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EDUCATION COMMUNICATIONS DEVELOPMENT PROJECT

ECONOMIC FEASIBILITY

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ECONOMIC ANALYSIS

1. Background

Indonesia has experienced significant shifts in its economic structure in the last few years. Table 1 shows the growth in Gross Domestic Product (GDP) based on 1973 prices. The figures in each of the columns for the years represent percentages. Note that the proportion of total GDP devoted to agriculture has fallen from 44% to 36% due primarily to the fact that this sector failed to keep pace with the manufacturing, mining, and construction sectors. The driving force for this change has been the increasing modernization of the manufacturing, mineral development, and construction industries as well as the increased availability of foreign exchange reserves resulting from OPEC oil price increases.

TABLE 1

INDONESIAN GROSS DOMESTIC PRODUCT DISTRIBUTED BY SECTOR

	1971	1973	1976	Percent Change 1971-1976
Agriculture	43.6%	40.1%	36.1%	- 7.5%
Mining	9.8%	10.3%	11.6%	+ 1.8%
Manufacturing	8.8%	9.6%	11.1%	+ 2.3%
Electricity, etc.	0.4%	0.5%	0.6%	+ 0.2%
Construction	3.0%	3.9%	4.7%	+ 1.7%
Transportation	3.8%	3.8%	4.2%	+ 0.4%
Services	30.6%	29.8%	31.7%	+ 1.1%
Gross Domestic Product	100.0%	100.0%	100.0%	-
Rp. Value of GDPP	5,500.7	6,753.4	8,174.8	-

Because a given volume of capital exports now buys a much larger volume of imports the expansion of Indonesia's capital base has been accomplished without a reduction in private consumption. Between 1971 and 1976 private consumption has risen from 72.1% to 74% of GDP while both government consumption and gross domestic capital formation have increased their share (the latter from 15.5% to 21.4%).

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An increase in the capital base of a country is often viewed as a prerequisite to its successful economic development. Together with a reduction in reliance on the agricultural sector, it suggests that Indonesia is entering a period of somewhat more rapid growth than it experienced in the sixties and early seventies. GDP grew at about 1.4% per year from 1961-66 and at 6.6% per year from 1966-1971. Recent experience suggests a growth rate of about 7% per year. By way of contrast, population has been growing at a rate of about 1.2% a year.

These changes in the economic scene have been unevenly distributed among the different regions of Indonesia. Much of the increase in GDP was produced in the forestry and oil industries which are heavily concentrated in six provinces - Riau, East Kalimantan, Southeast Sulawesi, Aceh, Maluku, and Irian Java. The aggregate GDP of these six provinces is roughly estimated to have grown by an average rate of 15% from 1968-72. In contrast, the growth rate for the remaining 14 provinces was 4.5%; in Java, it was estimated as 6% per year. These figures suggest that development has been largely confined to a few provinces with some spillover to the central government in Java. Under the government's third year plan (Repelita III) a program of regional development is proposed which involves the movement of families to the outer islands to avoid potential manpower shortages in the 1980s. Prior to the articulation of an official transmigration program designed to encourage the migration of as many as 150,000 families a year, the higher wage levels prevailing in the outer islands have been ineffective in inducing a net flow of voluntary migrants from Java. In encouraging more laborers to migrate to the developing regions education will prove to be an important development tool.

Implications for Education and Training

The acceleration in Indonesia's growth rate and the uneven incidence of economic development give rise to several problems for its training and education institutions. While there is currently no labor shortage in the outer islands, it is likely that if the required rate of growth of the outer islands exceeds the natural rate of about 2.5% per year a shortage could develop (current estimates of the expected annual growth rate suggest an expected growth rate of 3-4% a year). This implies that workers will have to be imported from the less rapid

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growth areas of Indonesia in fairly large numbers. However, Indonesia currently has over 200 different languages and the burden is on the school system to teach those from diverse backgrounds the national language. As the transmigration program grows in importance, the language training program will assume greater importance then it has to date.

