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Plan of Public Expenditure

For Education in Central America

An IIME Staff Report
1964



INSTITUTO DE INVESTIGACIONES Y MEJORAMIENTO EDUCATIVO
Interuniversity Program of the University of San Carlos of Guatemala and Michigan State University



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CSUCA: CONSEJO SUPERIOR UNIVERSITARIO CENTROAMERICANO**

Plan of Public Expenditure

For Education in Central America

An IIME Staff Report

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PREFACE

IIME has published two earlier documents that deal with the production of secondary school personnel—a *Plan of Action and Projected Costs*.¹ These aspects of personnel development—to create a body of trained, capable teachers in Central America—are now placed in the context of a set of suppositions that comprise a far broader scheme: a *Plan of Public Expenditure for Education in Central America*.

Present Situation

The Central American nations collectively devote 20 per cent of their national governmental budgets to public education: approximately 12.5 per cent for elementary education, 3 per cent for secondary education and 2 per cent for higher education. The remaining 2-3 per cent covers administrative and other general costs. This investment amounts to approximately \$72 millions of a total public annual expenditure of \$351 millions (1963-64). It represents \$36 per year per public primary school student; \$127 per year per public secondary school student and \$335 per year per enrolled university-level student.

One Central American child in two enters the primary schools. One in twenty completes a primary education. Only one in one hundred completes secondary school. "Drop-out" rates are extremely high. Literacy levels are extremely low.

If present funds were invested in ways that were of optimum effectiveness and productivity, the situation would be more satisfactory, but still inadequate. Funds must be utilized to far better effect than at present, and greater amounts must be invested in education. Only if both of these conditions are met—better utilization and larger investment—will it be possible to achieve substantial improvement of education in Central America.

¹*La Formación de Personal para la Enseñanza Media: Plan de Acolón.* (Guatemala: IIME, 1964), hereinafter referred to as *The Plan of Teacher Training*.

La Formación de Personal para la Enseñanza Media: Estimación de Costos. (Guatemala: IIME, 1964). Available in English as: *The Production of Secondary School Personnel: Projected Costs.* (Michigan State University: IIME, 1964).

Assumptions

It is assumed that:

1. Central American governments and educational institutions are seriously determined to build a productive, democratic system of universal public education.
2. The national budgets of Central American nations will increase at the rate of 5 per cent per year.
3. A significant qualitative improvement will be achieved in education if expenditures are increased to these levels: \$100 per year per public elementary school student; \$217 per year per public secondary student, and \$1,200 per year per full-time university student. (All estimates of expenditure are based on 1964 value of the dollar, or its equivalent in local currencies.)
4. These levels will be achieved by a series of gradual increases in the share of national budgets devoted to education, i.e., gradual increases from 20 per cent in 1963 to nearly 37 per cent in 1980.
5. Central America will use the increased levels of funds deliberately to build a strong, viable, highly productive educational system which (a) will make immediate, direct contributions to the national economy and (b) will be capable of quantitative expansion without detriment to the quality of its operations.
6. Governments, educational institutions, students (and their families), and local individuals and institutions, as well as international, philanthropic and financial organizations and institutions will assume responsibilities appropriate to their interests in a major reform of the scope and quality of education.

Preparation of Educational Personnel

A first major program must be a new plan for the preparation of secondary school teachers. That plan is the subject of a separate IIME document entitled *La Formación de Personal para la Enseñanza Media: Plan de Acción*. (Guatemala: IIME, 1964). An abstract of *The Preparation of Personnel for Secondary Education: Plan of Action* follows:

A corps of fully qualified high school teachers and supporting staff personnel is the *sine qua non* of a basic and comprehensive reconstruction of the deficient educational systems of Central America. Highest priority should be assigned to the task of creating that corps. The justifications for this view include:

1. This task is of modest size (in contrast to the problem of eliminating illiteracy, for example). It is, therefore, a task that (a) can be achieved and (b) can be achieved rapidly.
2. This task is the key to a quantitative and qualitative improvement in *secondary* education, because the caliber of personnel determines the productivity of the educational enterprise.
3. Secondary-level normal schools train elementary school teachers. Therefore a major improvement in secondary education will have a profound effect upon future *elementary* education as well.
4. To produce high school teachers, librarians, counselors, administrators, etc., is a job for the universities and other institutions of post-secondary education. The job is large enough that—in order to perform it satisfactorily—those institutions must be significantly strengthened. Their improvement—in organization, staff, curriculum and facilities—will increase their presently limited capacity to perform the several duties appropriate to the universities and related institutions. (Example: a university that truly equips itself to produce high school teachers of biology and agriculture is equipped also to produce biologists and agriculturists.)
5. Universities and ministries of education in Central America are excessively isolated from each other. Because the proper training and placement of high school personnel requires their collaboration, one of the desired—and anticipated—outcomes of the proposed production of secondary school personnel is a relaxation of traditional hostilities between universities and ministries.

The plan suggested requires a series of simultaneous and well-coordinated actions:

1. Train the university-level faculty that will later train the future high school teachers. This requires (a) fellowships

for study abroad and (b) the collaboration of experienced "sister" universities.

2. Train high school teachers in a B.A. level, full-time, four-year program, consisting of (a) general education (approximately 50 per cent), (b) advanced undergraduate study in the area of teaching specialization (25 per cent), and (c) study of the professional field of education, plus practice teaching (25 per cent). This requires a full-time university faculty. It requires a large program of low-cost loans to students. Operated on a year-round basis, the four-year program could—and preferably should—be condensed into three *calendar* years, thereby reducing costs to the degree candidates as well as to the State and thereby advancing the date at which qualified personnel would be available for service in the public secondary schools.
3. Provide graduate-level full-time study opportunities for administrators and specialists. This requires the designation of *one* graduate center to serve the five nations in this area of study. It also requires a system of fellowships.
4. Employ graduates of the program for full-time service in large, well-equipped comprehensive high schools. This requires a suitable salary scale. It requires a departure from present part-time employment practices. It requires major changes in the operation of those "new" schools that would be staffed with the "new" style of high school teacher.
5. Each year, select certain high schools for conversion into "new" secondary schools. Staff them exclusively with "new" teachers, or with those few fully-qualified, experienced teachers now in service. Utilize these schools as "satellite" schools, closely related to teacher-training institutions, so that they may serve as practice-teaching centers, experimental centers, materials-development and curricular development centers, etc. By converting several schools per year into "new" schools—or constructing new institutions—*all* schools can be "new" schools within a brief number of years.
6. These actions require a continuous program of research, program evaluation and planning, as well as a continuing

program of review and improvement of materials, methods and curriculum.

7. It is proposed by the IIME Staff that the "new" secondary schools be *administered under joint university-ministry auspices*, in order that (a) secondary school operations as well as teacher training activities may be well-integrated, (b) the proposed course of action may serve to minimize the traditional cold war aspects of relationships between a national autonomous university and its country's ministry of education, and (c) a major impetus toward continuity may modify the usually unstable administrative environments in which educational programs are conducted in Central America.

The plan developed by the IIME Staff is designed to produce 1,077 teachers per year, beginning three years after operations begin. Just five years later, *every* public secondary school in Central America *could* be fully staffed with fully qualified personnel.

The following are indispensable requisites to success of the proposed *Plan of Action*:

1. The universities must equip themselves to offer full-time study opportunities to the full-time, day-time students that enter the teacher training programs.
2. The banking community must offer (and government or others must guarantee) long-term, low-interest loans to students, so that the prospective teachers can study full-time and year-round for three years, i.e., to completion of their degrees.
3. Fully-trained teachers must be employed full-time in public secondary schools that (a) collaborate fully with teacher training institutions, (b) are protected from the adverse effects of political happenings and (c) are staffed exclusively with qualified, well-trained personnel.
4. The governments must make public school teaching an attractive career by providing adequate salary schedules comparable to the opportunities offered to college graduates by other sectors of the national economy.

General Expansion and Improvement of Education

The plan for training secondary school teachers is an essential first major program in an over-all plan for educational improvement. Simultaneously, however, other developments must occur.

1. Institutions of higher education must be improved and organized to train teachers.
2. Secondary education must be reorganized in order to be able to employ the new, full-time teachers.
3. Elementary education must be improved in order to increase the number of youngsters eligible and ready to enter the secondary schools.

By 1980, it is clearly possible to achieve the goals that are necessary. At that point each level of education can be a strong and viable instrument of social action. In particular, at that point, elementary education can be ready for a major expansion of its quantitative capacity, and the goal of universal education will be within range.

