the only country with a ratio higher than 10:1; the lowest ratios are in Tanzania, Sudan, and Zambia (less than 5.5:1). These ratios are significantly lower than in the rest of the world. The reason appears to be that higher education institutions in Eastern Africa, most of which are relatively small, have developed the full spectrum of subjects and specializations, with the result that enrollments per course, especially in third and fourth years of study, are very low. It is appropriate to review needs for these programs to determine whether some should be phased out and others expanded to reach minimum levels of enrollment necessary for both quality instruction and lower costs. Other possible cost saving measures would be to increase teaching demands on staff members who are not
heavily involved in research and to expand specialized post-secondary institutions, most of which have lower teaching costs than full scale national universities.

23. Non-teaching costs of higher education in Eastern Africa average 60% of total costs of higher education. This is a result of provision of full dormitory, boarding, and staff housing facilities, as well as relatively higher costs for administration, equipment, and library books. A review of these costs in one country resulted in proposals for cost-reduction equivalent to 16% of total higher education costs and a similar review elsewhere resulted in recommended savings of 5.6%. Among the various proposals made are: encouraging off-campus living; gradually devolving responsibility for finding housing to staff; privatizing food and other services; reducing transportation costs; lowering salaries paid to staff while being trained abroad; charging full costs for services provided by universities; closing down institutes which may not be serving a useful function; and utilizing existing physical facilities more efficiently through longer teaching hours and computerized scheduling. Adequate libraries, equipment, and maintenance are essential for quality instruction and therefore these should usually be the last areas for cost reductions.

24. Governments in Eastern Africa cover nearly the full cost of higher education and usually provide stipends to students for costs of books and incidental expenses. This policy made sense at the time of independence because of urgent needs to educate a core of nationals to run the machinery of government. However civil service employment has now expanded rapidly and graduates in several countries are having difficulty finding public sector employment. In addition it has been argued that the private rate of return to higher education graduate is very high and that free higher education in effect amounts to a subsidy of the privileged elements of society by more needy elements. Over the long run it is appropriate, therefore, to consider eliminating student stipends and gradually charging the full cost of room and boarding. However such policies would have to be accompanied by programs of scholarships and loan schemes for the needy. Loan schemes, which have already been adopted in several countries, need to be carefully managed and enforced to be successful.

25. Based on a cost-reduction exercise using available data, on average higher education institutions could reduce unit costs by more than 25% through increasing student-teacher ratios to 12:1 and reducing room and boarding costs by one half. Such policies, however, would have to be based on careful review of the issues on a country by country basis and could be implemented only gradually. Information on higher education salaries was not available.

26. In nearly all countries in Eastern Africa, further expansion of higher education is essential for national economic development. However to strengthen the role of higher education in development, it will be necessary to periodically review all programs and to expand or contract
them in accordance with national needs. It may also be necessary to strengthen students' entrepreneurial and creative skills as a means of encouraging job creation in the private sector. In addition establishment of cooperative programs with institutions in neighboring countries may be an important means of providing qualitatively superior and cost effective programs.

Management of Education Systems

27. It is necessary to establish a process to successfully identify and implement policies to control costs. This process requires better data and information which, with the advent of the micro-computer, can now be provided with relative ease. In addition, computer programs are now available to project costs under different sets of assumptions. Presentation of financial data in budget documents can also be improved.

28. Planning offices in education are usually overwhelmed with day-to-day problems and require more and better staffing and training. Administrative and accounting offices need practice in establishing and enforcing system-wide regulations. Headmasters and school supervisors also need training in financial and personnel management. Overall ministries of education should be organized so as to provide a new form of "technical assistance" to local communities and headmasters.

29. A more systematic framework, including formal review sessions by ministers of education and finance, is needed for review of education budgets, especially those of autonomous institutions such as universities, institutes of education and testing agencies. Policy decisions on costs need to be clearly set out and then rigorously enforced at both the local and national levels.
I. INTRODUCTION

The Need for Investment in Education in Eastern Africa

1.01 From 1970 to the early 1980's, countries in the Eastern Africa region 1/ made great progress in expanding educational opportunities and in meeting manpower needs. Primary school enrollment ratios increased from about 55% to 74% of the primary school age population (Annex I, T-1). Enrollment ratios in secondary education increased from 8 to 15% of the relevant school age population, and in higher education increased from 0.7 to 1.1% of the relevant population age group. Despite this major effort, the region is still at the bottom of all rankings in educational development. Eastern Africa's need to invest in human resources has been documented many times. One World Bank report puts it this way: "Faster economic growth in Africa requires accelerated development of human resources. This involves more and better formal schooling and intensified training. There is agreement among African and other experts that school systems must be expanded and improved, especially at the primary level. Secondary education should also be substantially extended. While university education has spread rapidly in the last two decades there are numerous places where the output of university graduates is still far short of demand. A review of economic returns to educational investment has shown the returns to be substantial (pp. 81-82)." 2/

The Need for Cost Savings in Eastern Africa

1.02 Governments in the region have continued to make major efforts to increase their support of education. The percentage of overall government recurrent expenditures devoted to education and training in both 1970 and 1980 was 18% (Annex I, T-2), and in most countries education accounted for the highest percentage of the recurrent budget. This percentage varied from about 11% in Ethiopia, Somalia, Djibouti, and Malawi to over 21% in Comoros, Madagascar, Kenya, Swaziland, and Rwanda. At the same time, the percentage of GNP devoted to education averaged 4.6% in 1980, a figure which has increased significantly from 4.2% in 1970 (Annex I, T-3).

1.03 Despite its acknowledged gains, Eastern Africa is facing a dilemma. Long term investment in human resources is essential for economic and social development. However, slow economic growth over the next 5-10 years will limit seriously the amount of funds available for the public sector, and it is likely that there will be little scope for increasing the share of government budgets devoted to education and training. Furthermore, continued and rapid population growth will require real increases in budgets of 4-5% per year merely to maintain present enrollment ratios. To meet their goals, countries in the region must ensure that their education systems are efficiently managed, that their limited funds have a maximum impact and that sources of education financing other than

1/ These are the twenty member countries of the World Bank served by the Eastern Africa Regional Office.

the government budget are available. Greater cost-efficiency and cost-recovery will assist governments to continue to expand enrollment and at the same time to retain or improve quality. The alternative is stark: stagnating enrollment or expansion with greatly diluted quality, resulting in long term deterioration in Eastern Africa's human resources.

1.04 The effort required to make education systems more cost-efficient is part of an overall effort needed in Africa to ensure economic development, and education is neither more nor less efficient than other sectors. However, the need is particularly crucial in this sector because of its large share of national budgets as well as because of crucial long term needs for manpower development, which can only be met through expansion and quality improvement of education. In addition, as seen below, the unit costs of education in Eastern Africa as a percentage of GNP per capita are higher than all other regions with the exception of francophone Africa. Only through significant reductions in the burden of these costs can goals for expansion and improvement of education be achieved.

Table 1: UNIT COSTS OF PUBLIC EDUCATION AT THE VARIOUS LEVELS

<table>
<thead>
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<th>Region</th>
<th>Primary</th>
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<td>85</td>
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<tr>
<td>Francophone Africa</td>
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<td>South East Asia and Pacific</td>
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<td>Advanced Countries</td>
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</table>


The Purpose of this Report

1.05 This report reviews comparative data, policies, and practices and makes proposals for increased cost-efficiency in primary and secondary education. Its purpose is not to make conclusive country by country recommendations, since these can only be made after further country specific analysis. Nonetheless a comparative analysis serves the important purpose of highlighting issues and problems which may then be studied further. The report is therefore designed to provide a springboard for
further country-based policy analysis and discussion on cost-efficiency of education systems. This report focusses on the formal education system and does not cover training and non-formal education, which usually take place outside ministries of education. In general the report does not cover issues of the relevance of education to country needs, which is a cost-effectiveness issue in the widest sense. Wherever possible, the report considers proposed cost saving measures in terms of their possible effects on quality and equity. These relationships are very complex but policy decisions on educational costs must be taken in cognizance of these effects. This report should be read in conjunction with a number of World Bank reports, which are listed in Annex 3. This report is not meant to be a prescription for reducing the amount of public funds allocated to education. As noted above additional investment in education is essential for economic and social development. Some countries may well need to increase their allocations to education, while other countries may need to re-allocate savings made in one educational sub-sector to other higher priority educational levels or programs. Such decisions need to be taken in the perspective of coherent sets of country policy objectives.

The Data and Information Presented

1.06 Seven countries completed a questionnaire prepared by World Bank staff on financing of education. However, for the most part this report relies on data from World Bank appraisal and sector reports and from the Unesco Statistical Yearbook. The data in Bank reports were gathered by Bank staff during the course of their missions over the last five years. The Unesco Statistical Yearbook compiles information prepared by individual governments according to Unesco guidelines. Each government follows its own practice of defining categories, and World Bank and Unesco documents do not fully reconcile these differences.

1.07 To a great extent it is misleading to compare unit costs or teachers salaries in very poor countries such as Somalia and Burundi with costs or salaries in relatively well developed countries such as Zimbabwe and Mauritius. In the first place, the nature of the labor market and the system of wage remuneration may vary significantly. In addition, exchange rates may be unrealistic and in fact have fluctuated significantly in recent years. World Bank sponsored research on "Purchasing Power Parities" has been underway for some time and in the three African countries studied --Kenya, Malawi, and Zambia-- the research shows in 1975 that GDP per capita is significantly higher when using Purchasing Power Parity Exchange rates rather than official exchange rates 3/. However, the research is incomplete and there is still no viable alternative to using official exchange rates. Inter-country comparisons, including those using ratios of costs or salaries to GNP per capita, should therefore be used to point out key issues and place countries in a framework for further analysis rather than for reaching definitive conclusions.

1.08 This report is also based on informal observations and analyses, including conversations with Government and Bank officials, direct observation of schools and of school systems management, and review of World Bank research papers, appraisal reports, and sector reports. It is hoped that readers of this report will compare their own experiences with those cited in this report to ensure the validity of the recommendations made.

II. ISSUES IN PRIMARY EDUCATION COSTS

Unit Costs

2.01 The unit costs of primary education in Eastern Africa vary greatly (Annex I, T-4). In primary education the highest unit costs, all above US$100 equivalent, are those of Djibouti, Botswana, Zimbabwe, and Mauritius. Except for Djibouti, whose high unit costs are a result of a cost structure tied to Middle Eastern and French levels, these countries are also among those with the highest per capita income. The lowest unit costs (less than US$13) are those of Malawi and Uganda. In terms of relationships of primary education unit costs to GNP per capita (Annex I, T-5), Djibouti (63%), Burundi (23%), Botswana (20%), Ethiopia (19%), and Comoros (18%) have the highest costs. The countries with the lowest unit costs in relation to GNP per capita are Uganda (3%), Malawi (6%), Lesotho (7%), and Swaziland (9%).

2.02 The two major elements affecting primary school unit costs are student-teacher ratios and salaries paid to teachers. In only a few countries do non-teacher costs constitute a significant component of primary school costs. The following sections review teacher utilization and training, teacher salaries, and non-teacher costs, and make proposals for policy changes based on available data and information.

Primary School Teachers

2.03 On the whole student-teacher ratios in primary education have declined from an average of 43:1 in 1970 to 41:1 in the 1978-82 period (Annex I, T-6). During this period Madagascar, Sudan, and Mauritius have reduced student-teacher ratios significantly, while Malawi, Ethiopia, and Kenya have raised student-teacher ratios considerably. Countries which have relatively low student-teacher ratios are Mauritius (22:1), Somalia (29:1), Botswana (32:1), Sudan, Swaziland and Uganda (34:1). The countries with the highest student-teacher ratios are Malawi (65:1) and Ethiopia (65:1).

2.04 Traditionally both educators and the general public have believed that low student-teacher ratios result in higher achievement. However, a review of research studies has reported that "on the basis of available data no optimum class size can be scientifically established as a function of educational benefits" 4/. The review concludes that how teacher

organizes the class is more important than class size and that savings made from increased class size might be invested in teacher training or educational materials, which have been shown to have stronger effects on student achievement.

2.05 Experience in Eastern Africa seems to corroborate the finding of no clear-cut pattern in the relationship between class size and internal efficiency. For example, the correlation coefficient \((r^2)\) between student-teacher ratios and the percentage of students who complete primary education in countries in Eastern Africa is a low .1. Specifically, Somalia has had a policy of hiring all graduates of teacher training colleges, which has resulted in over-production of teachers hoping to get on the civil service payroll, and the low student-teacher ratio has apparently not improved internal efficiency (only 26% of entering students complete primary school). In Mauritius, the low teacher-student ratio is to a great extent a result of a policy of providing specialized language teachers (Hindi, Urdu, Mandarin, etc.) in each school. These teachers teach only a few students at a time and therefore have little or no effect on achievement in the regular school subjects. In three other countries with relatively low student-teacher ratios -- Swaziland, Sudan, and Uganda -- about 60% of entering students completed the primary course, which is slightly above the average of 56% for the region as a whole. On the other hand, Botswana, with a low student-teacher ratio, is a country with a very high percentage of primary school completers. In the absence of any conclusive findings, a number of countries might consider raising student-teacher ratios as a means of reducing costs. In particular, Somalia, Uganda and Sudan, with low enrollment ratios as well as low per capita income, will be able to expand education significantly only through raising their student-teacher ratios.

2.06 At a certain point classroom management and organizational problems become difficult when a teacher has to handle very large numbers of students. Therefore, Ethiopia, with a student-teacher ratio of 59:1, and Malawi, with a ratio of 65:1, may have student-teacher ratios which are too high to ensure that children learn adequately. As a short term policy, these two countries might strengthen their teacher-training programs to include methods of teaching large class sizes, such as small group instruction, student leaders, and double shifting. Over the long run they might consider gradually reducing the student-teacher ratio to more manageable averages.

2.07 National student-teacher ratios may hide an equally important issue, that of equitable distribution of teachers. Some densely populated urban or rural areas may have student-teacher ratios which deviate widely from national averages; and decisions may be needed on how to smooth out these variations.

2.08 In most of Eastern Africa primary school teachers are trained at the upper secondary level. In Mauritius, Malawi, Kenya, Somalia, and Zimbabwe, among other countries, primary teacher training is also offered at the post-secondary level. While this policy may be appropriate for Mauritius, Kenya, and Zimbabwe, where secondary enrollments are high, countries such as Malawi and Somalia might consider reducing output from this level. As many as one third of the primary teaching force in some
countries are untrained, and many have no more than a primary education. These teachers can be upgraded through combinations of vacation and correspondence courses, often at lower costs and with results similar to those of the regular pre-entry course. This approach has the added value of utilizing those who are already committed to teaching, since the aspirations of graduates of teacher training colleges are often such that they do not enter the profession. As another means of lowering teacher costs, it would be appropriate to reconsider policies of providing specialized primary school teachers in areas such as home economics, industrial arts, language and/or agriculture, which are in force in Botswana, Swaziland, and Mauritius, as well as the policy, in these countries and in Zimbabwe, of including a non-teaching headmaster in all schools.