Another consequence of the new development patterns involves an increase in the demand for skilled labor. The skills of managers and administrators, of building tradesmen, of communications specialists, and engineers are necessary to meet Indonesia's development requirements. Numbers on actual manpower requirements are not easy to come by but one study suggested that an 11% annual growth rate of GDP would translate into an annual manpower requirement of 22,000 professionals, 72,000 technicians and 205,100 skilled workers. Numbers of this type are usually, at best, ball-park estimates because of the inherent difficulties involved in linking product demand to manpower estimates and because of the difficulties involved in forecasting how hiring will be done in a semi-market economy. Nonetheless, these figures do suggest several important insights. First, when they are translated into educational and/or training requirements it appears that the educational system is not producing enough technicians and skilled workers. This is partially a reflection of the high dropout rate in the primary schools and of the fact that those who finish usually continue their education at the secondary schools and institutions of higher education rather than at vocational training centers. The upper secondary schools educate students almost exclusively for higher education and tend to concentrate their energies on those preparing for university training. Perhaps as a consequence, the almost half of the students who terminate their training are not well suited to fill the technician and skilled worker positions opened up by the growth of the extractive and forestry industries.

Second, the universities tend to train students for specialities only tangentially related to those needed by the developing industries. In part, this is a reflection of the limited number of disciplines available within Indonesia and of the high cost of study abroad. But it probably also reflects a commitment by the educational sector to the training of an elite management class.

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This is often a characteristic of higher education in developing countries.

Of equal concern is the unevenness of the quality of education provided within Indonesia. While underfinancing is a quality of the educational system throughout Indonesia, the situation is worse in some areas of the country than in others. The Indonesian school system is scattered across 3,000 islands covering an area of about 1,950,000 Km². A study of Indonesian provincial education systems by James Johnstone provides several insights into provincial differences. Several are cited here: (1) Using an index to measure the relative balance of "qualified", "semi-qualified", and "unqualified" teachers, the study finds values of 0.66, 0.73, and 0.65 for Sulawesi Selatan, Bali, and Jawa Tengah. A 1.0 would indicate that all teachers are qualified. In contrast, values of 0.12, 0.23, and 0.27 are obtained for Bengkulu, Kalimantan, and Irian Jaya. (2) Using a measure of the proportion of students who remain in the education system, Johnstone finds that Yogyakarta & Jakarta have a higher proportion of continuations than the other provinces. The lowest values are for Irian Jaya, Nusa Tenggara Timur, and Lampung. A similar conclusion is reached if an index designed to measure the relative availability of classes for continuing one's education is used. (3) When an indicator measuring the average number of years a student entering a particular level of education can expect to spend at select grade levels is used to compare differences among provinces marked differences again emerge. Taken together, these and other indicators suggest a marked difference in the quality of education available in the urban and rural areas of Indonesia.

3. Upgrading the Quality of Education in Indonesia

Most studies of the educational system have acknowledged that the relatively low level of expenditures on education has had a negative effect on the quality of education in Indonesia. Among the many examples that have been cited: (1) About 20% of the primary school and almost half the secondary school buildings needed repair at the time of the study. Limited funds were available for this purpose. (2) Only about 15% of the secondary school had libraries. (3) A widespread lack of textbooks in the national language, especially in the sciences and technical areas, makes it necessary for students to take extensive notes. In the towns and small cities of the less developed provinces, in over 50% of the primary

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schools the children questioned had no textbook at all: at the secondary level only in one third of the schools did everyone have a book of some kind. (4) In the more urbanized provinces the National Assesment found an average of 58 children in each grade 1 classroom: the figure dropped to 46% in the rural provinces. Despite this fact, 38% of all schools in the urbanized provinces and 56% in the state schools had been unable to accept all applicants, mostly for lack of space. (5) In 30% of the schools in the poorer provinces, overcrowding apparently interfered with the students' work and with teacher

Of special concern is the question of the qualifications of the teachers. In an evaluation of the results of the National Assessment, Beeby suggested "that between 50-60% of the primary school teachers have either full SPG education and training or the equivalent". The situation was worse at the secondary level where close to 50% of the teachers had no degree at all and many of the rest were teaching at the same level they had achieved in their own schooling. At the secondary level only 4 were taught in a context where over 50% of the teachers were qualified.