The IIME staff is pleased to present in this document a first comprehensive statement of the magnitude and pattern of public expenditure that should be contemplated for the achievement of these basic education aims in Central America.

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Co-Directors

Guatemala, Guatemala
October, 1964

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Plan of Public Expenditure For Education in Central America

Elements of a plan to improve public education in Central America¹ are here translated into fiscal terms. General cost estimates are provided for each major program element; these are projected through a period of fifteen years, beginning in 1965. In this manner, it is possible to illustrate (a) the *magnitude* of expenditures that might be needed to support education adequately during this period, and (b) the *pattern* of public expenditure that will be required to develop a potentially effective and efficient education system in Central America.

The point of departure for the various cost estimates is a combination of actions, each of which is deemed a prerequisite to the educational programs and organization set forth in the *Plan of Teacher Training*.²

1. Assign highest immediate priority to the university-level preparation of: approximately ten thousand qualified secondary school teachers; 2,150 school administrative and service personnel; and 260 university professors in academic and professional specialties.
2. Initiate immediately (1965-66) regional and international programs to prepare (a) needed university professors and (b) school administrative and supervisory personnel; an additional two years will be required to bring the teacher preparation programs to maximum capacity and productivity in each country.
3. Emphasize the *qualitative* improvement of secondary education. For optimal results: (a) concentrate improvement efforts upon those secondary schools directly involved with

¹Central America includes the republics of Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua.

²*La Formación de Personal para la Enseñanza Media: Plan de Acción.* (Guatemala: IIME, 1964).

preparatory institutions in the preparation of secondary school personnel (the *escuelas "nuevas"* of the *Plan of Teacher Training*); (b) staff the schools exclusively with full-time, fully-qualified personnel, and (c) create these schools precisely at the rate made possible by the graduation of qualified teachers and related personnel.

4. Place emphasis during the near future on the *qualitative* improvement of primary education; substantial *quantitative* improvement in this area should become possible a few years hence.

ELEMENTS OF A PLAN OF PUBLIC EXPENDITURES

Three major decisions must precede the plan of public expenditure by which to translate these program objectives into action. These decisions are:

1. Funds will be provided to develop a strong, viable *program* and *organization* at each level of the educational system; this shall be achieved within not more than fifteen years, i.e., between 1965 and 1980, a period hereafter referred to as the "development period."
2. Priority will be assigned to, and funds expended for precisely those areas of education where major improvement is most *feasible* and *productive*; improvement during the development period will be less rapid in areas (e.g., primary education) in which immediate change is less feasible.
3. Funding for the over-all public expenditure for educational improvement will be financed—theoretically, at least—from resources *available in* Central America. (Although foreign investments in Central American education should be anticipated,³ the plan of public expenditure should not depend for its success principally upon foreign resources.)

Operationally, the 15-year "development period" of planned public expenditure can be divided grossly into three major phases,

³Foreign funds offer the best opportunity to initiate certain pivotal actions in the *Plan of Teacher Training*: e.g., the preparation of university professors, establishment of graduate studies for school administrative and service personnel, and in critical programs of research and planning assistance. Foreign investments could also be used advantageously to secure (underwrite) student loans made by the banking institutions in Central America, and for long-term construction loans.

each related principally to a separate major area of education. These are:

1. The first five years of the development period: increase expenditure most rapidly in higher education, specifically in that aspect of higher education involved in and related to the preparation of secondary school personnel (e.g., "general studies" and science and letters.)
2. The second five years: increase expenditure most rapidly in secondary education, additional expenditures being made precisely in proportion to the number of newly qualified secondary school personnel entering the secondary schools.
3. The third five years: increase expenditure rapidly in primary education in order that—by the end of the 15-year development period—a reasonable minimum level of financial support will have been established for *all children and youth then enrolled*.

CURRENT PATTERN OF EXPENDITURE

Present levels of financial support for public education are low. Although one-fifth of national budgets is dedicated to education, appropriations now provide an average of only \$36 per enrolled elementary school child, \$127 per enrolled secondary school student, and about \$335 per enrolled university-level student.⁴

The results obtained by this under-expenditure—and the dearth of qualified personnel it sustains—are plainly visible:

1. Only one in two eligible children enroll in primary school.
2. Only one in 20 children complete primary school.
3. Only one in 100 children complete secondary school.
4. Only one in 1,000 children will undertake university studies.⁵

Moreover, the investment now made in education does not produce a socially useful result, and this "non-production" is itself inefficient. For example: one-half or more of the children enrolled in first grade of primary school fail to pass to the second. Three-

⁴Based upon data for 1959-64 from Reports of National Budgets of Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua. The average per student expenditures are approximations, but of sufficient accuracy to justify their use in the illustrated plan.

⁵Estudio de Recursos Humanos, Consejo Superior Universitario Centroamericano (CSUCA), San Jose, Costa Rica, 1963. (Unpublished data).

fourths of those who enter primary school fail to pass through the fourth grade, a level generally deemed to be minimal to achieve functional literacy (*alfabeto potencial*) among children. For all practical purposes, therefore, up to three-fourths of the funds expended annually in elementary education fail to achieve the minimum program objective of simple literacy. Therefore, the true *cost* of producing a literate citizen is far higher than the expenditure per pupil, as the following arithmetic illustrates. The average annual expenditure per pupil is \$36. Only one enrolled child in four becomes literate. Therefore, the true *cost* of imparting literacy to that child is $4 \times \$36$, or \$144 per year.

If it is assumed (as experience justifies) that literacy (*alfabeto absoluto*) is achieved only upon completion of the full 6-year elementary program, the cost is higher still. Of ten children who enter first grade, only one child may be expected to complete grade six. Therefore only one-tenth of each year's effort proves productive. The amount spent to educate *ten* children produces only *one* grade school graduate. The *cost* of that one child's elementary education, therefore, is $\$36 \times 10$, or \$360 per year: for six years, the cost is $\$36 \times 10 \times 6$, or \$2,160. This cost is quite different than the expenditure per pupil, which is \$36 per year for six years, or \$216.

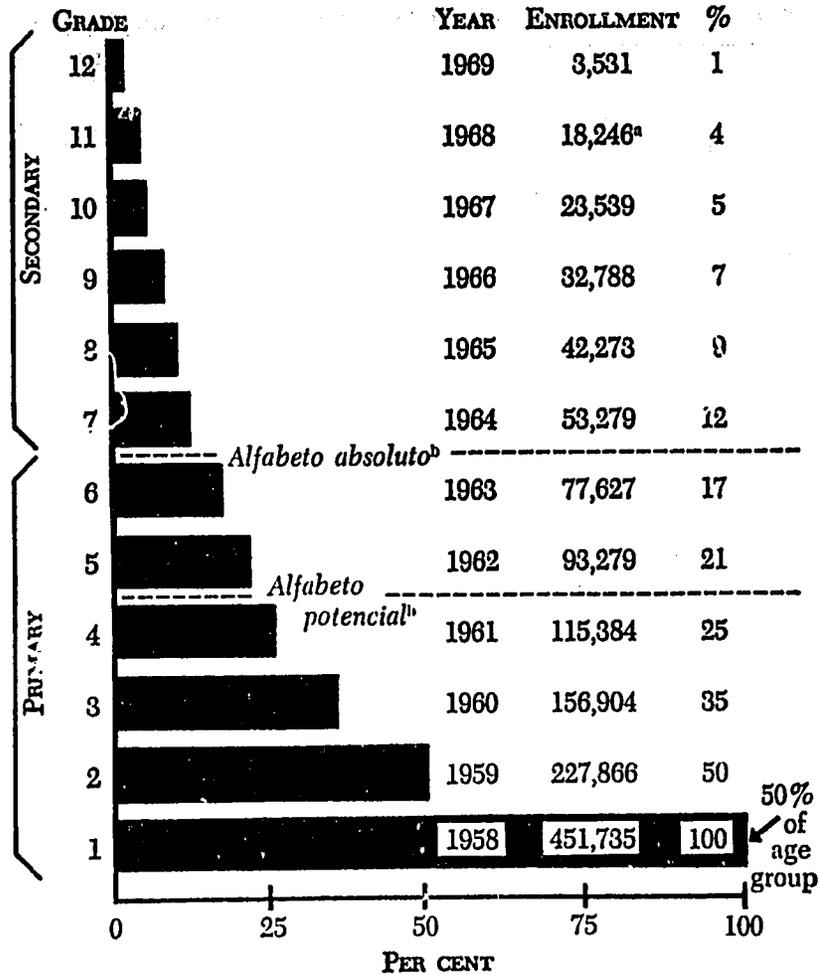
Similarly, the *intended* cost to *prepare* an elementary school teacher is only \$978 ($6 \times \36 for first six years; $6 \times \$127$ for six years of secondary education). However, because only one candidate in five completes the secondary school program of training for elementary teaching, the *actual* cost to *produce* an elementary school teacher is far more: namely, \$5,920 ($\$36 \times 10 \times 6$ plus $\$127 \times 5 \times 6$).