Teacher Salaries

2.09 The countries with the highest teacher salaries in the region are Zimbabwe (US$4725 equivalent), Botswana (US$4291), Zambia (US$3183), and Swaziland (US$2332) (Annex I, T-7). The countries with the lowest salaries are Uganda (US$185), Somalia (US$466), Malawi (US$797), and Tanzania (US$851). Uganda's especially low salaries in dollar terms are a result of high domestic inflation, devaluation of the currency, and the deterioration of government finances and services, and can be expected to increase over the next few years.

2.10 The ratio of salaries to GNP per capita averages 4.6:1. The countries paying teachers the most in comparison with GNP per capita are Ethiopia (10 times GNP per capita), Burundi (8.5), and Comoros (7.3). Ethiopia's per capita income of US$140 is so low that it distorts somewhat the significance of the ratio of teachers salaries to GNP per capita. In addition Ethiopia teachers face an average class size of 59:1. However, the ratios in Burundi and Comoros are much higher than those of countries with similar GNPs per capita, such as Rwanda, Malawi, Somalia, and Tanzania, and these two countries should consider restricting future salary increases. Since Burundi enrolls only 29% of the school age population, and Ethiopia only 38%, their relatively high teacher costs make it very difficult to significantly expand primary education. Just below these ratios, Zimbabwe, Botswana, and Zambia pay teachers salaries equivalent to about 5.5 times GNP per capita. Since their GNPs per capita are also relatively high, teachers in these countries also receive high absolute salaries. This may in part be a reflection of the influence of even higher salaries in neighboring South Africa. These countries should review carefully the level of teachers salaries, since it may be necessary to keep increases below the rate of inflation so as to ensure availability of funds for other social programs.

2.11 Another way of determining whether teachers are relatively overpaid or underpaid is to compare their salaries with average wages in the private sector. These data are often difficult to gather. Annex I, T-8 compares average manufacturing salaries in ten countries where data are available with average teacher salaries. Primary teacher salaries vary from .7 to 1.6 of average manufacturing salaries, with an average ratio of 1.2. The countries with the highest ratios are Burundi, Ethiopia,
Zambia, and Zimbabwe. With the exception of Mauritius the countries with high ratios to manufacturing salaries also have high ratios to GNP per capita (see Annex I, T-9).

2.12 The three countries which pay primary school teachers least in comparison to GNP per capita are Uganda (0.8 times GNP per capita), Somalia (1.7), and Mauritius (1.6). Each have low student-teacher ratios (Uganda 34:1, Somalia 29:1, Mauritius 22:1). Demands on teachers in all three of these countries have apparently been reduced as salaries have been lowered and the result may have been a lowering of teacher morale and esprit de corps.

2.13 Any policy on teacher salaries must take into account the relative abundance or scarcity of teachers as well as alternative employment possibilities. In addition, overall civil service salaries are reported to have decreased in real terms over the last 5-7 years in many countries, and further decreases may have detrimental effects. Analysis of teacher salaries should also take into account organization and remuneration of service to ensure that the salary system acts as an incentive to improve teaching. Length of time between salary steps, salary differentials between steps, differentials between untrained, partially trained, and fully trained teachers, and incentives for teaching in rural or isolated areas could be reviewed. To encourage continuation in the profession, initial salaries could be kept relatively low and financial incentives provided for career advancement and additional training. When there are difficulties recruiting new teachers, it may be appropriate to provide stipends for attendance at teacher training colleges as a means of encouraging entry into the profession, as is already done in a number of countries in the region. Overall there is a need for more systematic country data and analysis on teachers' salaries.

Cost Recovery and Costs Other than Teachers' Salaries

2.14 Historically communities and parents in Eastern Africa have paid high percentages of the costs of education. Before independence, primary level education was almost exclusively the responsibility of the community or of local church groups which selected and paid teachers. Parents and students were asked to contribute funds as well as labor for teaching materials, maintenance, equipment, furniture, school operations and school construction.

2.15 In the last thirty years, African governments have gradually taken on a higher share of the financing of education. However it is now apparent that the governments do not have the capacity to fully finance educational services. Because of this shortage of financial resources, it is necessary to review the possibility of passing back to communities and parents a portion of the financial responsibility for schooling, either through recovery of costs by means of fees or through cost sharing in which the student or parent pays directly for items such as books and school running expenses. Cost sharing and cost recovery allow a government to extend its financial resources further so as to improve quality or more likely so as to provide services to those which it did not previously serve.
2.16 Information on primary school fees is available for about twelve countries (Annex I, T-11). Among these countries fees in Malawi and Uganda are highest, compared to government costs—37% in Malawi and 27% in Uganda. Botswana, Burundi, Somalia, and Tanzania charge no fees at the primary level; Lesotho and Swaziland charge moderate local fees, usually for school maintenance, equipment, and materials; Kenya and Zambia have official no-fee policies, but on their own primary schools have began to charge fees for quality improvement.

2.17 Information on other private costs for primary education is very scarce. A study on primary education costs in Malawi showed that while school fees were US$5 equivalent per year, the total private costs of attending primary school were about US$41, including US$4 for teaching materials (e.g. pencils, notebooks, paper); US$9 for uniforms and shoes; US$5 for transport; and US$18 for food and other incidentals (caution fee, school entertainment, school construction).

2.18 In Malawi the fees mandated by the Government vary from US$3 to US$6 and are higher in urban areas and in the first years of primary schooling. These fees are utilized solely for purchase of teaching materials, especially books, as well as for furniture, equipment, and miscellaneous administrative expenses. This means that parents are aware their fees are returned to them in the form of higher quality schooling. In Malawi it has therefore been suggested that the requirements for uniforms and shoes should be reviewed and ways sought to reduce their costs. In addition school fees might be selectively increased to implement specific policies. For example fees could be increased in urban areas, where parents are more able to afford school costs, with a portion of the funds used for quality improvement in rural areas, or could be increased for students who repeat the final year of primary schooling as a means of getting higher examination scores for secondary school entrance.

2.19 The private costs of attending school in Eastern Africa are similar to those in Malawi. For example, the cost of uniforms and shoes is estimated at US$15 in Botswana, at US$40 in Zambia, and at US$10-15 in Somalia. Books and materials are also estimated at US$1 in Burundi, US$10 in Somalia and US$30 in Zambia. In addition the costs of construction, which are still largely a local or district responsibility, can be calculated. In Kenya, they are estimated at about US$21 equivalent per year and in Lesotho and Malawi they are estimated at $15 to $20 per year. Therefore it is clear that the overall costs of attending school in Eastern Africa are significant. They may average as much as 20% of per capita income and therefore may be a severe burden on poorer families with large numbers of children. Fees usually cover only a small portion of these costs.

2.20 All Eastern Africa governments cover the full costs of public primary teacher salaries and the vast majority of primary schools are public. However, government support of non-teacher salary items varies from country to country (Annex I, T-10). In Burundi, Lesotho, Madagascar, Malawi, Swaziland, and Uganda, teacher salaries account for more than 95% of their primary education budgets. In contrast, Tanzania (42%), Somalia (40%), Mauritius (34%), Djibouti (16%), Botswana (15%), Zambia (11%), and
Zimbabwe (11%) devote much of their budget to non-teacher salary items such as textbooks (most of the above countries), school operation (Zimbabwe, Zambia, and Mauritius), school feeding (Kenya and Somalia), and administration (Mauritius).

2.21 As noted above, governments in Eastern Africa are now finding it difficult to continue their policy of increased financing of non-teacher salary expenditures. Provision of textbooks is an example of the problems facing governments in the region. Tanzania, Rwanda, Ethiopia, and Comoros, which have policies of providing free textbooks, are finding it difficult to provide the necessary funds for full textbook programs and the result is severe textbook shortages in the classroom especially in rural areas.

2.22 With all this information in place, it is appropriate to consider a number of policy options. In the first place governments which have covered all or nearly all non-teaching costs need to review their policies in the light of financial constraints, and consider cutting back on these supports. This would include the policies in Somalia and Kenya of providing school feeding programs, in Zimbabwe, Zambia, and Mauritius of financing primary school operational budgets and in other countries of financing school construction. A number of governments may also need to review their policies of providing free textbooks to students. However research has shown that availability of textbooks is an important factor in improving student achievement. If asking students to purchase or rent them results in a significant lessening of their usage, then it may well be better to continue to provide free or subsidized textbooks and to make savings in the more politically difficult areas of student-teacher salaries (see also para. 2.32).

2.23 In order to minimize the burden on parents of paying for textbooks governments could ask parents to rent textbooks, could establish standard bulk procurement, shipping, and distribution procedures, and could encourage schools to store textbooks adequately for protection against the weather and insect damage. They could also reduce physical features of textbooks, such as cover and paper stock, binding, and colors to a minimum level, and could establish regulations and train headmasters on the management of textbook fees at the local and district level. The governments of francophone countries in particular should pay close attention to physical quality of textbooks, since imported French language textbooks have been found to be expensive.

2.24 Governments can take similar action in self-help construction by reducing their direct financial assistance and providing appropriate technical assistance to communities to ensure that buildings are durably and timely constructed. They can assist in cost saving measures such as bulk procurement of standardized equipment and furniture, and establish programs to train school administrators in the proper management of school funds. Where needed, various donor agencies would likely provide technical assistance to develop this training capacity at the national level.

2.25 Although information is scanty, a modest level of fees may not be a major disincentive to primary school attendance, especially since most costs of attending school are not fee related. This means that Governments will need to continue to pay the full costs of teachers salaries but could
consider using fees as "enforced" quality improvement measures, as in the case of Malawi, with the results visible to both children and parents. The level of such fees could be varied to meet national policy objectives such as reducing repetition in the final year of primary education and expanding access in under privileged areas. Governments will also need to oversee the various fees and charges required by individual schools to ensure that they are efficiently managed and that collection costs are kept to a minimum.

A Cost-Reduction Exercise

2.26 Based on the data and information presented above, it is possible to undertake an exercise which estimates unit cost savings if certain policies are adopted. Such an exercise must be considered illustrative only, since country policies can be defined only in the context of detailed analysis of country issues.

2.27 The exercise is based on three possible policy options. The first policy option would be to increase the average student-teacher ratio to 40:1. There is no special magic in this particular ratio, and it is equally important to establish policies on maximum and minimum averages by country regions. Nonetheless, many educators consider a 40:1 ratio acceptable, and World Bank financed primary level projects usually are designed with average student-teacher ratios equal to or higher than this figure. Based on available data, seven countries in Eastern Africa (Botswana, Burundi, Mauritius, Somalia, Swaziland, Uganda, and Zimbabwe) have student-teacher ratios below 40:1. According to the exercise (see below) these countries could reduce their unit costs by 7 to 48% by increasing their average ratios to this level.

2.28 The second policy option would be to set the average teacher salary at no more than five times GNP per capita. There is also no magic in the ratio, and, if data were available, it would probably be better to use a ratio to average manufacturing or other private sector salaries. Nonetheless a 5:1 ratio to GNP per capita does seem adequate to attract and hold teachers in the profession. Six countries--Ethiopia, Burundi, Comoros, Botswana, Zimbabwe, and Zambia-- have ratios higher than 5:1 and theoretically they could reduce unit costs by 8 to 40%, if they implemented this policy. Of course, salary levels would have to take into account the relative scarcity of trained manpower as well as wage policy in other sectors and in the civil service. The implementation of such a policy would require further analysis and could only be implemented gradually. In addition, teachers' salaries are usually tied to civil servant salaries and these groups constitute a very strong pressure group.

2.29 The third policy option would be to reduce expenditures for non-teacher salary items to no more than 10% of total government recurrent expenditures on primary education. This assumes that governments would continue to play a vital role in improving primary school quality through in-service training, local technical assistance, supervision, and provision of essential teaching aids, but support for these programs should not amount to more than 10% of total costs. Students, parents, and the community would cover most costs of school construction and school maintenance. Governments would continue to pay the full costs of teachers' salaries and at least a portion of teaching materials and textbooks.
2.30 Only six countries (Tanzania, Mauritius, Somalia, Botswana, Zimbabwe, and Kenya) meet the criterion for the third option. Depending on the country, this might involve cutting back on textbooks, school feeding, school administration, and school operations costs. Savings would be from 3 to 38% depending on the country.

2.31 Table 2 summarizes the results of this exercise. With the exception of Lesotho, Malawi, and Rwanda, all countries in Eastern Africa qualify for implementation of one or more of these proposed policies. Savings of more than 30% in unit costs could be made by Mauritius, Somalia, savings of 9-28% could be made by Botswana, Comoros, Djibouti, Kenya, Swaziland, Uganda, scope for possible cost-reductions in Eastern Africa. The next step naturally should be the detailed country by country analysis necessary to develop firmly grounded policy decisions rather than the generalized approach taken here. The exercise would be incomplete without looking at needs for possible increases in unit costs. For example Malawi and Ethiopia have what appear to be excessively high student-teacher ratios (65:1 and 59:1). Uganda and Somalia appear to be paying their teachers very poorly in comparison to GNP per capita (0.8 and 1.7). Some countries (e.g. Lesotho, Burundi, Swaziland, Madagascar) may even wish to increase government support of non-teacher salary costs beyond the present 0.1% to 3%. Such increases would have to be balanced against proposed decreases. However even after calculating their effects, there appears to be scope for net savings in unit costs in all countries studied with the exception of Lesotho, Malawi, and Uganda where overall primary level unit costs should most probably be increased.

Trade-offs to Improve Quality

2.32 It may be possible to trade off savings in one area of education for investments in the areas with greater possible returns in terms of student achievement. Research has shown than an appropriate and adequate supply of textbooks improves student achievement and this has a greater effect than lowering student-teacher ratios or raising the percentage of trained teachers. Establishment of school libraries would also be expected to improve achievement at relatively low costs. Therefore, research projects could be undertaken in which savings made in teacher costs through higher student-teacher ratios or lower salaries would be invested in textbooks and libraries, and the results measured to demonstrate under which circumstances there is indeed a net improvement in student achievement.