The proposed project will involve several programmatic changes designed to upgrade the quality of Indonesian education and to increase the country's capability to reach its large and far flung population. Essentially, this will be accomplished through three related activities: (1) An instructional radio training program for teachers designed to allow those designated as "semi-qualified" or as "u qualified" to upgrade their skills; (2) An open" junior secondary education program for those at the junior secondary school level and (3) A program of non-formal education designed to upgrade the various skills levels of the listening audience.

4. Th Effectiveness of Alternative Technologies for Distance Teaching

In analyzing a project configuration of the type envisioned by TKM it is useful to consider the relative effectiveness of the alternative educational media. Recent research has focused on the various roles of the radio and other media in promoting distance learning. In a review of 65 radio projects, McAnany identified five major

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roles for radio in development*. Comparative data are available in a recent study by Spain et.al. and in an interesting book by Schramm**. These and other studies shed some light on the importance of radio as a low cost but comparatively effective educational tool. But virtually all of the studies suggest that visual supplementation, whether in the form of workbooks, textbooks, or mimeograph aids is a necessary supplement to the instructional package.

Recent interest has focused on the use of cassettes and phonograph records as an alternative to the high capital costs of installing a radio facility. Recent work by Bates has shown that each of the media has different advantage and that which is the least costly will depend upon the size and distribution of the audience to be reached***. The Bates study tends to favor instructional radio for its inexpensiveness in teaching large audiences, its ability to reach an entire population, and its immediacy. In the latter regard, radio is useful for relating a course of study to current events, as a vehicle through which improvements in instruction can be introduced relatively rapidly, and as a vehicle through which two-way feedback in instructure can be introduced. On the negative side, Bates notes that research suggests that radio is a difficult medium to learn from, that learners lack control over the pace of a radio program, and they are constrained to listen at a fixed time.

A similar analysis could be made for each of the potential delivery vehicles envisioned by TKPK but given the large number of outputs envisioned in this paper, this is impossible. The point to be made here is that the most efficient technology package will vary both across projects and regions. What is needed is a careful pilot project using several different delivery modes followed by a careful evaluation of the effectiveness of each at the conclusion. It is virtually impossible to judge the effectiveness of TKPK's delivery strategies at this point in time. In the next section we analyse the nature of

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* McAnany, E.G. Radio's Role in Development: Five Strategies for Use (Washington: Academy for Educational Development, 1973)

** Schramm, W. Big Media, Little Media (Washington: Academy for Educational Development, 1977)

*** Bates, T. "Options for Media Delivery" in H. Perraton, The Cost Effectiveness of Distance Teaching (Paris: UNESCO, 1978)

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the economic returns to each program.

5. The Private Returns from the Proposed Project

Ideally, we would like to both identify and quantify the returns to the three projects. There are several reasons why this is not feasible at present. These can be illustrated fairly well using the teacher training activity as a case in point. The number of teachers whose skills will be upgraded and the change in teacher skill levels resulting from the proposed project cannot be estimated from available data. Yet quantitative data are necessary prerequisites for benefit quantification. While the National Assessment provided several subjectively determined measures of teacher competency in 1970, the sampling procedures used in this study are not conducive to generalization at a national level. Likewise, the absence of quantitative data on the ability of a program such as that proposed by TKPK to change skill levels means that no quantitative base exists for estimating the effects of teacher training on the skills acquired by students.

An additional complication is introduced by the need to distinguish between potential and actual participation in the three programs. Given the use of the PALAPA satellites and an effective set of ground stations the potential audience consists of all school teachers with qualifications below those ultimately judged adequate by the Ministry. But it seems clear that the actual beneficiaries will be a fraction of the potential. Lack of information on program availability, the presence of persons with multiple jobs, the presence of some persons who do not speak the national language, and related factors are all likely to contribute to limited program usage, at least in the first few years of the project. Once again, however, the lack of prior experience with a distance training program precludes a reasonable guesstimate of how many persons will actually be reached.