It is imperative, therefore, that future funds for education be invested in ways which will increase the productivity as well as the quality of the education system.

This pattern of "survival rates" is dramatically illustrated in Graph 1. Here, the future is foretold for a representative class of beginning pupils, the class of first-grade students in Central America of 1958. The 450,000 pupils who were actually enrolled in 1958 represented only about 50 per cent of those children who were eligible to be enrolled. Yet, of each 100 of those enrolled in first grade in 1958, only 21 completed fourth grade in 1961, and passed to the fifth grade in 1962. These are *alfabetos potenciales* whose

GRAPH 1

EDUCATIONAL FUTURE OF 450,000 PUBLIC SCHOOL PUPILS WHO ENROLLED IN FIRST GRADE IN CENTRAL AMERICA IN 1958



a. Secondary school programs terminate at both grades eleven and twelve in Central America. The common plan is a 5-year program resting upon a 6-year primary school base. College preparatory students (*bachilleratos*) terminate at end of grade eleven. Students pursuing certificates as elementary school teachers proceed through grade 12, as do majors in commerce and other forms of technical education. The exception is Costa Rica where technical education is offered at the bachillerato level and elementary teaching is post-secondary study.

b. An *alfabeto absoluto* is a literate child likely to remain so into and throughout adulthood without additional schooling; an *alfabeto potencial* is a literate child likely to relapse into illiteracy without further formal education.

literacy may not persist through adulthood without additional training. Only 12 of each 100 completed sixth grade in 1963 and passed to the seventh grade. These are *alfabetos absolutos*. Of each group of 100 to enroll in first grade in 1958, only four can be expected to reach the eleventh grade, in 1968. Between one and four of each original 100 will be expected to complete secondary education.

The area most needful of improvement in these respects is clearly that of elementary education. However, to extend formal primary education to the majority of eligible children—a major social and political objective in each nation—would nearly double present expenditures for primary education, and would require increased national expenditures (even without increases in present per pupil rates of support) of nearly \$40,000,000 per year. Moreover, to raise elementary education to a minimum level of quality—hence to enhance its productivity of literate persons—the level of expenditure per pupil would have to be raised to nearly three times the present level. To attempt both tasks simultaneously (i.e., to double the number of enrolled children, while increasing the unit cost per child to an acceptable level) is manifestly *unfeasible*.⁶

Present levels of support produce neither an efficient nor an effective result. Therefore, future increases in funds for primary education had best be used at first to raise per pupil allocations for *those children in school*, and thereby to improve the quality and productivity of primary education programs. When this has been accomplished, it will be feasible to attempt the more difficult and expensive task of *extending* public primary education to a greater proportion of the eligible school population.⁷

⁶For example: The five nations now invest about \$44,000,000 to educate some 1.22 million primary pupils annually, or about 50 per cent of those children reported in national censuses to be eligible to attend. If primary education were extended at present unit costs to 90 per cent instead of to 50 per cent of these children, the governments would incur a cost of about \$79 millions annually, a sum which exceeds the combined Central American education budgets for 1963-64. Were the present per pupil level of support raised from \$36 to \$100 (a reasonable estimate of required expenditure for a minimum quality primary school program) the cost in 1965, for example, would be about \$131 millions, a sum nearly twice that of all education expenditures anticipated for that year, and an amount equivalent to nearly 34 per cent of total national expenditures.

⁷This is not to say that children not in school have less claim on national programs and resources than those enrolled. It simply states the obvious, namely: a better result must be obtained with present elementary school programs before serious consideration can be given to increased enrollments in these programs. Today's system of education is inefficient, costly and unproductive. Applying it to a greater number of the nations' children and youth would not provide a reasonable solution to the education problem, nor constitute a justifiable use of the nations' meagre financial resources.

Within the educational system, one area in which rapid improvement might most feasibly be made is that of secondary education. If the secondary schools were now staffed by qualified personnel—so that additional investment directly to secondary education would be worthwhile and productive—dramatic improvements in production of needed graduates could be realized by a mere doubling of present levels of financial support: since present expenditures for public secondary education amount only to \$10.3 millions, such increases could be made without serious impact upon the structure of national expenditure. However, the majority (83 per cent) of the teachers presently employed are in fact *not* qualified; hence, the emphasis for immediate investment is best placed on the *preparation* of secondary school personnel.⁸

Moreover, relatively huge financial investments would be required to improve primary education employing (a) secondary school graduates as teachers, and (b) conventional education methods. The prospect for developing truly modern and effective systems of primary education within the immediate future therefore seems dim. Yet the problem neither can nor should be avoided. Thus, education officials must concentrate their efforts to produce a minimum acceptable primary school system during the proposed developmental period. At the same time, however, they would be well advised—in anticipation of further advances to be made after 1980—to undertake now systematic programs of research and experimentation aimed specifically toward the development of practical methods for producing literate nations at a very low unit cost.

⁸Only 786 of 7,339 persons employed in 1963 as secondary school teachers were reported to be qualified as university-trained personnel. [*Necesidades de personal en la educación media en Centro America* (Guatemala: IIME, 1963), p. 10]. Since the overwhelming majority of the teachers are only high school graduates, their qualifications cannot readily or inexpensively be improved by part-time university study. For example: to qualify now as a university-trained secondary school teacher requires from three to four years of full-time academic study, depending upon the institution and area of specialization. At present rates of student progress, the average person will complete—if he completes it at all—a 3-year *carrera* in secondary education in 13.5 years. [*Academic Progress of University Students, University of San Carlos of Guatemala, 1963* (Michigan State University: IIME, 1964).] The average annual cost per student is \$335, hence the average cost to prepare a qualified secondary teacher is ($\$335 \times 13.5$), or \$4,522. However, the actual cost to produce a qualified teacher is nearly ten times greater, since only one in ten persons actually completes the program of studies. By contrast, the estimated cost to produce a qualified teacher in a full-time program of four academic years is only \$5,401. ["Análisis de los rubros de costos del plan de formación de personal," *La Formación de Personal para la Enseñanza Media: Plan de Acción*, Anexo 6 (Guatemala: IIME, 1964), p. 6.12]. Hence, it would appear that part-time professionalization programs do not provide a practical or economic approach to solving the shortage of qualified teachers. Teacher in-service training programs are valuable, nonetheless; they seem to be most effective, however, when based upon adequate pre-service preparation programs. It is the development of the latter that represents the essential task to be undertaken.

BASIS FOR DETERMINING FUTURE EXPENDITURE

Even if funds of proper amounts were available, there would remain the difficult task of expending them in ways that would produce a balanced and optimal impact upon the improvement of education at all levels. Hence the *appropriate pattern* of expenditure is as essential to the results obtained as the *magnitude* of expenditure.

In this paper, one possible plan of public expenditure is developed. The plan presented is intended to *illustrate a method* for meeting the problem. (The plan may be inadequate in detail because of inaccurate data or local variations in cost or other circumstance. Thus, the *method* is proposed, not necessarily the quantities.) The plan is intended to demonstrate that relatively small annual increases in national expenditure for education—cumulative during a period of fifteen years—can bring the levels of productivity and performance within each sector of education to reasonable minimums, and those of key sectors to somewhat higher levels. The plan assumes a close and continuing coordination of effort among the educational institutions and agencies involved; specifically it depends upon these actions:

1. Within each university, the creation of an organization able to bring all relevant academic resources to bear upon the development of the needed personnel preparation program;
2. Within each nation, the creation of a joint organization comprised of ministry of education and university personnel able to coordinate and implement the development program in the secondary schools;
3. Nationally and regionally, the creation of appropriate organizations able to bring the efforts of all relevant social, economic and political institutions to bear upon the problem of financing public education.