2.33 Similarly, Ethiopia, Kenya, Malawi, Lesotho, Tanzania, Comoros, Rwanda, and Burundi, among others, use radio programs to upgrade teachers and to improve language teaching. Research has shown that, properly managed, these programs can improve achievement at a reasonable additional cost 5/5. Programs initiated in Comoros, Rwanda, and Burundi, with French

Table 2: POSSIBLE SAVINGS IN PRIMARY EDUCATION UNIT COSTS, EASTERN AFRICA

<table>
<thead>
<tr>
<th>Countries</th>
<th>Unit Costs (US$)</th>
<th>Savings if Teacher Salaries Reduced to 5 times GNP/Capita</th>
<th>Savings if Gov't Financing of non-Teacher Salaries Increased to 10% of Total Costs</th>
<th>Savings if Student-Teacher Ratio Increased to 40:1</th>
<th>Total Savings if All Three Measures Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount (US$)</td>
<td>%</td>
<td>Amount (US$)</td>
<td>%</td>
<td>Amount (US$)</td>
</tr>
<tr>
<td>Boswana</td>
<td>157</td>
<td>12</td>
<td>7</td>
<td>5</td>
<td>31</td>
</tr>
<tr>
<td>Burundi</td>
<td>53</td>
<td>21</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Comoros</td>
<td>47</td>
<td>13</td>
<td>6</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Djibouti</td>
<td>278</td>
<td>*</td>
<td>17</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>27</td>
<td>13</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Kenya</td>
<td>53</td>
<td>-</td>
<td>2</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Lesotho</td>
<td>36</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Madagascar</td>
<td>*</td>
<td>*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Malawi</td>
<td>12.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mauritius</td>
<td>116</td>
<td>-</td>
<td>28</td>
<td>24</td>
<td>52</td>
</tr>
<tr>
<td>Rwanda</td>
<td>28</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Somalia</td>
<td>27</td>
<td>-</td>
<td>8</td>
<td>30</td>
<td>7</td>
</tr>
<tr>
<td>Sudan</td>
<td>43</td>
<td>-</td>
<td>-</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Swaziland</td>
<td>69</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tanzania</td>
<td>34</td>
<td>-</td>
<td>11</td>
<td>32</td>
<td>-</td>
</tr>
<tr>
<td>Uganda</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Zaire</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Zambia</td>
<td>71</td>
<td>6</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>136</td>
<td>10</td>
<td>7</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1/ Total is not equal to sum of the three measures because of interaction of measures when applied simultaneously.
2/ "*" signifies data not available. "-" signifies that country already meets the criterion for this measure.
3/ A portion of these possible savings could be used to lower student-teacher ratios in Malawi and Ethiopia and to increase teachers salaries in Uganda and Somalia.

Source: Annex I, T-4, 5, 6, and 7

Date: October 27, 1983.
and other international donor assistance, are particularly well run, and have adequate feedback mechanisms. Savings made in teacher costs might be utilized to establish radio programs which, again, could result in net gains in achievement.

**Universal Primary Education, Population Growth, and Costs**

2.34 All governments in Eastern Africa are committed to achieving universal primary education (UPE) in the shortest possible time. Literacy is considered both a basic right of all people and an essential prerequisite for economic and social development. In 1980 nine countries (Botswana, Comoros, Kenya, Lesotho, Madagascar, Mauritius, Tanzania, Zambia, and Zimbabwe) already enrolled 90% or more of the primary school age population and therefore had essentially reached UPE. Six countries (Malawi, Rwanda, Sudan, Swaziland, Zaire, and Uganda) enrolled 50 to 80% and four countries (Burundi, Djibouti, Ethiopia, and Somalia) enrolled less than 50% of the school age population. The achievement of UPE in the near future by these countries will be very difficult given present financial stringencies. Equally important will be the effect of high rates of population growth, ranging from 2.3% to 4.3% per annum, in every country except Mauritius. These rates of population growth mean, first, that an additional 4-5% per year in real expenditures for primary education are needed merely to retain the present level of school age participation; and secondly that, in a number of countries, increases of 10-20% per annum, a clearly impossible task, would be needed to meet the goal of UPE twenty years from now.

2.35 All countries in the region could make major savings in primary education expenditures through successful implementation of programs to reduce population growth. Calculations have been made by the World Bank's Population, Health, and Nutrition Department to give a rough idea of the amount of these savings. By and large, after initiating such programs savings would be equivalent to 25% of the primary education budget by the year 2000 and to 65% of the primary education budget in the year 2015. If fertility rates remain as they are at present, then even those countries enrolling over 90% of the school age population today will have difficulty retaining present participation ratios; and the other countries will face an impossible burden of extending education to their population even if all the cost savings measures proposed above are implemented. Table 3 shows the estimated number of school age children by country for the years 2000 and 2015 under various scenarios. Annex I, T-12 and Annex 2 provide detailed projections of primary school costs based on varying population growth assumptions, and, with Table 2 on proposed cost-saving measures, should form a basis for a country by country planning exercise on the financing of primary education.

**Costs and Internal Efficiency**

2.36 Internal efficiency in education may be defined as the amount of learning achieved during school attendance, compared to the resources provided. Data on learning are very difficult to obtain, and a very poor substitute, the percentage of entering students who complete the course, is often used as a measure of efficiency. A calculation can also be made of the number of school years required to produce one graduate. All the school years spent attending school are summed and the result divided by
### Table 3: School Age Population for the Years 2000 and 2015

**Based on Two Fertility Assumptions, Eastern Africa**

(School Age Population 000's)

<table>
<thead>
<tr>
<th>Country</th>
<th>1980</th>
<th>No Fertility Decline</th>
<th>Rapid Fertility Decline</th>
<th>Year 2000</th>
<th>Year 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Amount</td>
<td>% Reduction</td>
<td>Amount</td>
<td>% Reduction</td>
</tr>
<tr>
<td>Botswana</td>
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<td>119927</td>
<td>65</td>
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</tbody>
</table>

Source: Annex 2 and projections made by the World Bank's Population, Health, and Nutrition Department.
the number of graduates 6/. The result is a rough measure of the difference between actual unit costs per graduate and the theoretical cost per graduate if there were no dropout or repetition. The calculation assumes that all the years spent on a dropout are "lost"; however, some literacy is normally retained after four years of schooling, and the calculation is therefore a very imperfect measure of efficiency.

2.37 Despite these drawbacks, a review of the data can offer guidance on policy options in the region. The countries which require the greatest number of school years to produce one graduate are Ethiopia (17 years), Somalia (17 years), Burundi (16 years), Malawi (16 years), and Madagascar (16 years) (Annex I, T-13); these countries also have the lowest primary school completion rates, ranging from 23% to 35%. The ratio of school years per graduate to the length of the primary school system gives a measure of to what extent actual efficiency diverges from the ideal. In Burundi, Ethiopia, Madagascar, Malawi, Somalia, and Zaire, the cost per graduate is more than twice the theoretical cost if there were no dropouts or repeaters. In other countries, costs range from 1.2 to 1.7 times the theoretical cost.

2.38 Governments can reduce dropout and repetition over the long term through improved primary school quality. In the short term governments can also implement certain policies with relatively minor financial implications which might result in an increase in internal efficiency. For example, in Burundi and Malawi, more than 40% of final year students are repeaters and in Botswana, Comoros, Djibouti, Lesotho, and Madagascar more than 20% are repeaters (Annex I, T-13). Repetition in this year occurs because children sit for the primary school certificate examination as many as four or five times in order to obtain higher scores which would enable them to enter the highly selective secondary school system. Governments

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6/ If data on pass and repetition rates are known, the following equations would give estimates of the number of students who graduate and the number of years to produce one graduate:

\[ p = \text{ratio of students promoted to next grade in following year} \]

\[ r = \text{ratio of students repeating same grade in following year} \]

In a four year primary school system the fraction of initial enrollees who graduate from the system (G) is calculated as follows:

\[ G = \frac{P_1 P_2 P_3 P_4}{(1-r_1)(1-r_2)(1-r_3)(1-r_4)} \]

The number of student years (Y) delivered by the system is:

\[ Y = \frac{1}{(1-r_1)(1-r_1)(1-r_2)(1-r_1)(1-r_2)(1-r_3)(1-r_2)(1-r_3)(1-r_4)} + \frac{P_1}{(1-r_1)(1-r_2)(1-r_3)(1-r_4)} + \frac{P_1 P_2}{(1-r_1)(1-r_2)(1-r_3)(1-r_4)} + \frac{P_1 P_2 P_3}{(1-r_1)(1-r_2)(1-r_3)(1-r_4)} \]

The number of student years to produce one graduate is therefore \( \frac{Y}{G} \).
could therefore consider establishing and enforcing regulations that would limit children sitting for the examination to no more than two times or would require them to attend private rather than public schools. For another example Kenya has initiated a system of providing detailed information to individual schools on examination results and pass rates have been significantly improved; this approach could be duplicated elsewhere and has a low cost. Research has also suggested that additional hours of school attendance or additional homework may be cost-effective ways of increasing achievement.

2.39 Tanzania, Botswana, Sudan, Zambia, and Mauritius have established systems of "automatic promotion" as a means of increasing retention. Experience has shown that this approach is effective only if teachers are prepared to deal with "slow" learners and if remedial classes are available. The unintended results may therefore be a significant lowering of pass rates on the primary school certificate examination. The implications of "automatic promotion" should therefore be carefully scrutinized to ensure that the results are a net improvement in learning.

III. ISSUES IN SECONDARY EDUCATION COSTS

Unit Costs

3.01 Unit costs at the secondary education level average US$430 and vary from US$41 equivalent in Uganda and US$93 in Ethiopia to US$823 in Tanzania, US$806 in Botswana, and US$1075 in Zimbabwe (Annex I, T-4). Unit costs in secondary education average seven times primary education unit costs, with a range of from 2 to 24. In general, the poorer the country, the lower the unit costs at the primary level and the higher the differential between primary and secondary level unit costs. In terms of the ratio of unit costs to GNP per capita, Tanzania's costs are the highest, at 2.94 times GNP per capita, followed by Rwanda (1.73), Burundi (1.52), Zimbabwe (1.24), and Botswana (1.03) (Annex I, T-5). The lowest ratios are those in Mauritius (.19), Uganda (.20), Sudan (.29), and Somalia (.30). In general, as enrollment increases, unit costs go down since boarding is reduced and teacher supply is increased. For instance, Tanzania, Rwanda, and Burundi, all of which have high unit costs, have the lowest secondary enrollment ratios (3 or 4%), while Mauritius, with low unit costs, has the highest enrollment ratio (49%).

3.02 The main elements affecting unit costs are teacher salaries, student-teacher ratios, and non-teacher salary costs (especially boarding costs). Non-teacher salary costs comprise on average 35% of all secondary education costs compared to only 10% in primary education. Each component of unit costs is discussed in detail below.

Secondary School Teachers

3.03 From 1970 to 1978-82, the secondary student-teacher ratio in Eastern Africa increased slightly from 21:1 to 22:1 (Annex I, T-6). Ethiopia has the highest ratio (41:1) followed by Comoros (30:1), Kenya (28:1), and Zaire (27:1). The countries with the lowest student-teacher
ratios are Rwanda (13:1), Sudan (16:1), Burundi (17:1), Botswana (18:1), and Swaziland (18:1). These ratios mask often large variations between lower and upper secondary education in a number of countries. For example the ratios for Comoros are: lower secondary 45:1; upper secondary 11:1; and for Sudan, lower secondary 24:1, upper secondary, 15:1. This variation occurs because some countries have lower secondary schools with a wide base and high enrollments combined with highly selective academic upper secondary schools with numerous subject options (e.g. Comoros, Sudan, Burundi, Kenya, Somalia) while others have more or less unitary secondary school systems (e.g. Malawi, Tanzania, Ethiopia, Mauritius) with high progression rates from lower to upper secondary education.

In the typical pattern of secondary teacher utilization, students attend classes for 40 periods per week, each of which is 40 minutes in length. On average, teachers teach about 24 periods per week, or the equivalent of 16 hours, and the average student-class size is 35. The result of these practices is about a 21:1 student-teacher ratio. There are policy alternatives which might result in higher student-teacher ratios (Annex I, T-14). Under one alternative, teachers teach an average of 30 rather than 24 periods per week. Under a second alternative the number of class periods per week is reduced to 32, the length of a teaching period is increased to 50 minutes, and teachers teach 24 (50 minute) periods per week. Under a third alternative, the average student class size is increased to 40. Implementing any one of these three alternatives results in increases in the student-teacher ratio from 21:1 to at least 24:1. On this basis increases in student-teacher ratios to 24:1 are feasible in most countries in the region, especially at the lower secondary level where the variety of subjects taught is low. In order to implement such changes, Governments would have to ensure that local headmasters acted in accordance with clearly established guidelines on class size, student contact hours, school size, teacher hiring practices, etc., which would include some combination of the above alternatives.

The countries with high student-teacher ratios have already introduced combinations of these policies. Ethiopia has established secondary schools with double shifts and long teaching hours; the result is a very high 41:1 student-teacher ratio. The Comoros Islands have a junior secondary system with a student-teacher ratio of 45:1 which is a result of a restricted number of subjects, double shifting, high student class ratios, and high weekly teaching loads. Kenya has relatively high student-teacher ratios because the number of students per class in harambee schools averages about 50 and teacher teach 30 periods per week. Zaire has a large number of students per class and high teaching loads.

Should savings be made in teacher costs through higher student-teacher ratios, consideration should be given to utilizing a portion of the savings to provide teacher support services, such as laboratory, library, and workshop assistants, duplicating machines, and other simple teaching aids.

A number of countries have introduced technical and vocational subjects such as home economics, wood work, metal work, and agriculture into the curriculum as a means of "enriching" the curriculum or making it
more "relevant". The class size for these subjects is usually 20 students rather than 40 and also additional specialized staff are required. Overall, a secondary school which devotes a major portion of the curriculum to technical and vocational subjects can expect a significant increase in unit costs because of needs for additional teachers as well as consumable materials and electricity. A study in Tanzania showed that increases in recurrent costs for vocationally oriented schools over academic schools were: for commercially oriented schools, 15%; for technically oriented schools, 36%; and for agriculturally oriented schools, 52%. A study of costs in Swaziland, where about one third of the junior secondary school curriculum is devoted to industrial arts, agriculture, and home economics, gives the following unit cost breakdown:

Table 4: SECONDARY SCHOOL COSTS IN SWAZILAND

<table>
<thead>
<tr>
<th>Type of School</th>
<th>Unit Capital Costs (1980)</th>
<th>Unit Recurrent Costs (1981)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Academic School</td>
<td>$1,090</td>
<td>$260</td>
</tr>
<tr>
<td>School with &quot;Practical&quot; Subjects</td>
<td>$1,430</td>
<td>$300</td>
</tr>
<tr>
<td>% Increase over Academic School</td>
<td>31%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: World Bank data

The introduction of these courses should therefore be considered very carefully. If hand tools rather than machine tools are utilized, especially at the lower secondary level, then costs of electricity in particular and of machine maintenance would be reduced, and it may also be possible to increase class size to at least 30, since possible problems of safety would be less serious.

3.08 Savings can also be made in teacher training programs. "Diploma" level programs are designed to train teachers for the junior secondary level, while "degree" programs train teachers for senior level schools. Diploma level programs usually take place in post-secondary but non-university institutions 7/. Annual diploma level teacher training costs in seven countries have been estimated (Annex I, T-15); they range from US$726 equivalent per year in Zambia to US$3,556 per year in Malawi, and the costs per graduate vary from US$1,400 in Zambia to US$7,800 in Zimbabwe and US$10,700 in Malawi. In comparison, degree programs, which take place at the national university in all countries, have yearly costs which range from US$2,550 per year in Swaziland to US$7,700 and US$8,500 in Tanzania and Zimbabwe and costs per graduate which range as high as US$30,000 in Tanzania and Zimbabwe.