A third consideration is also relevant in the case of the first and third components of the project (teacher upgrading and non-formal education). In most economic studies of educational systems, changes in educational training are usually equated with changes in earnings and incomes. In the case of the current project, this is not possible. Those who upgrade their skills as teachers will not be given a certification of their competency that can be used to raise their salaries. Instead, the

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current plan is to terminate those whose skills are judged to be inadequate and to provide no increase in pay to those who upgrade their skills. Thus, measured by a salary criterion no increase in productivity occurs. There is no private benefit. The problem of the relation between salaries and productivity is an important one. Some students of the Indonesian school system suggest that the salaries paid to teachers by the Indonesian government are too low to permit teachers to hold only one job. In 1975, for example, the average primary school teacher earned $390 per year; at the secondary level the figures were $480 at the lower level and $830 at the upper level. These salaries are set by the Indonesian government and bear little, if any, relation to worker productivity. The dollar differentials attributable to educational differences, even if the government were to recognize a productivity differential due to the operation of the project, would probably be a very inaccurate measure of the dollar value of the project since it would be difficult to relate the increase in the person's productivity to the changes in his or her earnings.

In the case of non-formal programs the problem is more serious. At the present time the course content of the non-formal programs is not well-defined. Clearly, the market value of the program will depend, at least in part, on which courses are selected. Here again, the absence of a certificate of successful completion is likely to result in education from this source receiving little, if any, market (i.e. salary) recognition. This is not to infer that the project will have no individual or social benefits. Indeed, a study of non-formal education in Colombia conducted by several members of our team suggests that a project of this type can increase capital accumulation and improve living conditions in rural areas. Instead, these observations are designed to suggest that quantification of these types of benefits is difficult and likely to lead to low measured returns if the traditional salary measures are employed to quantify benefits.

Measures of the quantitative effects of qualitative changes are inherently difficult to formulate and quantify. In part, this is because of measurement problems; in part it reflects the length of time required to see changes in earnings and to relate them to the effects of training programs. In the case of the teacher training program the decision to upgrade teachers and to remove those who fail to participate in the program will have only minimal observed effects on training in the short run. This is

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because many persons with upgraded skills will continue to hold jobs at the same pay level. But it is also because some of these persons will hold several jobs and spend relatively little time in each. A 1971 study of 715 teachers by Darpesman found that 18% of those at the state schools held 2 jobs, 6% held 3 jobs, and 1% held 4 or more jobs. At the private schools the comparable figures are 29%, 9% and 3%*. Overall, about 29% of those in the study held second jobs. The need for these persons to divide their time among several jobs will almost certainly reduce the quality of the education provided their students unless reforms can be effected which provide incentives for teachers to devote more time and effort to teaching a limited set of students. In the sense described above, skill upgrading is a necessary but not a sufficient condition for improving educational instruction in Indonesia. The incentive system must also be restructured to encourage attention to preparation for classroom teaching or, at least, to recognize those who teach well.

One measure of the primary benefits of the radio training program at the junior secondary level can be computed as representing the difference between what the persons completing these programs receive as a result of the program and what they would have received in its absence. At present, the project involves the initial training of 2,700 students in nine schools. At present wage rate differentials this component of the program would have a benefit/cost ratio of less than 1 but the ratio would rise if a larger program was added in the future. It seems clear that, at least in the early years of the program, the benefits to the individuals in this program are likely to be small given high unemployment rates and low differentials between the salaries of junior secondary graduates and those with primary school educations. As the demand for those with technical and vocational skills rises, especially in the middle and late 1980's, salary differentials might be expected to increase. But at the usual discount rates used in studies of this type (7% and 10%) the deflator on benefits five years out would be 29% - 38% and ten years out would be 51% - 62%. Thus, measured in present values the total benefits resulting from this program are not likely to be very large because they are realized fairly far in the future.

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*Ruth Darpesman, "Financing Education: Part I" Bulletin of Indonesian Studies, November 1971, p. 87

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On balance this analysis suggests that the private benefits from the proposed project, at least as measured in this section, are not likely to be large in the next five years. This is not only because of the measurement problems involved but also because of the absence of a market or administrative system for recognizing the upgrading of individual skills. Should such a system be implemented, our conclusions would be altered.

6. The Social Benefits of the Proposed Project

The benefits described above accrue primarily to the direct beneficiaries of the project, the students and teachers at which the project is aimed. In addition, there are likely to be benefits to the Indonesian society which would not be captured by the earlier measures. In this section we explore several of the more important benefits.