If these elements of cooperation and coordination of effort are successfully created, a productive and feasible plan of public expenditure for public education can be formulated and placed in action in each nation. The converse, unfortunately, is also true: failing to achieve necessary intra- and inter-institutional collaboration, expenditure for public education in Central America will continue to be largely unproductive.

EXPENDITURES REQUIRED FOR THE FUTURE

Estimates of required future expenditure for education depend upon five factors:

1. The priority assigned each educational level within the education systems;
2. The number of students to be educated;
3. Their distribution among the several academic levels of the education system;
4. The unit cost of educating and housing students at each academic level;
5. The availability of funds.

In the *Plan of Public Expenditure* herein described, priority is assigned sequentially to higher, secondary and elementary education, during a proposed development period of 15 years. Attention is now drawn to the other factors involved in estimating required future expenditures.

Number and Distribution of Students

Education statistics in Central America are not yet fully adequate to justify firm estimates of future school and university enrollments.⁹ Therefore estimates used in this text should be regarded as tentative.

(In order that systematic planning for improvement of the education systems can progress, it is urged each ministry of education and each university assign high priority in its administrative budget to the further development and refinement of data collection and tabulating capacities.¹⁰ As dependable data become available, modifications should be made in this *Plan of Public Expenditure*, as well as in specific plans for action devised in each of the five countries.)

⁹The very substantial work of CSUCA's Human Resources Study team is expected to relieve this difficulty soon. At the time of the preparation of this document, however, the team had not published the results of its two years of study of school and university populations. When these results are generally available, they should be substituted for those statistics used here; considerable agreement should be anticipated, however, between the IIME estimates and those of the CSUCA team for the period 1964-70. Beyond 1970, the projections used here will tend to be conservative.

¹⁰Directors of educational planning from each ministry of education met jointly for the first time, May 11-13, 1964, at IIME, to share information, and to study this problem on a regional basis. Their recommendations for action warrant the most serious study by responsible education officials. These are reproduced in *Primera Conferencia Regional Centroamericana Sobre Estadística y Registros Escolares* (Guatemala: IIME, 1964).

On the basis of enrollment increases during the period of 1958 to 1963, projections of possible future education enrollments were made by the IIME staff. The projections rest upon these assumptions:

1. Future school enrollments will continue to increase at the same rate reported for the period 1958-63;
2. School drop-outs and academic failures will continue at present rates;
3. There will be no major change in the capacity of schools;
4. There will be no major economic or international occurrences which will materially affect school enrollments.

If one or more of these conditions change during the next decade, adjustments will need to be made in the projections. For example: were there to be a significant reduction in the number of school drop-outs (*deserciones escolares*) at grade one in the next few years, the total future enrollment in the primary schools would immediately increase; secondary and university levels of enrollment would increase proportionately, although later. As another example: were one of the nations immediately to construct needed new secondary school buildings, the secondary school enrollment in that country—hence these projections—would increase to include those children not now attending school for lack of physical facilities.

Within the limitations noted, and on the basis of the above assumptions, it is possible to estimate conservatively the number of students to be enrolled between 1965 and 1980 in the nations' public schools and universities. This information is presented in Table 1. It should be noted that the vast majority (nearly 92 per cent) of enrolled students are in primary schools, hence the cost of elementary education (despite a low unit cost) will always represent the largest educational expenditure. It should be noted also that substantial increases in enrollment are anticipated in each of the three major sectors of education. Enrollments in elementary schools will probably double during the period 1965-80. Secondary school enrollments should more than double. University enrollments (here expressed as the equivalent of *full-time* enrolled students) should increase by much more than 100 per cent.

In order to project total instructional costs of education for the three sectors, unit costs per student—as defined in the sections which follow—are applied to the anticipated annual increases in numbers of students enrolled in primary, secondary and higher education.

TABLE 1
PROJECTION OF ENROLLMENT IN PUBLIC EDUCATIONAL INSTITUTIONS OF CENTRAL AMERICA, 1965-80

Year	Elementary	Secondary	University	Total
1963*	1,207,646†	86,463‡	9,216§	1,303,325
1965	1,310,445	101,692	10,335	1,422,492
1966	1,361,176	108,756	10,976	1,480,908
1967	1,416,667	114,736	11,635	1,543,038
1968	1,473,967	120,298	12,333	1,606,598
1969	1,508,369	126,244	13,073	1,647,686
1970	1,591,813	132,677	13,859	1,738,349
1975	1,911,953	164,672	18,545	2,095,170
1980	2,232,100	233,500	24,817	2,490,417

*1963 was base year for projections.

†Public school enrollment figures are not reliable in one of the five nations; hence, the figures cited for elementary education are extrapolated from projections of total elementary school enrollments. In four of the five countries, public schools enroll approximately 91 per cent of total elementary enrollment. This percentage was employed here as though it applies to all Central American nations.

‡A similar problem exists with respect to public secondary school enrollment figures. Public school enrollments constitute approximately 61 per cent of total secondary enrollments in four countries. This percentage was applied to total school enrollments of the five countries in order to project the public secondary school enrollments cited above.

§University student enrollments are expressed as *full-time equivalent* students, not as number of individuals. As will be discussed later in the document, the full-time equivalent enrollment is estimated to be approximately 46 per cent of the number of enrolled individuals. The estimated rate of annual increase for 1965-80 is the same as for the period 1958-63, namely: 6 per cent.

Unit Costs of Education

Unit costs are expressed in terms of "per pupil" or "per student" costs. Present or past costs per pupil are obtained by dividing (a) total operating expenditures (i.e., exclusive of capital outlay) by (b) total enrollment (or the number of "equivalent full-time students," if part-time enrollment is substantial). Unit costs may then be utilized to estimate future requirements: unit cost multiplied by anticipated enrollment equals future need. The future requirements may be based upon present unit costs, or

upon proposed changes in them. Such estimates were made for each level of public education. The method and results follow.

Primary Education. The present level of support for elementary education in Central America is approximately \$36 per pupil. (Aggregate 1963 total expenditure of approximately \$44 millions divided by 1.208 million pupils reported to be enrolled in official and semi-official schools). At this low rate of unit expenditure it is not possible to offer to primary school teachers an average annual salary sufficient to attract and hold qualified secondary school graduates to this field.

Were each primary teacher to instruct an average of 35 pupils, the funds available per teacher for salary and other direct costs of instruction would be $\$36 \times 35$, or \$1,260 per year. If a teacher's salary represents approximately 60 per cent of the total instructional costs at the primary school level,¹¹ the average annual salary presently supported by the expenditure of \$36 per pupil is only \$786 per year ($\$36 \times 35 \times .60$).

If primary schools are to be staffed with reasonably well-qualified persons—i.e., persons prepared specifically for this task, and at least at the secondary school level—an average annual salary level must be offered to primary school teachers which is competitive with salaries available to secondary school graduates in other sectors of the economy. If one assumes \$2,100¹² to be a reasonable average annual salary for secondary school graduates, then that salary level can be used as one basis for estimating desired future unit costs for primary education.

For example: if an average annual salary of \$2,100 is deemed to be adequate, then the minimum total annual cost to be provided for primary education would be $\$2,100 \div .60$, or \$3,500 per teacher or classroom unit (assuming that teachers' salaries represent 60 per cent of total instructional costs.) If the primary teacher enrolls an average of 35 pupils, then the unit cost per pupil would be $\$3,500 \div 35$ or \$100.

¹¹Other instructional costs include: salaries of administrative and supervisory personnel; instructional materials and aids; library books; maintenance and operation of school plant, etc.

¹²Economic conditions and cost of living vary among the five nations, hence, "average" salary figures adopted here and elsewhere in this paper are not meant to be applied uniformly in each country. "Regional" averages are employed here to illustrate a method for estimating future costs within each nation. In practice, officials in each country should substitute the most appropriate salary and related cost figures as a basis for estimating national costs.

It should be the intent of the *Plan of Public Expenditure*, therefore, that *the level of support for primary education shall be increased during the 15-year development period from \$36 to about \$100 per pupil per year*. The specific rates of increase will, of course, need to be established by each nation. However, the *initial* rate of increase for primary education in each country will necessarily be small, in order to conserve funds presently available for use in the areas of immediate priority, namely higher and secondary education.

In Table 2, an illustration is developed which assumes small and gradual increases in unit costs of primary education during the period 1965-80; by 1975 the unit cost is nearly doubled (\$70), and by 1980, the desired minimum level of support (\$100) is attained. On the basis of (a) these increments in unit costs and (b) estimates of population increases, it was possible to estimate an acceptable minimum total expenditure for primary education during the development period. These estimates appear in the last column of Table 2.