7/ In Malawi, diploma level training is carried out at the University.
3.09 Overall the cost per degree graduate is from two to fifteen times the cost per diploma graduate. At the same time, many degree graduates do not enter the teaching profession since they often have the option of working in the civil service or the private sector. Teacher training costs could therefore be lowered through expanding diploma level courses. An alternative is initially to provide only diploma level training, after which teachers would be required to work for at least two years before returning to the higher education system to earn full degrees. Such a program would require good supervision of diploma level teachers.

Teacher Salaries

3.10 On the whole, secondary teacher salaries are from one and a half to nine times higher than salaries paid to primary school teachers (Annex I, T-7). This differential, which is much greater than in developed countries, is in part a carryover from the time when expatriates formed most of the teaching force and is also a result of an overall shortage of secondary school teachers. The highest salaries are in Zimbabwe (US$16,900), Tanzania (US$7,300), and Botswana (US$6,500). The lowest salaries are in Uganda (US$500), Somalia (US$1,100), and Sudan (US$1,200). As a ratio to GNP per capita, the average is 11:1 and the highest salaries are in Tanzania, Ethiopia, Zimbabwe, and Burundi, while the lowest ratios are in Uganda, Sudan, Mauritius, and Somalia. Finally among the ten countries surveyed, Tanzania, Zimbabwe, and Ethiopia have the highest ratios of secondary teachers' salaries to average manufacturing salaries, while Swaziland, Zambia, and Kenya have the lowest ratios (Annex I, T-8).

3.11 Overall Tanzania, Zimbabwe, Ethiopia, and Burundi should consider taking a closer look at teachers salaries to determine whether it is appropriate to keep salary increments below the level of inflation in order to make funds available for expansion of secondary education or for providing other services. On the other hand Uganda, Sudan and Somalia should determine whether low salaries have caused morale problems. These latter countries have very low student-teacher ratios; in conjunction with low salaries they have apparently decreased teachers' responsibilities.

3.12 Somalia, Comoros and Madagascar, among others, require national service from students entering higher education and these students usually teach for one or two years in junior secondary schools. Salary costs of secondary education in these countries would be much higher except for the fact that national service teachers are paid minimal salaries. It is important, however, to give these teachers adequate pedagogical training and to supervise them carefully. Considering the large private benefits of higher education, other governments could consider requiring national service from their higher education students.

3.13 Countries in the region should also consider reviewing their salary scales. Salary scale items of importance include entering salaries, the annual step increases, and salary differentials for headmasters. Typically, these items have not been critically examined in terms of costs or policy objectives. There is usually a large differential between teachers with degree level training and those with less than degree (diploma) level, and expanded production of lower paid "diploma" level teachers would therefore result in significant savings in salaries.
Costs Other than Teacher Salaries

3.14 Costs other than teachers salaries make up about 35% of total governmental secondary school expenditures (Annex I, T-10). These include boarding costs, school operations, school equipment and purchase of textbooks. Botswana, Djibouti, Madagascar, Tanzania, and Uganda spend more than 50% of their secondary education budgets on these items. Burundi, Kenya, Rwanda, Somalia, Zambia, and Zimbabwe spend 20-50% of their budgets on these items. The countries with the lowest non-salary costs are Lesotho (0.1%), Mauritius (11%), Swaziland (11%), and Ethiopia (12%).

3.15 A major element of these costs is boarding costs. Countries with relatively high enrollment ratios and dense population have for the most part eliminated boarding. These include Mauritius, enrolling 49% of the secondary school age population, and Swaziland, enrolling 37% of the school age population, and with an efficient bus system. Lesotho, with a 21% enrollment ratio, has a predominantly non-boarding system, and Ethiopia, with a large number of community schools, also has minimal boarding. These four countries devote less than 12% of their secondary education budgets to non-teacher salary costs. Somalia, Kenya, Zambia, Zimbabwe, Sudan, and Uganda are gradually moving towards day secondary school systems but about one third of enrollment is still in boarding institutions. Burundi, Tanzania, Rwanda, and Malawi enroll more than 75% of their secondary school students in boarding institutions. In these countries enrollment ratios are still very low and travelling distances are often very great. Since the issue is being discussed in a number of countries, it is particularly appropriate to examine the estimated costs and other relative advantages and disadvantages of boarding against non-boarding institutions.

3.16 The cost per student place of constructing, financing, and equipping a school with full boarding and staff housing for one country is estimated as follows:

Table 5: UNIT COSTS OF BOARDING SECONDARY SCHOOL CONSTRUCTION IN MALAWI (1983)

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classrooms, administration, and common facilities, including dining hall</td>
<td>2,110</td>
<td>36</td>
</tr>
<tr>
<td>Dormitories</td>
<td>1,430</td>
<td>24</td>
</tr>
<tr>
<td>Staff housing</td>
<td>1,770</td>
<td>30</td>
</tr>
<tr>
<td>Furniture and equipment</td>
<td>570</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,880</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: World Bank data
Based on this estimate, a day school could be constructed for at most 75% of the cost of a full boarding school. If staff housing were also excluded, the same number of students could be accommodated for only 45% of the cost for full boarding and staff housing. In addition, the recurrent costs of boarding are estimated to be at least equivalent to the costs of teacher salaries. Thus, without boarding, governments could at least double the number of students covered for the same amount of funds expended for both capital and recurrent costs.

3.17 Over the long term, the switch from a boarding to a day secondary school system is inevitable. However, for countries such as Tanzania, Rwanda, Sudan, Kenya, Burundi, Malawi, and Uganda, systematic planning and experimentation is required to establish a smooth transition. These countries would have to review their policies of assigning the best students to "national" secondary schools. A school mapping exercise would be needed to determine the catchment area and the appropriate size of day secondary schools. Decisions would have to be taken on maximum walking distances, on minimum size of day secondary schools, and on possible streamlining of the curriculum to ensure that teachers would be fully utilized. As a temporary alternative where possible day streams could be added to boarding schools. It has been argued that boarding schools provide a more conducive "atmosphere" for learning and that day school examination results are generally lower than those of boarding schools. However, this may be a result of entrance policies rather than any inherent advantage in boarding and studies on this question should be undertaken. Alternatively decisions could be made to retain boarding but to shift most of these costs to students (see para. 3.23).

3.18 Double shifting is another way to ensure maximum utilization of physical facilities and should be considered in urban areas as well as in densely populated rural areas. Double shifting requires day schools, careful school mapping to ensure adequate catchment areas, and improved school management to ensure programming of teacher and facilities utilization. In some countries teachers have been asked to teach during both shifts. Doubling the teaching load might result in poorer instructional quality and it would be better to increase the load less drastically.

3.19 With the exception of Lesotho, governments in the region also cover much of the operational costs of public secondary schools. However, government support of school operational costs is often inadequate and individual schools usually require fees and/or donations from parents ranging from a few dollars to over US$200 equivalent, for maintenance, equipment, and school construction. In addition in several countries schools which were formerly mission-run are now "quasi-public", and the government covers only a portion of their running costs. In Lesotho most schools are still in this category and the government pays salaries only, with the result that student fees are the highest in the region. In Kenya, the "assisted" harambee schools are in a similar position. School maintenance is important to ensure that physical facilities are adequate. In addition, the proper operation of secondary schools requires science equipment, copy machines, school libraries, and consumables such as chalk, paper, and ink, as well as vehicles in rural areas. It is therefore appropriate for governments to continue to support these items, and to
expand support where possible. Such support should be cost-effective. It might, for example, include science demonstration kits rather than full-scale but costly and under-utilized science laboratories. If public funds are not available then governments should provide guidelines and advice to schools on how to get adequate funds from their students.

3.20 In the case of textbooks, most countries require students to purchase their own textbooks. A few (e.g. Tanzania, Rwanda, Burundi, Comoros, and Ethiopia) provide them free of charge and others (Malawi, Zambia) subsidize the cost. In a period of financial constraints it might be appropriate to reduce or eliminate this support and to ask students to purchase their own textbooks. This would also have the advantage of encouraging better textbook care as well as use of textbooks for future reference outside the school. Over the long-run governments might consider limiting spending on items other than teachers salaries to about 20% of their secondary education budget. This would permit schools to be operated effectively but would also mean major reductions in boarding and other costs.

Cost Recovery

3.21 The issue of cost recovery at the secondary level is different from that at the primary level. In most countries in Eastern Africa there is "excess demand" for a limited number of secondary school places and parents are apparently willing to find the funds necessary for their children to attend secondary schools. Research in several countries has also shown that the "private rate of return" to investment in secondary education is high. Historically church groups were responsible for most secondary schools in English speaking Africa with one or two public institutions run by the colonial authorities. Over time governments have gradually taken responsibility for all or most of the expenses of these institutions. At the same time in a number of countries private institutions account for a large portion of secondary school enrollment and are expanding because of shortages of government funds for public education.

3.22 In Kenya the Ministry of Education now recognizes numerous types of secondary schools. The Government provides "maintained" schools with teachers and makes other payments for operating and capital costs. Among the "maintained" schools are a number of prestigious institutions drawing the best students from the country as a whole. The Government pays 80% of teacher salaries of "assisted" schools. Communities establish harambee schools with completely private or local funding but as the qualifications of teachers rise they apply for classification as "assisted" schools. In addition Kenya has numerous completely private church and commercial (profit-making) secondary schools. In Kenya enrollment and financing of the major types of schools in 1980 were as follows:
Table 6: PUBLIC AND PRIVATE COSTS OF SECONDARY EDUCATION IN KENYA

<table>
<thead>
<tr>
<th>Type of School</th>
<th>Enrollment Amount</th>
<th>Percentage Financed by</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of Total</td>
<td>Public Sources</td>
</tr>
<tr>
<td>Maintained and Assisted</td>
<td>178,000</td>
<td>53</td>
</tr>
<tr>
<td>Assisted Harambee</td>
<td>80,000</td>
<td>18</td>
</tr>
<tr>
<td>Unassisted and Private</td>
<td>152,000</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>410,000</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: World Bank data

Despite the very high level of private financing (75% of total costs), enrollment in secondary education is equivalent to 19% of the school age population and output of middle level manpower may have been a significant factor in Kenya's past relatively good economic performance compared to neighboring countries.

3.23 In addition to Kenya data are available for eight countries in Eastern Africa on public and private costs of education. Private costs range from a low of 10% of total costs in Somalia to around 50% in Malawi, Uganda, and Lesotho (Annex I, T-16). The percentage of enrollment in private schools varies from Somalia, Burundi, Comoros, Swaziland, and Zimbabwe, where enrollment in private institutions is negligible, to Tanzania, Kenya, and Madagascar, where private school enrollment is 30% or more of total enrollment (Annex I, T-17). Little work has been done on the income elasticity of demand for secondary education and on the effects of increased fees on attendance by less-privileged socio-economic classes. Many governments and sometimes individual schools have scholarship programs for needy students, but there is little information on this matter.

3.24 Overall, in nearly every country surveyed it is possible to envisage mobilization of additional community, student and parents' financial resources for secondary education. The form such mobilization would take would depend on the particular conditions of each country. In most countries the cost of boarding could be shifted to students; alternatively school boarding could be eliminated and students asked to find their own accommodations. In other cases students could be asked to pay the full cost of textbooks as well as the costs of expendable materials which they will use in the course of their studies. Some rural schools could produce a portion of their food through establishment of school farms. It may also be possible to put aside a portion of all school fees gathered to provide scholarships to needy students.
3.25 It is also appropriate to further encourage private education. In the poorest countries, it may be that the vast majority of parents are unable to afford the costs of private education, and, for the time being, private education may play only a minor part in expansion of the education system. Nonetheless, governments could set up the machinery, including an inspection system to ensure that quality is upheld, to assist in the orderly expansion of private secondary education. At the same time it is important to monitor the effects of expansion of private education on attendance by poorer and rural children, and, if necessary, to establish compensatory public institutions or scholarship schemes in the most deprived areas.

A Cost Reduction Exercise

3.26 As in the case of primary education it is possible to undertake an exercise to give a rough idea of the magnitude of possible unit cost savings which could be made if certain policies are implemented (Table 7). Of course country specific policies depend on country conditions and the proposals made here are designed solely for illustrative purposes.

3.27 A first policy option would be to increase the average student-teacher ratio in secondary education to 24:1. As noted in para. 3.04 this increase would be feasible through the implementation of a combination of policies on teacher contact hours, class size, and curriculum at both junior and senior secondary levels but would also entail control by ministry officials of individual school decisions. Twelve countries (Rwanda, Burundi, Botswana, Swaziland, Tanzania, Lesotho, Malawi, Mauritius, Somalia, Zambia, Uganda, and Zimbabwe) currently have student-teacher ratios which are lower than 24:1 and could make savings of from 4 to 46% in the unit costs of secondary education if they were to increase ratios to this level.

3.28 The second policy option would be to restrict government financing of non-teacher salary items (e.g. boarding, school operation, textbooks) in public schools to no more than 20% of total public secondary school costs. Implementation of this arbitrarily selected figure would mean that governments would cover all the costs of teacher salaries, as well as costs for teaching aids, in-service training, supervision, and a portion of the costs of school operation and maintenance. Other costs, including especially boarding and textbooks, would be devolved to students, parents, and communities. Based on available data, nine countries (Tanzania, Botswana, Kenya, Uganda, Rwanda, Zambia,乌干达, and Zimbabwe) could make savings of 2 to 44% in expenditures by implementing such a policy. However implementation would obviously take a long time, especially in those countries where boarding is still a very common practice.

3.29 The third policy option would be to restrict teacher salaries to no more than twelve times per capita income. Tanzania, Burundi, Zimbabwe, Ethiopia, and Rwanda would qualify for such a policy and could make savings of 13 to 44% through implementation of this policy option.