Reduced Grade Repetition:

At present, the repetition rate is about 12% per year at the primary level. Approximately 2.4 million primary school places, 640,000 junior secondary school places, and 260,000 upper secondary places are occupied by students who are repeating a grade. At least in part, the failure of these students to complete their training is due to the poor instruction provided by their teachers. The upgrading program proposed in this paper, if successful, would reduce the number of repeaters within the school system. These reductions would be reflected in one or more of the following ways: (1) Fewer teachers would be required to teach the same number of students. As a result, the cost per student educated would fall and Indonesia would realize a benefit in the form of funds available for other social programs or reduced taxes. (2) More student places would open up in the schools. As a result, more students could be admitted for education without an increase in either capital or current investment. In this case the cost/student ratio would also fall. The magnitude of these effects is difficult to estimate.

In the former case, the economic benefit resulting from reduced repetition would be the dollar value of the cost-savings resulting from reducing the resources used by the project; in the latter case, the benefit would be the increment in salaries received by those who have access to education who otherwise would not. These measures

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do not provide the same dollar estimate of benefits for at least two reasons: (1) the cost-savings will be less than the dollar benefits of schooling if the benefit-cost ratio for schooling exceeds 1 and (2) the former measure will not capture the savings to society accruing because time is no longer given up to study a subject more than once (i.e. the production time lost by grade repetition) while the latter will. It is difficult to estimate the magnitude of either set of benefits without better data on the relationship between teacher quality and grade repetition.

Reduced Dropout Rates:

Indonesia has a fairly high dropout rate in its primary and lower secondary schools. According to one study, of the 2.0 million students who entered grade 1 in 1963/65, 16% had dropped out in the second grade, 29% in the third grade and 63% in the 6th grade. Only 23% of the original cohort actually graduated from primary school and only 18% entered secondary school. Of course, some of the dropouts may subsequently have returned to complete their schooling but the number is not likely to have been large.

The teacher training program should have some effect on the dropout rate if successful. This would be true if students are motivated to dropout of school because of dull teaching, poorly prepared lessons, or frustration with their teacher's ability to teach the material. However, for reasons discussed in the section on primary benefits, unless reforms are made in the education system, the upgrading program is unlikely to have a major effect on the quality of the education provided by local teachers. A reduction in the dropout rate affects efficiency in the sense that a larger number of students than was previously possible can complete their education at the same cost. This measure differs from the earlier one in that the denominator is not students attending school each year but rather student completions per year. A reduction in the dropout rate increases efficiency in the sense that any given year of education usually tends to lead to a higher earlier wage if it has led to a degree than if it has not. The credential effect may be important in establishing a person's market salary, especially at the higher educational levels. But, as in the case of dropouts the

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value to society can also be measured in terms of the reduced cost of producing a completion. For example, the World Bank has estimated that as a result of repetitions and dropouts it took approximately 11.6 student years of instruction and Rps.23,000 to produce one primary graduate compared with 6 years and Rp.12,000 if these inefficiences could be eliminated. Based upon the differential saved (Rp.11,000) and a very rough estimate of the effects of these inefficiences on the number of "extra" persons served by the system, we suspect that about $130 million could potentially be saved if these rates could be reduced. A somewhat smaller saving is achievable at the secondary level.

Increased Manpower Availability:

Radio training at the lower secondary school level is expected to increase the number of persons who are semi-skilled and/or technicians. It will probably have the effect of increasing the incomes of those who receive advanced training. Whether incomes actually rise will depend upon whether demand grows more rapidly than supply and on the actions of the government in affecting salaries. However, the increase in the number of these persons can be important because it provides Indonesia with a labor pool with which to attract outside investment. It also facilitates the expansion of Indonesia's internal industries. Recent projections call for an annual rate of growth of 4.4% in the technician class and for a 6.1% increase in skilled workers. At present these levels are not attainable without a significant upgrading, of educational expenditures. Should the desired training levels not be achieved, Indonesia's ambitious development goals are unlikely to be reached. With an upgrading of its human resources, it is in a better position to exploit its large natural resource base. Thus, increased manpower availability provides a means for reaching a higher growth path which has a value to Indonesia not reflected in the increase in market wages.