TABLE 2
ESTIMATE OF COST OF PUBLIC PRIMARY EDUCATION IN CENTRAL AMERICA,
1965-80

(Costs are expressed in 1964 dollars)

Year	Enrollment*	Unit Cost†	Total Cost
1965	1,310,445	36.00	47,176,020
1966	1,361,176	37.00	50,363,512
1967	1,416,667	39.00	55,250,013
1968	1,473,967	43.00	63,380,581
1969	1,508,369	47.00	70,893,343
1970	1,591,813	50.00	79,590,650
1975	1,911,953	70.00	133,836,710
1980	2,232,100	100.00	232,210,000

*Enrollment data are reproduced from Table 1.

†Unit costs per pupil, as illustrated, advance slowly during the first 5-year period to a level of \$50; the rate of increase accelerates during the second 5-year period (1970-75) and most rapidly during the third such period (1975-80).

Secondary Education. The present average level of support among the five nations is approximately \$127 per secondary school student.

$$\text{Calculation: } \frac{\$9,934,000}{77,856} \frac{\text{Total 1962 expenditure}}{\text{Students, 1962}} = \$127$$

At this rate of support, it is manifestly impossible to provide average teacher salaries sufficiently high to attract and hold qualified persons in the public secondary schools. Even were present funds expended in an optimum pattern—i.e., approximately 55 per cent of the total expenditure dedicated to teacher salaries, and a student-to-teacher ratio not to exceed 31 to 1—the present unit expenditure provides an average annual salary of only \$2,165 ($\$127 \times 31 \times .55$). This level of average salary would be adequate, perhaps, for those secondary school teachers who are only high school graduates. (The great majority of teachers presently employed). In most countries, however, it is clearly inadequate as an inducement to attract and hold the university graduate.

For the future, therefore, it will be necessary to increase unit expenditures for secondary education. If—as proposed in the *Plan of Teacher Training*—the secondary schools are to be staffed only with qualified university graduates, then an average salary must be provided which not only will attract qualified university graduates to full-time positions in the schools, but also will hold them there.

If one assumes that an average annual salary of \$3,700 would be sufficient to attract and hold qualified teachers,¹⁸ a more adequate level of total operating expenditure per teacher would be $\$3,700 \div .55$, or \$6,727 (the teacher's salary representing 55 per cent of total instructional cost). If an average student-to-teacher ratio of 31:1 is maintained, the annual unit cost to be provided per student would be $\$6,727 \div 31$ or \$217.

It should be the further intent of the *Plan of Public Expenditure* for education, therefore, that the average level of support for secondary education shall be increased as rapidly as possible from \$127 to approximately \$217 per student per year.

An illustration of this increase in unit expenditure is presented in Table 3. Note that the number of enrollees increases significantly during the period shown, hence the total cost would necessarily increase, with or without the increments in per student expenditure. With small increases in unit cost each year after 1966, the objective of a minimum level of support for secondary

¹⁸An average annual salary of \$3,700 will support any number of reasonable salary scales for qualified teachers. For example: a minimum salary for the beginning teacher of \$3,000; a maximum salary of \$6,000 for the experienced and successful teacher.

education can be achieved in less than ten years, depending upon the established rate of increase in per student expenditure.

TABLE 3
ESTIMATE OF COST OF PUBLIC SECONDARY EDUCATION IN CENTRAL AMERICA,
1965-80
(Costs are expressed in 1964 dollars)

Year	Enrollment*	Unit Cost	Total Cost
1965	101,692	142.30	14,470,763
1966	108,756	130.89†	14,236,161
1967	114,736	144.55	16,585,089
1968	120,298	147.70	17,768,014
1969	126,244	161.56	20,395,981
1970	132,677	170.97	22,683,742
1971	139,076	183.34	25,498,194
1972	145,475	191.80	27,902,105
1973	151,876	201.52	30,606,051
1974	158,273	208.54	33,006,251
1975	164,672	216.82	35,704,183
1980	233,500	217.00	50,869,500

*Source of enrollment data is Table 1.

†See Appendix 6 of the *Plan of Teacher Training* for an explanation of the reduction in annual costs which occurs in 1966.

Application of Unit Costs to Secondary Education. In applying unit rates in the field of secondary education, a sharp distinction should be drawn between support for *escuelas corrientes* and *escuelas "nuevas"*.¹⁴ In general, the lower (\$127) unit cost should be applied to the *escuelas corrientes*, and the greater rate (\$217) only to the *escuelas "nuevas."*

The intent of this differential application of unit costs by type of school is this:

Approximately 83 per cent of the teachers to be employed in 1965 will not be qualified by training to be secondary school teachers, although certificated to do so by their employing governments.¹⁵

¹⁴The term *escuela corriente* is here employed to represent those existing secondary schools which are staffed principally by nonqualified personnel. The term *escuela "nueva"* is here employed to represent certain existing schools—and such new schools as may be developed—which become staffed principally by qualified graduates of the proposed *Plan of Teacher Training*. See Anexo 3 of the *Plan de Acción* for full discussion of *escuelas "nuevas,"* and how they constitute an integral part of the *Plan of Teacher Training*.

¹⁵*Necesidades, op. cit.*, p. 10.

This is unfortunate, but true. Preparatory institutions simply have not produced graduates in numbers sufficient to staff the schools adequately; and salary levels provided by government ministries have not provided inducements sufficient to attract and hold university graduates to full-time teaching positions. Manifestly, an increase in financial support of *non-qualified* teachers would produce neither better instructed nor greater numbers of high school graduates, hence *should not be contemplated*. For this reason, it is proposed that the level of support for non-qualified teaching staffs would be maintained throughout the development period at *present unit levels* (i.e., equivalent to \$127, the present average per pupil rate).

As qualified teachers are produced—the result of serious implementation of the program recommendations in the *Plan of Teacher Training*—it is anticipated that graduates will be employed by government Ministries of Education and assigned *as teams* to cooperating “satellite” schools (*escuelas “nuevas”*).¹⁰ These schools are to become intimately a part of the program of teacher preparation; they will be “experimental” in nature, have qualified personnel, and should thus rapidly become in fact, modern schools. Since the qualified teacher is the key to secondary school curriculum and instructional improvement—hence, to more and better prepared secondary school graduates—additional funds expended in secondary education are properly allocated to the growing body of *qualified* teachers, and to the schools to which they are assigned. Thus, the new level of support (i.e., \$217 per student) is properly diverted to—and *only* to—the growing number of qualified teachers and *escuelas “nuevas.”*

The two unit cost figures were applied to the projection of future secondary school population in the manner described; the results are reproduced in Table 4.

As illustrated in Table 4, the proportion of funds for secondary education allocated to the *escuelas “nuevas”* (column B) increases during the period of 1965-75, until *all* funds for secondary educa-

¹⁰In 1963, there were 38 public secondary schools in Central America which enrolled 600 or more students. These would become the first *escuelas “nuevas.”* Where site size and physical facilities permit, enrollments would be increased to 600-1,000 in an additional 39 secondary schools which now enroll 300-599 students. For students who are not now adequately housed—and for the estimated 7,000 new public school students each year—new buildings will be required. Each of these should enroll at least 600 students and preferably 1,000 or more.

TABLE 4
ALLOCATION OF PUBLIC EXPENDITURES WITHIN SECONDARY EDUCATION IN
CENTRAL AMERICA, 1965-80
 (Costs are expressed in 1964 dollars)

Year	Enroll- ment*	A		B		Total Cost	Unit Cost
		<i>Escuelas corrientes</i> %†	Cost‡	<i>Escuelas "nuevas"</i> %†	Cost‡		
1965	101,692	83.0	10,719,354	17.0	3,751,409	14,470,763	142.30
1966	108,756	87.2	11,215,354	12.8	3,020,807	14,236,161	130.89
1967	114,736	80.5	11,730,035	19.5	4,855,054	16,585,089	144.55
1968	120,298	77.0	11,763,941	23.0	6,004,073	17,768,014	147.70
1969	126,244	61.6	9,876,321	38.4	10,519,660	20,395,981	161.56
1970	132,677	50.2	8,345,869	49.8	14,337,873	22,683,742	170.97
1971	139,076	37.4	6,605,832	62.6	18,892,362	25,498,194	183.34
1972	145,475	28.0	5,173,091	72.0	22,729,014	27,902,105	191.80
1973	151,876	17.2	3,317,579	82.8	27,288,472	30,606,051	201.52
1974	158,273	9.4	1,889,463	90.6	31,116,788	33,006,251	208.54
1975	164,672	0.2	41,827	99.8	35,662,356	35,704,183	216.82
1980	233,500	—	—	100.0	50,669,500	50,669,500	217.00

*Public secondary enrollments are taken from Table 1.