3.30 On the basis of the exercise (Table 7), all the countries for which data are available could make savings, and the average would be 38%, compared to an average of 26% in primary education. Tanzania, Rwanda, Botswana, and Burundi could reduce their unit costs by over 50%.
Table 7: POSSIBLE SAVINGS IN SECONDARY EDUCATION UNIT COSTS, EASTERN AFRICA

<table>
<thead>
<tr>
<th>Countries</th>
<th>Unit Costs (US$)</th>
<th>Savings if Teacher Salaries Reduced to 12 times GNP/Capita</th>
<th>Savings if Gov't Financing of non-Teacher Salary Costs Reduced to 20% of Total Costs</th>
<th>Savings if Student-Teacher Ratio Increased to 24:1</th>
<th>Total Savings if All Three Measures Applied 1/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount (US$)</td>
<td>%</td>
<td>Amount (US$)</td>
<td>%</td>
<td>Amount (US$)</td>
</tr>
<tr>
<td>Botswana</td>
<td>806</td>
<td>-</td>
<td>356</td>
<td>44</td>
<td>202</td>
</tr>
<tr>
<td>Burundi</td>
<td>350</td>
<td>57</td>
<td>76</td>
<td>22</td>
<td>102</td>
</tr>
<tr>
<td>Comoros</td>
<td>134</td>
<td>-</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Djibouti</td>
<td>288</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>93</td>
<td>41</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kenya</td>
<td>201</td>
<td>-</td>
<td>82</td>
<td>41</td>
<td>-</td>
</tr>
<tr>
<td>Lesotho</td>
<td>234</td>
<td>-</td>
<td>-</td>
<td>29</td>
<td>12</td>
</tr>
<tr>
<td>Madagascar</td>
<td>216</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>27</td>
</tr>
<tr>
<td>Malawi</td>
<td>201</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mauritius</td>
<td>216</td>
<td>-</td>
<td>-</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>Rwanda</td>
<td>381</td>
<td>48</td>
<td>67</td>
<td>17</td>
<td>175</td>
</tr>
<tr>
<td>Somalia</td>
<td>84</td>
<td>-</td>
<td>21</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>Sudan</td>
<td>104</td>
<td>-</td>
<td>-</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Swaziland</td>
<td>271</td>
<td>-</td>
<td>-</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Tanzania</td>
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<td>198</td>
<td>365</td>
<td>44</td>
<td>137</td>
</tr>
<tr>
<td>Uganda</td>
<td>41</td>
<td>-</td>
<td>13</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Zaïre</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
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<tr>
<td>Zambia</td>
<td>381</td>
<td>-</td>
<td>119</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1075</td>
<td>293</td>
<td>157</td>
<td>15</td>
<td>45</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>178</strong></td>
<td><strong>38</strong></td>
<td><strong>15</strong></td>
<td><strong>15</strong></td>
<td><strong>45</strong></td>
</tr>
</tbody>
</table>

1/ Total is not equal to sum of the three measures because of interaction of measures when applied simultaneously.
2/ "*" signifies data not available. "-" signifies that country already meets the criterion for this measure.
3/ A portion of these possible savings might be used to lower student-teacher ratios in Ethiopia, to increase teachers' salaries in Somalia and Uganda, and to increase Government financing of non-teacher salary items in Lesotho.

Source: Annex I, T-4, 5, 6, and 7

Date: October 27, 1983.
The exercise would not be complete without consideration of policies which might lead to increases in costs. For example, Ethiopia's student-teacher ratio of 41:1 seems very high; Uganda, Sudan, and Somalia appear to have very low teacher salaries which may adversely affect morale; and Lesotho, which finances only teacher salaries, might consider expanding its support of teaching materials and other secondary school costs as a means of promoting higher quality.

Mass Media and Secondary Education

Experience in several countries has shown that access to secondary education can be expanded at a unit cost which is lower than the costs of traditional secondary schools. The Lesotho Distance Teaching Center (LDTC) provides correspondence courses for secondary school equivalency examinations. Tutorial classes are held from time to time to assist students, and tests are graded at the LDTC headquarters. Pass rates are reported to be higher than in regular schools. The Malawi Correspondence College (MCC), with enrollment which is equal to one third of regular junior secondary enrollment, provides full time classes to students whose grades were not high enough to enter regular secondary schools. Classes are taught by primary school teachers who get additional training from MCC staff. Correspondence material is corrected at MCC headquarters and teaching is supplemented by radio programs. Even though only 20% of MCC students pass the junior secondary examination, compared to 85% in regular schools, the cost per graduate (US$414 equivalent) is lower than that of regular secondary schools (US$568). Institutions like the MCC have the advantages of lower cost as well as offering a second chance to highly motivated students who have not been able to enter the regular system. In order for them to function well, they require a well-managed central staff with an adequate budget for printed materials, a good postal system for distribution of materials, a system for radio utilization, and community organization and interest. Other countries in Eastern Africa could profit from the experience of the LDTC and the MCC and consider establishing or expanding similar programs.

Enrollment Growth and Costs

The countries with the highest enrollment ratios in secondary education are Mauritius (49%), Swaziland (37%), Lesotho (21%), Comoros (21%), and Botswana (20%) (Annex I, T-1). Mauritius, Swaziland, and Botswana have relatively high per capita incomes and Lesotho, while a very poor country, is part of a larger Southern African labor market; therefore it cannot be said with any certainty that these countries have "overinvested" in secondary education. Only Comoros is a case of high enrollment ratios in a poor country with a restricted labor market but even here there is evidence of emigration of skilled labor and significant worker remittances. It is therefore difficult to determine an "optimum" enrollment ratio in any country. Nonetheless, along with its low per capita income, the region as a whole has the world's lowest secondary enrollment ratios and enrollment ratios of 3% in Burundi and Tanzania and 4% in Malawi and Rwanda are more than likely severe impediments to economic growth. As in the case of primary education, any reduction in population growth will lead to less pressure to expand secondary education with resulting cost savings.
IV. ISSUES IN HIGHER EDUCATION COSTS

Unit Costs

4.01 During the period 1978-82 the unit costs of higher education 8/ in Eastern Africa averaged US$4100 equivalent and ranged from lows of US$895 in Somalia and US$1553 in Ethiopia to US$8661 in Tanzania and US$11081 in Zimbabwe (Annex I, T-18). On average these costs are more than 50 times those of primary education. The unit costs of higher education in Eastern Africa are equivalent to 10.4 times GNP per capita, a figure which is the highest in the world and compares with Asia, 1.2 times per capita income; Latin America, 0.9; and all developed countries 0.5. As a multiple of GNP per capita, the highest costs in Eastern Africa are found in Tanzania (30.9 times GNP per capita), Malawi (15.9), Rwanda (14.0), and Zimbabwe (12.7).

4.02 These figures make it particularly urgent to review costs at this level. Concern with higher education costs led the government of Malawi in 1983 to request assistance from the British Council to review higher education costs and in 1984 the government of Lesotho requested similar assistance from the World Bank. In addition a commission in Kenya has reviewed higher education costs, Unesco recently completed a study of higher education in Ethiopia, USAID has completed sector studies on Somalia and Botswana with chapters on higher education, and World Bank staff have visited and gathered data on Kenya, Tanzania, and Burundi. The following is a summary of the major findings of these reports.

Teaching Costs

4.03 Student-teacher ratios in eleven institutions in Eastern Africa for which data are available averaged 7.4:1, and the only country with a ratio higher than 10:1 was Ethiopia (Annex I, T-19). The lowest ratios were in Tanzania (3.8), Zambia (3.8), and Sudan (5.4). The recommended guidelines for university planning in the United Kingdom are 10:1. The overall US average is 14:1; the French average is 20:1; and averages are also much higher in Asia and Latin America. It appears that, as a matter of national policy, higher education institutions no matter what size have developed the full spectrum of subjects and specializations to the degree level. The result is that class sizes are low. For example in both Burundi and Lesotho, except for law, business studies, and education, the average number of students per course in the fourth and last year of studies is less than 10. Even the larger institutions in Kenya and Sudan have been unable to achieve economies of scale, apparently because of a continued proliferation of courses of study as well as minimum demands on teaching staff.

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8/ These data refer to the national university rather than to all post-secondary institutions. They do not include the value of expatriate teachers paid by donor agencies.
4.04 A minimum number of students per course is more than likely necessary for an optimal learning process and overly small enrollments may hinder quality education rather than enhance it. It may also be that production of more than a few graduates in many specializations is not necessary for national development and the small number needed could be produced more expeditiously through overseas scholarships or cooperative programs with other institutions. For example in many countries it might be appropriate to terminate the full degree in physics and to permit only joint majors in physics, chemistry, mathematics and education. Arrangements could be made for the few specially talented students interested in advanced physics to complete their degree training in a neighboring country university or overseas. Similar decisions could be reached in areas such as statistics, philosophy, geography, medicine, engineering, chemistry, etc. In order to increase student-teacher ratios, it would be necessary to carefully review programs, departments, and teaching loads. It would be necessary to determine whether each degree program is essential for national development, whether in the near future enrollments would reach the critical level necessary to sustain quality instruction and in general whether the costs of various programs outweigh the benefits.

4.05 In Eastern Africa full time staff are typically asked to teach no more than eight hours per week. However, most staff engage in a minimum amount of research and have very small classes. It may therefore be possible to increase the number of student contact hours for those staff members with little or no research activities and/or very small classes. In some countries it might also be appropriate to expand specialized post-secondary training institutions in areas such as secondary school teaching, nursing, agricultural extension, accounting, and operational engineering, since these generally have higher student-teacher ratios and lower costs than full-scale national universities. For example Ethiopia has initiated a junior college scheme which may also prove less costly than traditional universities.

4.06 There is little comparative information available on salaries in higher education. Higher education salaries must be competitive with both private sector and civil servant salaries in order to attract the highest quality staff, and therefore any policy on controlling higher education salary increases would have to be based on careful analysis of alternative employment opportunities.

Non-Teaching Costs

4.07 Among countries for which data are available the non-teaching or "overhead" costs of higher education are equivalent to about 60% of total university costs (Annex I, T-20). The smaller institutions of Burundi, Lesotho, and Malawi devote about 70% of their budget to non-teaching costs, while the figure for the larger institutions in Ethiopia and Sudan is closer to 40%. Because of the relatively small size of institutions, the costs of administration are relatively high compared to teaching costs. In addition the institutions provide full or nearly full boarding and staff housing facilities. Finally the costs of equipment and library books are high because in large part these items must be imported.
4.08 It is appropriate to review these costs critically and determine where savings can be made. For example a review of these costs in Lesotho showed that savings equivalent to 16% of the university's budget could be achieved through a combination of eliminating leased housing, privatizing food, maintenance, and car repair services, charging of full costs for the university run primary school, for books and for printing, and closing down two "institutes" which did not appear to be functioning well. A similar review in Malawi recommended savings equivalent to 5.6% of the budget through reduced administrative costs, lower salaries paid to staff while being trained abroad, and control of travel and transport costs. A review in Tanzania showed that administrative staff had grown far more rapidly than number of students and the overall staff-student ratio was approaching 1:1. Other possibilities discussed in these and other countries include: encouraging off-campus living with the effect of reducing recurrent costs of food and housing as well as reducing needs for dormitory construction; asking private firms to take over all food as well as other services traditionally provided by the university at high costs; and gradually withdrawing from the responsibility to provide staff housing (as an interim measure, economic rather than the present nominal rents could be charged to staff using university provided housing and salaries could be temporarily increased to cover the loss of subsidy). When faced with budgetary constraints, some universities (e.g. Kenya, Burundi, Tanzania) have tended to reduce expenditures on library books, equipment and maintenance. Since these elements are essential for good teaching and often require scarce foreign exchange, they should be cut only as a last resort and should be priority items for assistance from bilateral and multilateral agencies.

4.09 Evidence from Lesotho and Tanzania, as well as other countries, is that higher education physical plants are underutilized. Physical and academic planners have not yet become accustomed to using computerized programs for class scheduling. With better scheduling as well as extended teaching hours, it may be possible to expand enrollment without significant investment in new physical facilities. In fact, with better use of existing facilities, encouragement of off-campus living, and increases in staff-student ratios, the marginal cost of increasing higher education enrollment in a number of institutions could be close to zero.

Cost Recovery

4.10 Besides covering the full capital and recurrent costs of higher education institutions, most governments provide stipends to students; these averaged US$766 equivalent per year (Annex I, T-20) in the seven countries for which data are available. This amount is in addition to free tuition and usually only a small portion is returned to the university for room and board costs, with most of the stipend remaining with the student for books and other incidental expenses.

4.11 Free higher education accompanied by student stipends made sense fifteen to twenty years ago, since it was essential to educate, as soon as possible, a core of nationals capable of running the machinery of government, and since the vast majority of higher education students were children of illiterate peasants who could ill-afford the costs of university attendance. The justification for this policy has become
progressively weaker. In the first place, educated nationals are now managing governmental affairs; in fact, in many cases the civil service has expanded excessively, and university graduates are forced more and more to look to the private sector for employment. In the second place, the average socio-economic level of higher education students is more than likely much higher than at independence, since many of them are the children of the political and economic elite already managing the country's affairs.

4.12 Research in several countries in Africa has shown that the "private rate of return" to this level is high and is much higher than the "social rate of return." This suggests both that governments should reduce their subsidies to this level of education and that students will be willing to pay a higher portion of costs. Reducing subsidies to higher education students would provide a greater incentive to them to choose responsibly among alternative education options. They would be more likely to pay attention to "signals" in the labor market and therefore would make better economic choices. In addition since students in higher education institutions tend to come from privileged socio-economic backgrounds and expect to enjoy much higher incomes after they complete their studies, provision of full education to them means that in effect they are subsidized by the needier members of society.

4.13 A reduction in the subsidies provided to higher education cannot be achieved overnight, if only because students constitute a very strong political pressure group. A first step might be to eliminate the "stipends" for incidental expenditures, on the assumption that if students were able to support themselves at secondary schools they should be able to find some way of supporting themselves in higher education. A second step would be to increase charges for food and boarding until the full costs of these services are recovered. Such a policy must be accompanied by a program to assist particularly needy students. Countries could establish a means test for students and then provide scholarships or loans for room, board, and books to those with demonstrated needs. Depending on the country, about one-fourth to one-half of students might qualify for such assistance. In principle loan schemes are more equitable than scholarships and offer the possibility of additional cost recovery. With this in mind Lesotho, Burundi, and Kenya, have initiated loan schemes. However, management and organization problems have been found to be difficult. A loan scheme will work only if an institution such as the income tax division of the treasury, or a bank, has fully accepted loan collection responsibility, and only if penalties on delinquent accounts are made effective. Loan recovery should not be confiscatory, e.g. as a rule of thumb no more than 15% of after tax income of graduates should be collected on an annual basis. Given the difficulties already encountered, countries considering establishing or improving loan schemes should request and receive technical assistance.

A Cost Reduction Exercise

4.14 It is possible to undertake a cost reduction exercise for higher education (see Table 8 on following page). This exercise does not include salaries since data are not readily available on this important cost component. If (a) student-teacher ratios were increased to 12:1 and (b)
the costs of room and boarding were reduced by one half through a combination of improved efficiency and initiation of cost-recovery measures, then countries in the region could reduce their unit costs by an average of 26%. The greatest percentage of savings could be made by Sudan (58%), Tanzania (37%), and Mauritius (32%). On average savings made through increased student-teacher ratios would be 16% compared to 10% savings through reduced room and boarding costs. In some countries it may be appropriate to utilize savings made at this level to strengthen quality and expand coverage at lower education levels, especially when primary enrollment ratios are low. Of course, any policy change would have to be implemented only after careful review of its implications and over a three to five year period. Other cost saving possibilities may be appropriate depending on the country, including especially reductions in other overhead costs such as, in Somalia, publication costs; Malawi, transportation costs; Lesotho, maintenance costs; Tanzania, administration costs.