Equity Effects:

It is customary in cost-benefit analyses to distinguish equity and efficiency effects on the grounds that the latter involve changes in the aggregate outputs of a society and can be discussed objectively while the former need not involve changes in aggregate output and

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are inherently subjective. The distinction is an important one in this paper because of the properties of instructional radio and T.V. We have argued elsewhere that instructional radio substantially reduces the cost of schooling*. As such, it makes instruction more accessable to low income families. This is not only because the largely universal coverage of radio overcomes obstacles such as geography, teacher reluctance to live in rural areas, and low population densities but also because it reduces the amount of time that persons must spend away from their agricultural or other activities. In addition, this approach insures a more uniform quality of offering and a more standardized set of courses than exists if only regional or local programs are produced.

The implications in the Indonesian environment are fairly obvious. Given major regional differences in both the quality and quantity of course offerings cited earlier, the proposed teacher training and junior secondary programs should contribute to equalizing educational opportunities within the country. The contribution will be modest in the initial stages but is likely to grow in importance if the programs succeed. Particularly in the poorer provinces, the upgrading of educational opportunities for both teachers and students will be significant if accompanied by a program designed to insure a widespread distribution of receivers. This should be useful in increasing the potential supply of professional and semi-skilled workers in the developing provinces.

The project increases equity in second sense. Since it involves World Bank, AID, and Indonesian funds external to the rural areas, and since it is distributed evenly throughout the country, it involves a partial redistribution of services from those with more incomes to those with less. The poorer regions benefit in the sense that educational training programs are made available financed primarily by external funds; the urban areas benefit in the sense that they have more potential people to receive the broadcasts.

What is not clear is whether the equity objectives of the project can be fully achieved without the

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*H. Tuckman and F. Nas: Educational Technology in Developing Countries: The Resource Allocation Issues Washington US AID, 1978)

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provision of follow-through programs. In the case of non-formal programs, the issue is how to channel those with educational interests into a more formal training program. While there may not be many people in this category, realization of the equity objective would suggest that the provision of follow-through education for this group could be important. Likewise, in the case of teacher training. Some provision should be made not only to permit primary teachers to reach an "adequate" level but also to allow them to continue on for further training and placement if they are able. Unless the provision of additional education is accompanied by additional opportunities, the project will go only part of the way in serving equity goals.

7. Capacity Building Effects

A major feature of this project will be to build the ability of the Indonesian government to deal with educational issues on both a planning and implementation level. It is difficult to assign a quantitative value to this effect although it surely is important in the economic development of the country. The project will generate employment opportunities for at least 6 existing PhDs, and provide for the training of 8 PhD's and 18 MA's. This will have a significant effect on increasing the capacity of the Indonesian government to upgrade its educational system. It will also provide a new set of experts familiar with both the benefits and limitations of educational technology systems. These and related features of the project must be subjectively evaluated.

8. Spillovers and Other Secondary Effects

The presence of the project will give rise to tertiary benefits which will probably provide further stimulus to the economy. For example, the process of preparing improved teacher training materials is likely to give rise to written materials of use in the curriculums of the teacher training colleges. Likewise, the materials used in the instructural radio programs at the junior secondary levels may be adopted in some rural schools. As the program is implemented it is likely to serve as a focal point for further inquiry into means for the improvement and dissemination of instructional activity. No measure of these benefits

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is possible since there is no prior experience from which quantitative data on spillovers can be gathered. Nonetheless, spillovers of this type can be considerable.

9. Benefit/Cost Ratio

It has not been possible to compute a benefit/cost ratio for this project at this stage. It seems likely however, that once the programs are in-place and operating, several components will be more amenable to economic analysis. For this reason, it would be useful at the outset to introduce an accounting scheme along the lines proposed by the UNESCO cost conference to facilitate cost analysis. It would also be useful to encourage TKPK to maintain detailed cost figures on historical basis.

While an actual ratio has not been computed, it is likely that the project is cost-effective assuming a cut-off point of 1. The institution building effects, the spillover effects from developing the materials, and the equity effects commend this effort for AID funding.

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