†The change in proportion of students anticipated to be enrolled annually in *escuelas corrientes* and *escuelas "nuevas"* is derived from Cuadro 6.1, Anexo 6, *La Formación de Personal para la Enseñanza Media: Plan de Acción*. (Guatemala: HME, 1964), p. 64.

‡Calculated at \$127 per pupil enrolled in *escuelas corrientes*.

§Calculated at \$217 per pupil enrolled in *escuelas nuevas*.

tion are so expended. It is the intent of the *Plan of Teacher Training* that all secondary schools will, by then, be staffed by qualified teachers. Conversely, the proportion allocated to *escuelas corrientes* (Column A)—while 83 per cent in 1965—declines markedly during the development period. By 1975, no further expenditures will be required for *escuelas corrientes*, because all secondary education should, by then, be conducted in *escuelas "nuevas."* In the "Total Cost" column of Table 4, estimates of the cost of secondary education are given for representative years of the 15-year development period. "Unit Cost" figures are annual means, derived by dividing "Total Cost" by the combined enrollment of *escuelas corrientes* and *escuelas "nuevas."*

For best results, this "Plan" of public expenditure for secondary education (or whatever national plans may be developed utilizing this methodology) ought to be coordinated with the *Plan of Teacher Training* in each country. As cited earlier and now re-emphasized,

the implementation of this pattern for the funding of secondary education will require a high and *stable* order of ministry/university cooperation and coordination.

Higher Education. University-level programs in Central America¹⁷ are designed predominantly for part-time study; hence, unit cost estimates concerning full-time study programs must be constructed on bases other than current practice. The method employed for estimating costs of preparing teachers is fully described in *La Formación de Profesores de Enseñanza Media: Estimación de Costos* (Guatemala: IIME, 1964).

Present levels of financial support for higher education are difficult to identify and to segregate from other classes of educational expenditure. However, the five nations invested in 1963 approximately \$7,000,000 to provide university-level programs to an estimated 21,000 students, the overwhelming majority of whom were part-time. The public investment (exclusive of tuition and fees, wherever these exist) may be estimated, therefore, to represent approximately \$335 per enrolled student. This cost figure, however, is not useful, because the "enrolled student" it purports to represent is not a uniform unit of measurement.¹⁸ Most students complete only one or two of the subjects required each year in their course of study, although they may be enrolled officially as "full-time" students. Others may complete most or all of their courses. Hence, a cost per enrolled student lacks comparability and therefore utility in planning. Attempts are now being made to determine a useful definition of a *full-time equivalent* student, an enrollment figure which equates the total number of course enrollments actually created by all enrolled students (whether full- or part-time) with that number of enrollments which *would have been created* were each student actually attending full-time.

For example: if a university enrolled 1,500 *full-time* students, each taking six courses, the 1,500 students would create 9,000

¹⁷There are five national universities and two church-related universities in Central America; there are also three post-secondary institutions which prepare teachers, two for the secondary schools and one for elementary schools. In addition, there are both public and private post-secondary institutions for the preparation of other professionals, particularly for the field of agriculture. The term university-level instruction applies here to all official institutions which provide degree programs beyond the level of the secondary school.

¹⁸The most comparable cost figure in Central American higher education is that of instructor salaries. These usually represent about 45-50 per cent of the total instructional cost. Various unit costs (based upon instructor salaries) are the object of intensive IIME study in each of the five national universities. As these studies are completed, results will be made available to the appropriate institutions to incorporate them into their study and planning.

course enrollments (1,500 x 6). Were the university actually to enroll 3,000 students in such a manner as to create the same total of 9,000 course enrollments as the 1,500 full-time students, the 3,000 *part-time* students would be the *equivalent* of 1,500 *full-time* students. The advantage of the latter figure (i.e., the estimated equivalent of full-time students) is that it is comparable with similar calculations among universities, or within the same university for different years. Likewise, the enrollment of several faculties of a university may be compared.

One completed study¹⁹ indicates that the full-time equivalent of university enrollment is approximately 46 per cent of the total enrollment. If this estimate may validly be applied to all university-level enrollments, then the full-time equivalent of the aggregate enrollment of all institutions in 1965 would be about 22,000 x .46, or 10,138 full-time equivalent students.

In the same report, it was determined that the "average" student completed one *academic* year of study only after an average of 2.17 *calendar* years of enrollment in the University. For this reason, the mean annual expenditure of about \$335 per *enrolled* student is misleading. The actual level of support per *full-time equivalent* student is more nearly 2.17 x \$335, or about \$727. This being so, there is not much of a gap between *present* costs of university instruction and the *anticipated* expenditure level (\$809 per full-time student) that will be required (a) for the proposed *Plan of Teacher Training* and, later, (b) for other full-time programs of higher education.

The annual instructional cost per full-time student (to provide three academic years of basic studies in appropriate disciplines, and a fourth year comprised principally of professional studies and practice teaching) has been estimated to be \$809. The per student cost of buildings and equipment, to support approximately 5,100 full-time students annually, was estimated to be an additional \$82 per year; the total cost per student for the preparation of teachers is \$891.²⁰

¹⁹*Academic Progress of University Students, University of San Carlos of Guatemala, 1963* (Michigan State University: IIME, 1964). *Progreso Académico Estudiantil en la Universidad de San Carlos de Guatemala, 1963*. (Guatemala: IIME, 1964).

²⁰*La Formación de Personal para la Enseñanza Media: Estimación de Costos* (Guatemala: IIME, 1964), p. 21. Available in English as: *The Production of Secondary School Personnel: Projected Costs*. (Michigan State University: IIME, 1964).

Actual costs per student in various major fields of study have not as yet been firmly established in Central American higher education. Preliminary results indicate a wide variance by field and by nation. Instructional unit costs in the biological and physical sciences, for example, tend to be higher than those in the fields of law, education and economics. The general range of average annual cost (1961-63) appears to be from about \$150 per full-time equivalent law student to as much as \$2,500 or more per full-time equivalent student of veterinary medicine.²¹

Actual instructional costs are affected by factors other than salary levels (e.g., class size, number of instruction hours, and the number of instructors assigned to a course). It is estimated—subject to revision—that proposed university-level expenditure plans for future operations should probably anticipate an average cost per full-time student of \$1,000 per year, and preferably \$1,200.²²

In the *Plan of Public Expenditure* for the improvement and expansion of higher education, therefore, provisions should be included:

1. To concentrate efforts upon the establishment of a personnel preparation program similar to that described in the *Plan of Teacher Training*, while maintaining other areas of higher education more or less at present support levels.
2. To increase systematically the per student allocations to other areas of higher education *only after* (a) the preparation programs described are established and demonstrably productive, and (b) the universities have undertaken and accomplished certain internal reorganization related to increased efficiency of operation and productivity.

Application of Unit Costs in Higher Education. As in the case of secondary education, differential rates should be applied to the different aspects of higher education during the proposed development period. Two rates are immediately applicable: (a) the present average rate of \$727 for all types of programs, and (b) the proposed new rate of \$809 for teacher preparation. These are reflected in Table 5; the table is expressed in terms of *full-time equivalent* students, rather than individuals enrolled.

²¹Reports on this subject are in preparation.

²²It is anticipated that new levels of financial support will be coincident with—if not contingent upon—significant changes in university performance, particularly with respect to increased productivity of graduates in fields of critical national need.