**Higher Education and Development**

4.15 Enrollment ratios in Eastern Africa average 1.1% (Annex I, T-1), with the highest ratios in Madagascar (3.1%), and Swaziland (2.5%), and the lowest ratios in Tanzania (0.3%), Malawi (0.4%), Mauritius (0.4% but this does not account for a large number of students attending school in India), and Rwanda (0.4%). Except for Madagascar and Swaziland these ratios are low and will have to be increased to assist in national development. However, such enrollment increases must be based on careful analysis of needs and alternatives, as well as establishment of incentives for students to select higher priority specializations. In addition it is necessary to establish a process to ensure that resources provided to higher education are efficiently and effectively used. One way of strengthening this process would be to set up periodic reviews by outside experts in both the academic and non-academic areas on a three or five year cycle. Such reviews could include information on specific program objectives, structure, staff, students, clientele, placement, and manpower needs, relationships to other programs, students and faculty achievements, and quality compared to other similar institutions. One result of these reviews would undoubtedly be an awareness of needs to train students for the private sector, since public sector employment opportunities are already restricted. This would also imply training students in the specific entrepreneurial and creative skills necessary to create industrial enterprises and to generate private sector employment opportunities.

4.16 To strengthen the quality of instruction, higher education institutions should consider establishing programs of cooperation with other institutions for development of programs in high cost areas such as medicine and engineering, as well as for development of centers of excellence in areas such as science, business, public administration, and languages. In the past, these arrangements have often faced serious political and administrative problems. For example the University of Botswana, Lesotho, and Swaziland broke up into its constituent parts because of disputes over management and administration; and after the Faculty of Medicine of the University of Rwanda refused to accept students from Burundi, it was necessary to set up a new Faculty of Medicine in
### Table 8: POSSIBLE SAVINGS IN HIGHER EDUCATION

**UNIT COSTS, EASTERN AFRICA**

<table>
<thead>
<tr>
<th>Country</th>
<th>Unit Costs (US$)</th>
<th>Savings if Student:Teacher Ratio Increased to 12:1 1/</th>
<th>Savings if Costs of Room and Board Reduced by 50%</th>
<th>Total Savings if Both Measures Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Amount %</td>
<td>Amount %</td>
<td>Amount %</td>
</tr>
<tr>
<td>Botswana</td>
<td>6,572</td>
<td>701 11</td>
<td>657 10</td>
<td>1,358 21</td>
</tr>
<tr>
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<td>2,928</td>
<td>281 10</td>
<td>329 11</td>
<td>610 21</td>
</tr>
<tr>
<td>Comoros</td>
<td>*</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Djibouti</td>
<td>*</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1,553</td>
<td>-</td>
<td>155 10</td>
<td>155 10</td>
</tr>
<tr>
<td>Kenya</td>
<td>4,149</td>
<td>678 16</td>
<td>271 7</td>
<td>948 23</td>
</tr>
<tr>
<td>Lesotho</td>
<td>6,167</td>
<td>472 8</td>
<td>530 9</td>
<td>1,002 16</td>
</tr>
<tr>
<td>Madagascar</td>
<td>*</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Malawi</td>
<td>3,172</td>
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<td>484 15</td>
</tr>
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<td>3,169</td>
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<td>317 10</td>
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<tr>
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<td>*</td>
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<td>308 10</td>
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<tr>
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<td>891 58</td>
</tr>
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<td>Swaziland</td>
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</tr>
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<td>Tanzania</td>
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</tr>
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<td>3,139 10</td>
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<td>-</td>
<td></td>
</tr>
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* = Not available
- = Country meets criterion for this measure.
1/ If data not available, assures teaching costs = 40% of total costs
2/ If data not available, assumes room and board costs = 20% of total costs
3/ Totals are not consistent because of missing data

Source: Annex I, T-18, 19, and 20

Date: July 12, 1984
Burundi. Despite these past setbacks, it is clearly worthwhile in the long run to establish cooperative programs of study which are qualitatively superior and cost effective and can provide manpower essential for national and regional development.

V. MANAGEMENT OF EDUCATION SYSTEMS

5.01 It is necessary to establish a process to successfully identify and implement policies for reducing or controlling educational costs. Governments in Eastern Africa must therefore ensure that appropriate information is gathered and analyzed, that adequate staff are employed and trained, and that policy directives, once established, are enforced.

Information Processing

5.02 Statistical offices in ministries of education in Eastern Africa usually gather standard annual data on enrollment, repetition, teachers, and graduates in the education system, process this information by hand, and publish the results two or three years later in an education statistics yearbook. The presentation of the data follows a standard format developed a decade ago. These offices usually gather little or no financial data. With the advent of relatively inexpensive computers, it is possible for statistical offices to provide additional relevant information with minimum increase in costs. Calculations can be made nationwide, as well as by region, of student flows, unit costs, costs per graduate, student-teacher ratios, and teacher qualifications. Computer programs are now available to project enrollments, graduates, teacher requirements, and financial implications of enrollment expansion according to various scenarios. The ease of the computations permit annual reviews of progress toward meeting national policies and goals.

5.03 An education financing simulation model for use with micro-computers has been developed by the World Bank. This model differs from hitherto available models by making enrollment projections dependent on decisions on: (a) the amount of funds which will be available to the education system over a period of time, and (b) the unit costs of education levels, which are in turn based on student-teacher ratios, teacher salaries, and administrative and materials costs. The model therefore permits projections to be made within agreed upon budgetary constraints. Hitherto, enrollment and teacher projections models were designed and these would either stand as agreed upon objectives without adequate reviews of budgetary constraints or had to be adjusted in an ad hoc manner to fit within these constraints. In contrast this model allows simulation of effects due to changes in the available funds to education sub-sectors, as well as to combinations of changes in the budget and the operations of the education system. One of the innovations of the model is a detailed projection of teacher salary costs, including decisions on number of teacher steps and salary increments between steps. The model showed that in Burkina Faso a series of seemingly minor adjustments in teacher salary increments and student-teacher ratios could release significant amounts of funds to permit enrollment expansion.
5.04 The presentation of education budgets can also be improved to provide better opportunities for analysis. Most budget documents in Eastern Africa have highly aggregated categories such as "transfers" and "grants in aid". Budget documents should show the main categories of expenditures for each level of education --primary, secondary, technical, higher, teacher training, and adult education--as well as for general administration, and for each autonomous agency or institution. For each level, budget documents should provide line item estimates for expenditures on: (a) personal emoluments (e.g. teachers and others); (b) material and equipment (e.g. school equipment, office equipment, textbooks, and teaching materials); (c) running expenses (e.g. transport, electricity and water, office expenses, maintenance expenses, and student welfare expenses); (d) boarding expenses; and (e) grants and scholarships to students. This level of detail would provide the raw data needed for the analysis and projections discussed above.

5.05 Efforts to provide additional financial information for policy analysis have begun in only a few countries (e.g. Lesotho, Swaziland, Malawi), but there is an urgent need to initiate efforts elsewhere. As a first step micro-computers should be purchased and computer personnel hired and trained. In addition, three countries --Sudan, Madagascar, and Zaire-- are not processing even the data of the type traditionally gathered and require urgent efforts to strengthen their basic statistical services.

Staffing and Training

5.06 Planning offices in ministries of education in Eastern Africa are usually overwhelmed with day-to-day problems with little time for policy analysis, and most of their efforts are spent preparing the capital budget and dealing with donor agencies. These offices often suffer from high staff turnover because of low pay and more attractive offers elsewhere, especially for economists and statisticians. There is a need to establish a more permanent and well paid staff including competent and motivated education planners, economists, statisticians and computer personnel. Training available at the International Institute for Education Planning (IIEP), in World Bank sponsored EDI courses, as well as in masters degree programs in the UK, USA, and France, should be effectively utilized.

5.07 Administration, personnel, and accounting offices of the ministries of education are also usually overwhelmed with day-to-day problems. Routine decisions such as hiring of individual teachers need to be taken to a lower level in the chain of command, to ensure that departmental chiefs can become responsible for developing and enforcing policy guidelines. Middle level assistants and supervisors need basic training to carry out their responsibilities. Departmental chiefs need to be introduced to the necessity for policy making and implementation as well as to needs for better personnel management.

5.08 Headmasters of primary and secondary schools often handle large amounts of money collected from fees but have little or no training in financial management, and cases of mismanagement or private use of funds are often reported. Headmasters also are weak in areas such as timetabling, rotating use of school facilities, and personnel management in
general. In recognition of these needs, Kenya recently initiated a program of headmaster training. Lesotho, Malawi, and Zaire are initiating similar programs; there is a need for other Eastern Africa countries to seriously consider such programs.

5.09 Overall, there is also a need for a commitment to a new kind of technical assistance provided through the Ministry of Education. The purpose of this assistance would be to help communities and schools to improve local financial management. A "technical assistance" unit could establish guidelines for local school construction, assist in bulk procurement of textbooks, furniture, and equipment, provide feedback on examination results, and provide overall guidelines and advice for school management.

The Decision-Making Process

5.10 Often one or two high level officials in the ministry of education make budgetary decisions on an ad-hoc basis, and there is little time or capacity to analyze departmental budgets or to undertake dialogue with department heads. A more systematic framework is therefore required for the review of education budgets. Decisions need to be made on which sub-sectors of the education system are of the highest priority and on whether costs of various sub-sectors are appropriate to national policy objectives. Because of the nature of education systems, policies cannot be put into effect immediately. It is therefore important to have rolling three to five year plans, and to review progress towards stated goals annually. There is a need to establish a permanent budget review staff inside the ministry of education, possibly through expansion of the planning office, which would be charged with coordinating the capital and recurrent budgets. Ministries of finance also need to improve the quality and extent of their review of education budgets.

5.11 There is also a need to establish and then to follow-up on policy decisions relative to costs. For example, formulas for determining whether new staff are required in secondary schools can be established, based on student-teacher ratios and staff contact hours. These formulas are often stated in official regulations but they are not enforced. School headmasters should adhere to these formulas and release teachers in order to be within established norms. A system of rules and regulations for school collection and utilization of fees should also be established to ensure that fees are utilized in accordance with agreed upon national policies.

5.12 There are special problems with regard to autonomous education agencies such as universities, institutes of education, and testing agencies. Ministries of education and finance often do not have the time or capacity to subject these agencies to scrutiny of their budget requests. In most cases, these ministries are represented on the governing boards of these institutions and may be in a conflict of interest when they initiate their own review after the boards have taken decisions or made proposals. There is a need to put pressure on these institutions, i.e. to require them to formally defend and justify their expenditures to a much greater extent than has previously been done.

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1/ Primary and secondary level ratios are calculated by dividing enrollment in the particular level by the estimated number of children in the officially designated appropriate age group. For higher education, the age group is arbitrarily estimated at 20-24. Primary education figures may be greater than 100% when overaged children and repeaters attend school. The length of primary schooling varies from six to eight years and the length of secondary education varies from four to seven years; this makes direct comparisons between countries difficult.

1977-82 - World Bank Comparative Education Indicators, except Mauritius, primary and secondary, and Rwanda, primary, for which the source is Unesco.

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Sources: 1970 - Unesco Statistical Yearbook  

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1/ Not including foreign teacher salaries

Date: September 29, 1983
## UNIT COSTS AS A MULTIPLE OF GNP PER CAPITA, EASTERN AFRICA

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<tr>
<th>Country</th>
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<td>1.52</td>
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<td>260</td>
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Source: Table 4

Date: October 4, 1983
## PRIMARY AND SECONDARY STUDENT-TEACHER RATIOS
### EASTERN AFRICA, 1970-1982

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<td>Comoros</td>
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<td>65</td>
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<td>Zaire</td>
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<td>42</td>
</tr>
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<tr>
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<td><strong>43</strong></td>
<td><strong>21</strong></td>
<td><strong>41</strong></td>
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</tbody>
</table>

1/ Figures for Rwanda do not include post-primary vocational training, where the student-teacher ratio is 21:1.

Sources: 1970 - Unesco Statistical Yearbook
1978-82 - World Bank Comparative Education Indicators.
### ESTIMATED AVERAGE TEACHER SALARIES AND AS A MULTIPLE OF GNP PER CAPITA, PRIMARY AND SECONDARY EDUCATION, EASTERN AFRICA

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<thead>
<tr>
<th></th>
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<th>Secondary Education</th>
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<tbody>
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<td></td>
<td>Average Teacher Salary</td>
<td>As a Multiple of GNP per Capita</td>
</tr>
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<tr>
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</tr>
<tr>
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<td>43,781</td>
<td>1,904</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ethiopia</td>
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<td>1,467</td>
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<tr>
<td>Kenya</td>
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<td>1,808</td>
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<td>-</td>
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<tr>
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<td>797</td>
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<tr>
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<td>12,951</td>
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<td>4.6</td>
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Sources: For Malawi, Rwanda, Uganda, and Zambia, data were provided by Government. For other countries, figures are estimated by multiplying unit costs per student (Table 4) times student-teacher ratio (Table 6). This figure is then multiplied by the percentage of costs covered by salaries (Table 8). Where data are missing (Comoros, Sudan, Zaire), it is assumed that teachers' salaries make up 90% of the costs to the government of primary education. For secondary education, the figure is multiplied by the estimated percentage of salary costs to the government, from Table 8. Where data are missing, the figure is multiplied by 70%.