TABLE 5

ALLOCATION OF PUBLIC EXPENDITURE WITHIN HIGHER EDUCATION IN CENTRAL AMERICA, 1965-80
(Costs are expressed in 1964 dollars)

YEAR	ENROLLMENT*			Costs			Average Annual Unit Cost**
	Future Educators†	Students in Other Majors	Total	Preparation of Educational Personnel‡	Other Programs§	Total	
1965	600	9,755	10,355	842,700	7,091,885	7,934,585	766.28
1966	2,706	8,270	10,976	2,546,454	6,012,290	8,558,744	779.77
1967	4,222	7,413	11,635	3,772,898	5,389,251	9,162,149	787.46
1968	5,391	6,942	12,333	4,718,619	5,046,834	9,765,453	791.81
1969	5,391	7,682	13,073	4,718,619	5,584,814	10,303,433	788.15
1970	5,391	8,468	13,859	4,718,619	6,774,400††	11,493,019	829.28
1975	5,391	13,154	18,545	4,718,619	13,154,000††	17,872,619	963.74
1980	(2,500)***	22,317	24,817	2,201,150	26,780,400§§	28,981,550	1,167.81

*Enrollment is reported in terms of full-time equivalent students; the actual number of persons enrolled will be more than twice this number.

†Future educators include 300 post-graduate administrative candidates and up to 5,091 teacher trainees annually.

‡Unit cost includes: \$809 per teacher trainee; \$2,000 per graduate student.

§Unit cost calculated at \$727 per student through 1969.

**Average annual unit cost of all programs is derived by dividing Total Cost by Total Enrollment.

††Unit cost applied at \$800 per student: 1970-74.

‡‡Unit cost applied at \$1,000 per student: 1975-79.

§§Unit cost applied at \$1,200 per student: 1980 and beyond.

***The number of future educators to be enrolled each year beginning in 1980 should be adjusted to school enrollment requirements and program criteria. At present rates of growth no less than 2,500 full-time teacher trainees will be needed. See *Plan de Acción, Anexo 6.*

One means to apply the differential rates is illustrated in Table 5. Consistent with the priorities established earlier, the illustration provides for a rapid increase in support *only* for teacher training and related programs.

1. In 1965, the estimated *present* support level (\$727 per full-time equivalent student) is applied to *all* programs, pending definition and implementation of the new teacher preparation program.
2. Beginning in 1966, the seven teacher training institutions should enroll 2,406 full-time teacher trainees, plus 300 others in a graduate level program for school directors and other school functionaries.
 - a. The *new* rate of \$809 is applied to the 2,406 full-time teacher trainees.
 - b. A *separate* rate of \$2,000 is applied to the 300 full-time graduate students.
 - c. The present average rate of \$727 per full-time equivalent student is applied in other *carreras*.
3. By 1968—and for each subsequent year through 1975—the universities should enroll not less than 5,091 full-time teacher trainees plus 300 graduate students annually; the new rates continue to be applied to these full-time students.
4. By 1970, the universities may be expected to have established their administrative and academic reforms, hence should then be ready to absorb higher levels of support in other areas. An average rate of \$800 per full-time equivalent student is applied in that year to replace the present rate of \$727.
5. By 1976, the rate of \$1,000 is applied.
6. By 1980, the desired rate of \$1,200 might be justified.²³

Total Costs of Higher Education. A summary of estimated annual costs for all aspects of higher education is presented in Table 6. Items 1 through 6 of the table pertain to the cost of preparing personnel in the *Plan of Teacher Training*, and are discussed in the pertinent sections of the *Plan*.

²³The rationale for, and evidence in support of, these unit costs are developed and presented fully in "Análisis de los rubros de costos del plan de formación de personal," *La Formación de Personal para la Enseñanza Media: Plan de Acción, Anexo 6*.

TABLE 6

ESTIMATE OF TOTAL PUBLIC EXPENDITURE FOR HIGHER EDUCATION IN CENTRAL AMERICA, 1965-80

(Costs are expressed in millions of 1964 dollars)

Category of Expenditure*	1965	1966	1967	1968	1969	1970	1975	1980
1. Preparation of teachers	0.24	1.95	3.17	4.12	4.12	4.12	4.12	1.90
2. Preparation of graduate educational personnel	.60	.60	.60	.60	.60	.60	.60	.30
3. Security for student loans	—	.22	.34	.44	.44	.44	.44	1.70
4. Preparation of university professors	.35	1.09	.85	.80	.25	.25	.25	.25
5. Graduate fellowships	.92	.92	.92	.92	.92	.92	.92	.46
6. Research and planning assistance services	.25	.25	.25	.25	.25	.25	.50	.50
7. Costs of other areas of higher education†	7.09	6.01	6.00	6.00	6.00	6.77	13.15	26.78
Total	9.45	11.04	12.13	13.13	12.58	13.35	19.98	31.89

*The particular pattern of expenditure reproduced here was developed in the *Plan de Acción*. It appears in Cuadro 6.3, "Análisis de los rubros de costos del plan de formación de personal," Anexo 6, p. 11.

†The cost estimates for Item 7, "Other areas of higher education," as employed here, are higher during 1967-69 than those derived and presented in Table 5. It is assumed that the universities will not be able to make the transition to full-time study without incurring additional costs for this limited period, hence the higher estimates in Table 6.

The first six items of Table 6 would add to university budgets over \$4,500,000 annually for the operation of the *Plan of Teacher Training*. Students of university administration and finance should discern that this major increase will sharply augment the universities' over-all instructional capability, even though direct allocations to other areas of higher education are not increased until 1970. The reason is apparent: three-fourths of the proposed teacher preparation program involves fundamental academic studies; this presupposes the creation or expansion within each university of academic units able to provide these studies. The academic studies will be relevant not only to the field of teacher preparation, but also to most other professional fields within the university, including law, medicine, economics, engineering and agronomy. Hence one effect of the *Plan of Teacher Training* and this illustrative *Plan of Public Expenditure* will be to strengthen the universities' capacity

to offer programs of study *outside* the field of teacher preparation. Both Plans presuppose an orderly transition of university life to that of full-time day programs for full-time students, as well as the expansion of part-time study opportunities through evening programs. The proposed teacher education program—and the *Plan of Public Expenditure*—are designed to encourage and to make feasible that transition.

Cost of New Construction

During the development period (1965-80), it is anticipated that school and university enrollments will increase significantly. In addition to increased costs for school and university operation, it will also be necessary to provide additional funds for new school and university construction. Costs for new construction vary among the five countries; hence, precise estimates should be made on a national basis. However, it is possible to estimate over-all totals, employing average construction costs. These are developed in the following sections.

New Primary School Construction. Between 1965 and 1980, there should be an increase of at least 921,655 pupils in the public elementary school enrollment in Central America. (See Table 1). If a new classroom is required for each 35 additional pupils, it will be necessary to construct a minimum of 26,333 ($921,655/35$) classrooms, an average of 1,755 each year beginning in 1966. If it is reasonable to assume an average cost per classroom of \$2,500, the total cost during the period for elementary school construction would be $\$2,500 \times 26,333$, or \$65,832,500, an average cost of approximately \$4,400,000 per year.

New Secondary School Construction. Between 1965 and 1980, there should be an increase of at least 131,808 students in the public secondary schools in Central America. (See Table 1). In order to provide adequate physical facilities for these new students, at least 130 new school buildings, each of 1,000 or more student capacity, will be required, principally in urban centers. If a new school for 1,000 pupils can be constructed at an average cost of approximately \$600,000, the average cost per pupil would be \$600. Applying this estimate of unit cost to the anticipated number of additional students, the total cost during the 15-year development period would be $\$600 \times 131,808$, or \$79,084,800, an average of approximately \$4,900,000 per year.

New University Construction. University enrollments are expected to increase by the equivalent of at least 14,482 full-time students during the 15-year period. (See Table 1). University building needs—by the very diverse nature of university work—are more complex and more expensive than those of schools. It is estimated that most university building requirements could be met from an allocation of \$1,200 per full-time equivalent student. [*The Production of Secondary School Personnel: Projected Costs* (Michigan State University: IIME, 1964), p. 18.] This would provide space for classrooms, laboratories, faculty offices, library and research facilities. Given this estimate of cost per equivalent full-time student, the minimum cost of new university construction during the development period would be \$1,200 x 14,482, or \$17,378,400, an average of about \$1.2 millions per year.

Cost of Capital Outlay to Government. The estimated minimum total cost of all new construction during the development period is \$162,295,700. This estimate does not include any construction which may be needed for students now in school but not properly housed; nor does it include costs of land purchases. The average annual cost during the 15-year period would be approximately \$10.4 millions, or about the current annual operation cost for all of secondary education.