Date: October 1, 1983
### TEACHERS' SALARIES AS A RATIO OF MANUFACTURING SALARIES, EASTERN AFRICA

<table>
<thead>
<tr>
<th>Country</th>
<th>Average Salary, Manufacturing Sector (1)</th>
<th>Average Primary School, Teachers' Salary (2)</th>
<th>Ratio of (2) to (1) (3)</th>
<th>Average Secondary School, Teachers' Salary (4)</th>
<th>Ratio of (4) to (1) (5)</th>
<th>Year of Data</th>
<th>Source of Manufacturing Data</th>
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<td>P5069</td>
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<td>FB835553</td>
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<td>1980</td>
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</tr>
<tr>
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<td>n.a.</td>
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<td>FB735553</td>
<td>3.03</td>
<td>1980</td>
<td>ILO Yearbook, Table 17</td>
</tr>
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<td>n.a.</td>
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<td>S29579</td>
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<tr>
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<td>n.a.</td>
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<td>FB735553</td>
<td>3.03</td>
<td>1980</td>
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<td>n.a.</td>
<td>1.59</td>
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2/ Assumes 80% unskilled workers

Source: As above and Table 7

Date: June 15, 1984
RANK ORDER OF RATIOS OF TEACHER SALARIES TO
AVERAGE MANUFACTURING SALARIES, AND GNP PER CAPITA,
FOR TEN COUNTRIES IN EASTERN AFRICA

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<th>Country</th>
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<td>Teacher Salaries/</td>
<td>Teacher Salaries/</td>
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<tr>
<td></td>
<td>Manufacturing Salaries</td>
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<td>Teacher Salaries/</td>
<td>Teacher Salaries/</td>
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<tr>
<td></td>
<td>GNP per Capita</td>
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<tr>
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<td>GNP per Capita</td>
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Source: Tables 7 and 8
Date: June 8, 1984
## PERCENTAGE OF GOVERNMENT EXPENDITURE BY PURPOSE FOR PRIMARY AND SECONDARY EDUCATION, EAST AFRICA

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<th>Country</th>
<th>Type</th>
<th>Administrative Emoluments</th>
<th>Teachers Teaching Materials</th>
<th>Scholarships</th>
<th>Welfare Services</th>
<th>School Operation and Other</th>
<th>Year of Data</th>
<th>Source</th>
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<td>-</td>
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<td>-</td>
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Sources: UN - Unesco Statistical Yearbook
Budget - Government Budget Documents

Date: September 30, 1983
## Unit Cost for Students and for Governments in Primary Education, Eastern Africa

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Date: May 15, 1984
POSSIBLE SAVINGS IN PRIMARY EDUCATION COSTS WITH DECREASED FERTILITY RATES, FOR THE YEAR 2000 AND 2015

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## Flow Rates, Efficiency, Repetition and Cost per Graduate

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<td>11.9</td>
<td>7</td>
<td>1.7</td>
<td>10.9</td>
</tr>
<tr>
<td>Tanzania</td>
<td>87</td>
<td>7.6</td>
<td>7</td>
<td>1.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Uganda</td>
<td>61</td>
<td>10.4</td>
<td>7</td>
<td>1.5</td>
<td>9.6</td>
</tr>
<tr>
<td>Zaire</td>
<td>44</td>
<td>12.5</td>
<td>6</td>
<td>2.1</td>
<td>20.3</td>
</tr>
<tr>
<td>Zambia</td>
<td>80</td>
<td>8.1</td>
<td>7</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>55</td>
<td>-</td>
<td>7</td>
<td>-</td>
<td>n.a.</td>
</tr>
<tr>
<td>Average</td>
<td>56</td>
<td>11.9</td>
<td>6.7</td>
<td>1.8</td>
<td>12.7</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Year of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
</tr>
<tr>
<td>79</td>
</tr>
<tr>
<td>77</td>
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<tr>
<td>77</td>
</tr>
<tr>
<td>81</td>
</tr>
<tr>
<td>79</td>
</tr>
<tr>
<td>81</td>
</tr>
<tr>
<td>75</td>
</tr>
<tr>
<td>80</td>
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<tr>
<td>80</td>
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<tr>
<td>81</td>
</tr>
<tr>
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</tr>
<tr>
<td>78</td>
</tr>
<tr>
<td>78</td>
</tr>
</tbody>
</table>

### Sources:

1. World Bank Comparative Education Indicators
2. For most countries, calculated on the assumption that pass rate and repeater rate remain constant.
   For Comoros, Malawi, and Ethiopia calculated using actual yearly repeater and dropout rate derived from available statistics. For Somalia, provided in USAID Sector Survey.
3. UNESCO Statistical Yearbook.
4. Calculated by multiplying unit cost (Table 4) times number of years to produce one graduate.
5. Calculated by multiplying unit cost times number of years of primary education.

Date: October 24, 1983
TYPICAL PATTERN OF TEACHER UTILIZATION IN SECONDARY EDUCATION, AND MORE EFFICIENT ALTERNATIVES, EAST AFRICA

<table>
<thead>
<tr>
<th></th>
<th>Typical Pattern 1/</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) Additional Teaching Load</td>
<td>(B) More Students per Class</td>
</tr>
<tr>
<td></td>
<td>a.1 More Teaching Periods</td>
<td>a.2 Longer Teaching Periods</td>
</tr>
<tr>
<td>Number of Student Periods per Week</td>
<td>40</td>
<td>32 40</td>
</tr>
<tr>
<td>Length of Periods in Minutes</td>
<td>40</td>
<td>50 40</td>
</tr>
<tr>
<td>Total Number of School Hours</td>
<td>26 2/3</td>
<td>26 2/3 26 2/3 26 2/3</td>
</tr>
<tr>
<td>Average Number of Teaching Periods per Teacher</td>
<td>24</td>
<td>24 24</td>
</tr>
<tr>
<td>Average Number of Teaching Hours per Teacher</td>
<td>16</td>
<td>20 20</td>
</tr>
<tr>
<td>Average Class Size</td>
<td>35 35</td>
<td>35 35 40</td>
</tr>
<tr>
<td>Average Student Teacher Ratio</td>
<td>21:1 26:1</td>
<td>26:1 26:1 24:1</td>
</tr>
</tbody>
</table>

1/ This is the pattern of teaching in all East Africa countries, with the exception of Comoros, Ethiopia, Zaire, and Kenya, which have student teacher ratios of 27:1 or above.
LENGTH AND COST OF SECONDARY TEACHER TRAINING PROGRAMS IN SEVEN COUNTRIES, IN SOUTHERN AFRICA, 1981

<table>
<thead>
<tr>
<th></th>
<th>Diploma Programs</th>
<th></th>
<th>Degree Programs</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Length of Program in Years</td>
<td>Cost per Year (US$)</td>
<td>Total Cost per Graduate (US$)</td>
</tr>
<tr>
<td>Botswana</td>
<td>2</td>
<td>1,038</td>
<td>2,076</td>
</tr>
<tr>
<td>Lesotho</td>
<td>3</td>
<td>1,242</td>
<td>3,726</td>
</tr>
<tr>
<td>Malawi</td>
<td>3</td>
<td>3,556</td>
<td>10,668</td>
</tr>
<tr>
<td>Swaziland</td>
<td>2</td>
<td>1,610</td>
<td>3,220</td>
</tr>
<tr>
<td>Tanzania</td>
<td>2</td>
<td>1,170</td>
<td>2,340</td>
</tr>
<tr>
<td>Zambia</td>
<td>2</td>
<td>726</td>
<td>1,452</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>3</td>
<td>2,600</td>
<td>7,800</td>
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## UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS
### IN SECONDARY EDUCATION, EASTERN AFRICA

<table>
<thead>
<tr>
<th></th>
<th>Day Schools</th>
<th>Boarding Schools</th>
<th>Community Junior Secondary Schools</th>
<th>Government Aided Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOTSWANA (1982)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government's Unit Cost</td>
<td>P751</td>
<td>P789</td>
<td>P134</td>
<td>P415</td>
</tr>
<tr>
<td>Student Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuition</td>
<td>20</td>
<td>20</td>
<td>200</td>
<td>20</td>
</tr>
<tr>
<td>Uniforms</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Books and Supplies</td>
<td>35</td>
<td>35</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>Examination Fees</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Room and Board</td>
<td>12</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Student Cost</td>
<td>82</td>
<td>130</td>
<td>215</td>
<td>P65</td>
</tr>
<tr>
<td>(as a % of Total Cost)</td>
<td>(9.8)</td>
<td>(14.1)</td>
<td>(61.6)</td>
<td>(13.5)</td>
</tr>
<tr>
<td>Total Costs</td>
<td>833</td>
<td>919</td>
<td>349</td>
<td>480</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Maintained and Assisted Schools</th>
<th>Assisted Harambee Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KENYA (1981-82)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government's Unit Cost</td>
<td>S2340</td>
<td>S413</td>
</tr>
<tr>
<td>Student Cost Fees</td>
<td>1820</td>
<td>1851</td>
</tr>
<tr>
<td>Total</td>
<td>1820</td>
<td>1851</td>
</tr>
<tr>
<td>(As a % of Total Cost)</td>
<td>(43.7)</td>
<td>(80.7)</td>
</tr>
<tr>
<td>Total School Cost</td>
<td>4168</td>
<td>2294</td>
</tr>
</tbody>
</table>
### UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS IN EASTER AFRICA

#### LESOTHO (1982)

<table>
<thead>
<tr>
<th></th>
<th>Day Schools</th>
<th>Boarding Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government's Unit Cost</td>
<td>M254</td>
<td>M254</td>
</tr>
<tr>
<td>Student Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees</td>
<td>163</td>
<td>275</td>
</tr>
<tr>
<td>Uniforms, Shoes</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Total Student Cost</td>
<td>185</td>
<td>297</td>
</tr>
<tr>
<td>(As a % of Total Cost)</td>
<td>(42.1)</td>
<td>(53.9)</td>
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<tr>
<td>Total School Cost</td>
<td>439</td>
<td>551</td>
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</table>

Source: Government of Lesotho Sector Survey (1983)

#### MALAWI (1982)

<table>
<thead>
<tr>
<th></th>
<th>State Boarding Schools (Form IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government's Unit Cost</td>
<td>K235</td>
</tr>
<tr>
<td>Student Cost</td>
<td></td>
</tr>
<tr>
<td>School Fees</td>
<td>27</td>
</tr>
<tr>
<td>Boarding Fees</td>
<td>56</td>
</tr>
<tr>
<td>Other Fees</td>
<td>14</td>
</tr>
<tr>
<td>Books, Stationary</td>
<td>8</td>
</tr>
<tr>
<td>School Attire</td>
<td>37</td>
</tr>
<tr>
<td>Transport</td>
<td>56</td>
</tr>
<tr>
<td>Expenditures</td>
<td>23</td>
</tr>
<tr>
<td>Total Student Cost</td>
<td>221</td>
</tr>
<tr>
<td>(As a % of Total Cost)</td>
<td>(48.5)</td>
</tr>
<tr>
<td>Total School Cost</td>
<td>456</td>
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</tbody>
</table>

## UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS

### IN SECONDARY EDUCATION, EASTERN AFRICA

#### SOMALIA (1981-82)

<table>
<thead>
<tr>
<th></th>
<th>Day Schools</th>
<th>Boarding Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Government Unit Cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Salaries</td>
<td>S754</td>
<td></td>
</tr>
<tr>
<td>Non Teacher Salaries</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>Textbooks, Exercise Books</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td>Class Supplies</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Science, Workshop Supplies</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Maintenance, Repairs</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-Total Government</strong></td>
<td>1068</td>
<td>S1068</td>
</tr>
<tr>
<td>Salaries</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>2160</td>
<td></td>
</tr>
<tr>
<td>Outline Books</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Boarding</td>
<td>322</td>
<td></td>
</tr>
<tr>
<td><strong>Total Government Cost</strong></td>
<td>1068</td>
<td>3803</td>
</tr>
<tr>
<td><strong>Student Cost</strong></td>
<td>-0-</td>
<td>450</td>
</tr>
<tr>
<td>Boarding Charges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Total Student Cost as a % of Total Cost)</td>
<td>(0.0)</td>
<td>(10.6)</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>1068</td>
<td>4253</td>
</tr>
</tbody>
</table>

**Source:** USAID Sector Study (1983)

#### SWAZILAND (1980)

<table>
<thead>
<tr>
<th></th>
<th>Lower Secondary Education</th>
<th>Upper Secondary Education</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Governments' Unit Cost</strong></td>
<td>E168</td>
<td>E280.2</td>
</tr>
<tr>
<td><strong>Student Cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees</td>
<td>37.7</td>
<td>53.1</td>
</tr>
<tr>
<td>Books</td>
<td>38.4</td>
<td>39.4</td>
</tr>
<tr>
<td>Building</td>
<td>6.5</td>
<td>9.0</td>
</tr>
<tr>
<td><strong>Total Student Cost</strong></td>
<td>82.0</td>
<td>101.5</td>
</tr>
<tr>
<td>(as a % of Total Cost)</td>
<td>(32.8)</td>
<td>(26.6)</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>250.0</td>
<td>381.7</td>
</tr>
</tbody>
</table>

**Source:** Education Sector Review, 1981 "Education Financing in Swaziland", Government of Swaziland
### ANNEX I

#### Table 16

**UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS**

**IN EASTERN AFRICA**

---

#### TANZANIA (1980)

<table>
<thead>
<tr>
<th></th>
<th>Boarding Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Governments' Unit Cost</strong></td>
<td>S6860</td>
</tr>
<tr>
<td><strong>Student Cost</strong></td>
<td></td>
</tr>
<tr>
<td>Fees</td>
<td>0</td>
</tr>
<tr>
<td>School Books</td>
<td>131</td>
</tr>
<tr>
<td>Writing Supplies</td>
<td>109</td>
</tr>
<tr>
<td>School Equipment</td>
<td>107</td>
</tr>
<tr>
<td>Transport to School</td>
<td>151</td>
</tr>
<tr>
<td>School Uniforms</td>
<td>267</td>
</tr>
<tr>
<td>Boarding</td>
<td>204</td>
</tr>
<tr>
<td>Incidentals</td>
<td>171</td>
</tr>
<tr>
<td><strong>Total Student Cost</strong></td>
<td>1140</td>
</tr>
<tr>
<td><em>(As a % of Costs)</em></td>
<td><em>(14.3)</em></td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>S8000</td>
</tr>
</tbody>
</table>


---

#### UGANDA (1981)

<table>
<thead>
<tr>
<th></th>
<th>Day Schools</th>
<th>Boarding Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Governments' Unit Cost</strong></td>
<td>4095</td>
<td>4095</td>
</tr>
<tr>
<td><strong>Student Cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees</td>
<td>1311</td>
<td>3496</td>
</tr>
<tr>
<td><strong>Total Student Cost</strong></td>
<td>1311</td>
<td>3496</td>
</tr>
<tr>
<td><em>(As a % of Total Cost)</em></td>
<td><em>(24.3)</em></td>
<td><em>(46.1)</em></td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>5406</td>
<td>7591</td>
</tr>
</tbody>
</table>

*Source: Unesco Sector Survey, (1982)*

---
### ZAMBIA (1980)

<table>
<thead>
<tr>
<th></th>
<th>Day Schools</th>
<th>Boarding Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governments' Unit Cost</td>
<td>331</td>
<td>331</td>
</tr>
<tr>
<td>Student Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees</td>
<td>38.5</td>
<td>38</td>
</tr>
<tr>
<td>Exercise Books, etc.</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Uniforms, Shoes</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Transportation</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Total Student Cost</td>
<td>178.5</td>
<td>193</td>
</tr>
<tr>
<td>(As a % of Total Cost)</td>
<td>(35.0)</td>
<td>(36.8)</td>
</tr>
<tr>
<td>Total Cost</td>
<td>509.5</td>
<td>524</td>
</tr>
</tbody>
</table>

Source: MOE estimates provided to World Bank (1983)
## Enrollment in Public and Private Secondary Schools, Eastern Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Enrollment in Public Schools</th>
<th>Enrollment in Private Schools</th>
<th>Total</th>
<th>Year of Data</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>14500 71%</td>
<td>6020 29%</td>
<td>20520</td>
<td>1982</td>
<td>USAID Sector Survey</td>
</tr>
<tr>
<td>Burundi</td>
<td>17570 94%</td>
<td>1048 6%</td>
<td>18618</td>
<td>1982</td>
<td>Government of Burundi, Statistiques Scolaires</td>
</tr>
<tr>
<td>Comoros</td>
<td>13628 100%</td>
<td>0 0%</td>
<td>13628</td>
<td>1981</td>
<td>World Bank Appraisal Report</td>
</tr>
<tr>
<td>Djibouti</td>
<td>5322 89%</td>
<td>677 11%</td>
<td>5999</td>
<td>1983</td>
<td>World Bank Sector Memorandum</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>451674 93%</td>
<td>35500 7%</td>
<td>487174</td>
<td>1981</td>
<td>Ethiopian Government</td>
</tr>
<tr>
<td>Kenya</td>
<td>258119 63%</td>
<td>152430 37%</td>
<td>410549</td>
<td>1981</td>
<td>Sector Study of Ethiopian Education</td>
</tr>
<tr>
<td>Lesotho</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>World Bank Financing Study</td>
</tr>
<tr>
<td>Madagascar</td>
<td>129370 69%</td>
<td>57694 31%</td>
<td>18706</td>
<td>1978</td>
<td>Malgache Government</td>
</tr>
<tr>
<td>Malawi</td>
<td>16590 85%</td>
<td>3000 15%</td>
<td>18590</td>
<td>1982</td>
<td>World Bank Financing Study</td>
</tr>
<tr>
<td>Mauritius</td>
<td></td>
<td></td>
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<td>Rwanda</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somalia</td>
<td>44860 100%</td>
<td>0 0%</td>
<td>44860</td>
<td>1982</td>
<td>USAID Sector Study</td>
</tr>
<tr>
<td>Sudan</td>
<td></td>
<td></td>
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</tr>
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<td>Swaziland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>35400 64%</td>
<td>19800 36%</td>
<td>55230</td>
<td>1980</td>
<td>Unesco Sector Study, 1981 (Forms I - IV)</td>
</tr>
<tr>
<td>Uganda</td>
<td>66730 75%</td>
<td>21992 25%</td>
<td>88722</td>
<td>1979</td>
<td>Unesco Sector Study, 1983</td>
</tr>
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<td>Zaire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zambia</td>
<td>9627 97%</td>
<td>3270 3%</td>
<td>94897</td>
<td>1980</td>
<td>Government of Zambia Data</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>316438 100%</td>
<td>0 0%</td>
<td>316428</td>
<td>1983</td>
<td>Government of Zimbabwe Data</td>
</tr>
</tbody>
</table>

Average: 86% Public, 14% Private

1/ Private schools are defined as institutions which receive little or no financial assistance from government.

Date: July 10, 1984
### ESTIMATED UNIT COSTS TO GOVERNMENTS OF HIGHER EDUCATION, EASTERN AFRICA

<table>
<thead>
<tr>
<th>Country</th>
<th>Unit Cost</th>
<th>As a Multiple of GNP per capita</th>
<th>Year of Data</th>
<th>Exchange Rate</th>
<th>Source</th>
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1/ Based on data from the national university rather than all post-secondary institution. Does not include value of expatriate teachers financed by external loans.

2/ 1981 Data on GNP per capita except Mauritius, 1979; Rwanda, 1980; Sudan, 1980; Swaziland 1980.

3/ Most higher education costs are paid by Italian Government.

Date: July 12, 1984.
### STUDENT-TEACHER RATIOS

**IN HIGHER EDUCATION INSTITUTIONS, EASTERN AFRICA**

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**Date:** July 10, 1984
### Breakdown of Higher Education Costs and Amount of Stipends to Students, Eastern Africa

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<th>Teaching Costs %</th>
<th>Student Room and Board %</th>
<th>Administration and Other Costs %</th>
<th>Yearly Stipend per Student</th>
<th>Amount of which Returned for Room, Board, and Tuition</th>
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1/ Provided to all students except Lesotho 67%, Botswana 89%, and Burundi 75%
2/ In the form of loans in Kenya, Burundi, and Lesotho

Date: July 12, 1984
The following pages provide projections by country of primary level enrollments and costs through the year 2015. Alternative projections are based on: (a) continuation of present enrollment ratios (Option A) or achievement of 98% enrollment ratio by the year 2000 (Option B); and (b) alternative fertility assumptions including: (i) constant fertility; (ii) moderate fertility decline, and (iii) rapid fertility decline along the lines of countries such as Singapore and the Republic of Korea. The population projections with alternative fertility assumptions were provided by the Population, Health, and Nutrition Department of the World Bank. The projection assumes no changes in unit costs and student-teacher ratios.
## VARIABLES PER COUNTRY

<table>
<thead>
<tr>
<th>Country</th>
<th>Enrollment Ratio</th>
<th>Student-Teacher Ratio</th>
<th>Cost per Student (in Local Currency)</th>
<th>School Age Population</th>
<th>Population Growth Rate (1980)</th>
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Note: The number of deaths and deaths per 100,000 population are hypothetical and for illustrative purposes only.
### Constant Fertility Decline

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<th>Country</th>
<th>Year</th>
<th>Total Population (000's)</th>
<th>School-Age Population (000's)</th>
<th>Constant Enrollment Ratio by Number of Teachers</th>
<th>U.P.E. by Option B (000's)</th>
<th>Number of Teachers Required (Option A)</th>
<th>Number of Teachers Required (Option B)</th>
<th>Government Expenses Option A (000,000's of Local Currency)</th>
<th>Government Expenses Option B (000,000's of Local Currency)</th>
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### Intermediate Fertility Decline

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<th>U.P.E. by Option B (000's)</th>
<th>Number of Teachers Required (Option A)</th>
<th>Number of Teachers Required (Option B)</th>
<th>Government Expenses Option A (000,000's of Local Currency)</th>
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### Constant Fertility

| Year | Total Population (000's) | School-Age Population (000's) | Constant Enrollment Ratio Option A (000's) | U.P.E. by Year 2000 Option A (000's) | Number of Teachers Required Option A | Number of Teachers Required Option B | Government Expenses Option A (000's) (of Local Currency) | Government Expenses Option B (000,000's) (of Local Currency) |
|------|-------------------------|-------------------------------|------------------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| 1980 | 16443                   | 3533                          | 3250                                     | 81300                             | 81300                                | 1000.14                              | 100                                            | 100                                            | 100                                            |
| 1985 | 20579                   | 4715                          | 4037                                     | 100800                            | 110260                               | 1735.12                              | 123                                            | 1765.48                                        | 135                                            |
| 1990 | 25584                   | 6011                          | 5530                                     | 162800                            | 140200                               | 2212.04                              | 170                                            | 2164.18                                        | 175                                            |
| 1995 | 32024                   | 7419                          | 6825                                     | 170600                            | 179800                               | 2730.19                              | 269                                            | 2863.73                                        | 220                                            |
| 2000 | 40602                   | 9271                          | 9621                                     | 215500                            | 239400                               | 3448.52                              | 265                                            | 3673.43                                        | 282                                            |
| 2005 | 51291                   | 11970                         | 11912                                    | 275300                            | 293200                               | 4494.94                              | 338                                            | 4692.24                                        | 366                                            |
| 2010 | 65358                   | 15646                         | 14182                                    | 356400                            | 377700                               | 5673.08                              | 436                                            | 5094.07                                        | 444                                            |
| 2015 | 83485                   | 19770                         | 18188                                    | 456700                            | 484600                               | 7275.36                              | 559                                            | 7749.84                                        | 594                                            |

### Intermediate Fertility Decline

| Year | Total Population (000's) | School-Age Population (000's) | Constant Enrollment Ratio Option A (000's) | U.P.E. by Year 2000 Option A (000's) | Number of Teachers Required Option A | Number of Teachers Required Option B | Government Expenses Option A (000's) (of Local Currency) | Government Expenses Option B (000,000's) (of Local Currency) |
|------|-------------------------|-------------------------------|------------------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| 1980 | 14443                   | 3233                          | 3250                                     | 81300                             | 81300                                | 1000.14                              | 100                                            | 100                                            | 100                                            |
| 1985 | 20579                   | 4715                          | 4037                                     | 100800                            | 110260                               | 1735.12                              | 123                                            | 1765.48                                        | 135                                            |
| 1990 | 25584                   | 6011                          | 5530                                     | 162800                            | 140200                               | 2212.04                              | 170                                            | 2164.18                                        | 175                                            |
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| 2005 | 51291                   | 11970                         | 11912                                    | 275300                            | 293200                               | 4494.94                              | 338                                            | 4692.24                                        | 366                                            |
| 2010 | 65358                   | 15646                         | 14182                                    | 356400                            | 377700                               | 5673.08                              | 436                                            | 5094.07                                        | 444                                            |
| 2015 | 83485                   | 19770                         | 18188                                    | 456700                            | 484600                               | 7275.36                              | 559                                            | 7749.84                                        | 594                                            |

### Rapid Fertility Decline

| Year | Total Population (000's) | School-Age Population (000's) | Constant Enrollment Ratio Option A (000's) | U.P.E. by Year 2000 Option A (000's) | Number of Teachers Required Option A | Number of Teachers Required Option B | Government Expenses Option A (000's) (of Local Currency) | Government Expenses Option B (000,000's) (of Local Currency) |
|------|-------------------------|-------------------------------|------------------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|------------------------------------------------|------------------------------------------------|------------------------------------------------|
| 1980 | 14443                   | 3233                          | 3250                                     | 81300                             | 81300                                | 1000.14                              | 100                                            | 100                                            | 100                                            |
| 1985 | 20579                   | 4715                          | 4037                                     | 100800                            | 110260                               | 1735.12                              | 123                                            | 1765.48                                        | 135                                            |
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| 2010 | 65358                   | 15646                         | 14182                                    | 356400                            | 377700                               | 5673.08                              | 436                                            | 5094.07                                        | 444                                            |
| 2015 | 83485                   | 19770                         | 18188                                    | 456700                            | 484600                               | 7275.36                              | 559                                            | 7749.84                                        | 594                                            |
|------|-------|--------|------------------|------------------|------------------|-------------------|------------------|-----------------------------|
| 001  | NY    | Westchester | 940,000          | 890,000          | 50,000           | 5,000             | 5,000            | 5,000                       |
| 002  | NY    | Rockland   | 860,000          | 810,000          | 50,000           | 5,000             | 5,000            | 5,000                       |
| 003  | NY    | Putnam     | 780,000          | 730,000          | 50,000           | 5,000             | 5,000            | 5,000                       |

*Table legend:*
- **Total Population**
- **White Population**
- **Black Population**
- **Hispanic Population**
- **Asian Population**
- **American Indian Population**

*Note:* Data rounded to nearest 10,000.
### CONSTANT FERTILITY DECLINE

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#### Annex II

**Constant Fertility**

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* World Bank, "Cost Effectiveness of Education in the Kingdom of Lesotho" (draft), Washington, D.C., June 6, 1984.


Papers marked with * are unpublished World Bank documents with restricted circulation.
World Bank Publications of Related Interest

Alternative Routes to Formal Education: Distance Teaching for School Equivalency
Edited by Hilary Perraton
The demand for education is outstripping the capacity of many countries to build schools or to recruit and pay teachers. To meet this demand and to provide access to education to individuals who are unable to attend regular schools, educators throughout the world are trying to develop alternatives to the traditional classroom. One of these alternatives—known as distance teaching—combines correspondence courses with radio or television broadcasts and occasional face-to-face study.

Does this alternative work? Is it cheaper? This book is the first attempt to answer such key questions. It examines the variety of ways in which distance teaching has been used, provides comparisons of specific cases, analyzes their costs, and considers the effectiveness of distance teaching versus traditional education.


Attacking Rural Poverty: How Non-Formal Education Can Help
Philip H. Coombs and Manzoor Ahmed
ISBN 84-309-0559-6, Stock No. IB 0525. $10.95.

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Basic Education and Agricultural Extension: Costs, Effects, and Alternatives
Hilary Perraton and others
Addresses the effectiveness of using mass media for agricultural extension and basic education. Includes a review of the literature on the effectiveness of agricultural extension and on the use of mass media for rural education. Case studies from Malawi, Cameroon, and Lesotho examine institutions using mass media in widely different ways.


Charging User Fees for Social Services: The Case of Education in Malawi
Mateen Thobani
An analysis of one way to reduce the problem of recurrent expenditure in social sector services. Argues that the deterioratation or curtailment of services resulting from low user charges affects the poor disproportionately, and considers conditions under which raising charges would increase efficiency while reducing the financing problem.


The Economic Evaluation of Vocational Training Programs
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A methodology for appraising the cost effectiveness of alternative methods of industrial training in developing countries.


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Emphasizes the pervasive role of education in development and draws extensively on the Bank's experience in education for two decades and its close collaborative ties with other international agencies, individuals, and institutions of developing countries.

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Edited by Timothy King; prepared by Mary Jean Bowman and others
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Stephen P. Heyneman
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Farmer Education and Farm Efficiency
Dean T. Jamison and Lawrence J. Lau
This book complements earlier studies by reviewing existing literature on the
relation between farmer education and farm efficiency. The authors then are able to confirm these earlier findings—which strongly suggest that more educated farmers are more productive, particularly where new inputs and methods are available—by using new techniques to examine new data sets from Korea, Malaysia, and Thailand. Price data from Thailand are used to test the effect of education on the ability of a farmer to adjust the prices and composition of his output to the prevailing prices.

The Johns Hopkins University Press, 1982. 310 pages (including bibliography, appendices, index).

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Human Resources Planning in the Republic of Korea: Improving Technical Education and Vocational Training
Kye-Woo Lee
Provides a basis for human resources planning during a period of far-reaching structural change. Focuses on labor market problems and their solution through institutional linkages between formal education and vocational training and improvement of the vocational training system.


The Influence of School Resources in Chile: Their Effect on Educational Achievement and Occupational Attainment
Ernesto Schielcbein, Joseph P. Farrell, and Manuel Sepulveda-Stuardo
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Manpower Issues in Educational Investment: A Consideration of Planning Processes and Techniques
George Psacharopoulos, Keith Hinchliffe, Christopher Dougherty, and Robinson Hollister
Outlines for educators and economists a variety of approaches to improve manpower analysis. Advocates replacing a dominant technique with a well-structured planning methodology. Recommends a broad approach to be used to analyze the relationship between manpower and the educational system. Examines planning techniques, three points of view (country, technical assistance agency, lending agency), and the role of manpower analysis planning in developing countries. Contests that forcing all manpower questions into any single analytical framework results in low-quality analysis and low-quality educational investments. Cites a need for continuity of manpower analysis through the development of a planning methodology. Suggests that such analysis should go beyond identifying and preparing specific education projects.


Mexico's Free Textbooks: Nationalism and the Urgency to Educate
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Staff Working Paper No. 399. 1980. 31 pages (including references, 5 tables).
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