If the five national governments were to indebt themselves through long-term loans for this needed new construction, the total annual cost would be considerably reduced; the number of years in which that reduced cost would need to be applied would, of course, be lengthened considerably. Consider this example:

A long-term loan is negotiated during each of three major construction periods, namely: (a) 1966-70, (b) 1971-75 and (c) 1976-80. The cost of classrooms and buildings to be constructed during each period would be as follows:

PERIOD	PRIMARY			SECONDARY		UNIVERSITY	
	Pupils	Class-rooms	Cost	Students	Cost	Students	Costs
1966-70	281,368	8,039	\$20,097,500	30,985	\$18,591,000	3,524	\$ 4,228,800
1971-75	320,140	9,147	22,867,500	31,995	19,197,000	4,686	5,623,200
1976-80	320,147	9,147	22,867,500	68,828	41,296,800	6,272	7,526,400
Total	921,655	26,333	\$65,832,500	131,808	\$79,084,800	14,482	\$17,378,400

*Projections of cost expressed in 1964 dollars.

Assume that long-term loans are available at low interest: a repayment period of 50 years, for example, at a cost of 1.5 per cent interest per year. Assume also that each of the three major loans are to be repaid in 49 equal annual payments (including principal and interest), beginning the second year. The cost of debt service (i.e., combined payment on interest and principal) for each of the three loans would be as follows:

Period	Total Construction Costs = Loan Value	Principal plus Interest ^a	Average Annual Payment
1966-70	\$42,917,300	\$59,011,287	\$1,204,312 ^a
1971-75	47,687,700	65,570,287	1,338,175
1976-80	71,690,700	98,574,712	2,011,727

^aSample calculations:

(a) $\$42,917,300 \times 0.015 = \$6,437,595$; interest on full principal, i.e., first year payment of interest.

(b) $\$42,917,300 \times 0.00 = 0.0$; interest at end of 50 years.

(c) $\$6,437,595/2 = \$3,218,797$; average annual interest during 50 years.

(d) $\$3,218,797 \times 50 = \$16,093,985$; total interest to be paid during 50 years.

(e) $\$16,093,985 + \$42,917,300 = \$59,011,285$; principal plus interest to be repaid after first year.

(f) $\$59,011,285/49 = \$1,204,312$; each of 49 equal annual payments.

The cumulative annual payments for debt service, therefore, would be:

1966-70:	\$1,204,312
1971-75:	2,542,487
1976-80:	4,554,214

These estimates of minimum costs for capital outlay are combined with estimates of costs for operation of the several educational programs, and the totals are summarized in the following section.

Total Cost of Public Education: 1965-80

In summary, the *Plan of Public Expenditure* provides for these changes in levels of support for the major sectors of public education, during the period 1965 through 1980:

- *Per primary school pupil: From present \$36 to \$100 by 1980.
- *Per secondary school student: From present \$127 to \$217 by 1975.
- *Per university-level student: From present \$727 to \$1,200 by 1980.

- °Per teacher trainee: From present \$727 to \$809 in 1966.
- °Per administrative trainee: From present \$727 to \$2,000 in 1966.

These unit costs were applied (in the manner described in preceding sections) to the projections of enrollments cited in Table 1. The results are summarized in Table 7. The pattern of expenditures illustrated is designed to provide to each sector of education that personnel (and related instructional aids, materials, facilities and organization) required of a minimum program of public instruction by 1980. By that year, it is anticipated that the educational systems in Central America will have acquired the capacity (1) to produce qualified graduates in sufficient numbers at all levels, (2) to effect basic and enduring curricular and organizational revisions and reforms, and (3) to extend opportunities for public education to the large number of children now so denied.

Specifically, a means is illustrated whereby total expenditures for higher education can be doubled with productive effect during the first five years of the 15-year development period. Support for secondary education could also be doubled during this period; but the most productive period—hence that of most rapid increase in financial support—does not appear until the second 5-year period (1970-75), when qualified teachers for public secondary schools should be in full supply. Suggested support for elementary education increases slowly during the period of its least productivity (1965-70), and most rapidly (1975-80) following the full development of the *Plan of Teacher Training*.

TABLE 7

ESTIMATE OF TOTAL PUBLIC EXPENDITURE FOR EDUCATION IN CENTRAL AMERICA, 1965-80

(Costs are expressed in millions of 1964 dollars)

Area of Education	1965	1966	1967	1968	1969	1970	1975	1980
Higher Education*	9.45	11.04	12.13	13.13	12.58	13.35	19.98	31.89
Secondary Education†	14.47	14.24	16.59	17.77	20.40	22.68	35.70	50.67
Elementary Education‡	47.18	50.36	55.25	63.38	70.89	79.59	133.84	232.21
General administration and other areas of education§	10.40	10.80	11.20	11.60	12.00	12.40	14.40	16.40
Capital Outlay**		1.20	1.20	1.20	1.20	1.20	2.54	4.55
Total	81.50	87.64	98.37	107.08	117.07	129.22	206.46	335.72

Sources:

*Table 6.

†Table 3.

‡Table 2.

§Includes costs of Ministries of Education and of other national schools; see Anexo 6, Plan de Acción.

**Text, "Cost of New Construction."

FEASIBILITY OF NEW FINANCIAL SUPPORT LEVELS

It would seem reasonable that the nations in Central America aspire to develop by 1980 the human resources, instructional apparatus, and organizational and administrative capacity needed to build modern educational systems, and that they will be willing to support substantially higher levels of expenditure for education in order to do so.

It would also seem reasonable that the nations would endeavor to base their individual and collective plans for educational improvement upon the financial resources available to them.

The real question, then, becomes: are these new levels of expenditure *worthwhile* and *feasible*?

Clearly they are worthwhile if they produce the results anticipated in both the *Plan of Teacher Training* and in previous sections of this document. To make these new levels of expenditure productive of desired results, however, the major educational institutions and agencies in Central America will have to attain and sustain new levels of collaboration, based upon commonly accepted plans of action. Given this, it would behoove the supporting governments to make all reasonable efforts to provide needed new levels of financial support, and further to elicit the support of national and commercial banks and related enterprises in that effort.

The effort required may not be as great as one would anticipate, given the rather meagre public capital the five nations now have to

TABLE 8
GROWTH IN NATIONAL BUDGETS, 1959-64
(In thousands of dollars)

Year	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Total
1959	51,083.8	60,434.7	114,919.3	44,796.9	—	—
1960	57,723.5	63,718.9	102,433.8	47,848.5	—	—
1961	61,191.9	69,082.5	121,028.8	46,836.5	36,877.3	335,067.0
1962	74,517.1	67,626.3	105,950.0	50,220.8	44,538.1	342,852.3
1963	62,350.2	76,745.4	114,266.1	55,131.2	48,758.8	357,251.7
1964	—	—	155,952.2	57,337.9	59,335.5	—
Average annual increase in per cent	7.2	6.75	7.14	5.77	15.2	—

NOTE: Accurate data were not available for years omitted.

invest in all programs of national development. As shown in Table 8, during the period 1959-63, government expenditures for all public services in each country increased significantly over-all. Although these increases were not uniform, none averaged less than 5 per cent, and in one country, the average annual increase exceeded 15 per cent. It would appear, therefore, that the needed new support levels might be *feasible* under two conditions:

1. That the *magnitude* of total annual government expenditure continue to increase as much as 5 per cent (cumulated annually) during 1965-80, and
2. that the *proportion* of that government expenditure dedicated to the support of public education be increased from its present average level of about 20 per cent to a new average level of 36-37 per cent by 1980.

A pattern of increases in magnitudes and proportions is illustrated in Table 9. Consistent with the three five-year phases of the 15-year period of development, increases in the proportion of total expenditure to education are very small during the initial years. As the *Plan of Teacher Training* progresses, and as the required re-organization of secondary education occurs, the educational systems also increase their capacity to expend funds wisely and productively; hence, during the middle (1970-75) and last (1975-80) phases of the development period, more significant proportions of

TABLE 9
TOTAL COST OF EDUCATION EXPRESSED AS PER CENT OF NATIONAL BUDGET,
1965-80
(Costs are expressed in 1964 dollars)

Year	Aggregate of National Budgets	Aggregate Annual Cost of Education	Per Cent
1965	\$440,187,131	\$ 81,450,000	18.51
1966	462,196,488	87,640,000	18.96
1967	484,653,544	96,370,000	19.88
1968	508,886,222	107,080,000	21.04
1969	534,330,533	117,070,000	21.91
1970	561,047,030	129,220,000	23.03
1975	716,054,018	206,460,000	28.83
1980	913,886,541	335,720,000	36.74

NOTE: A progressive annual increase of 5 per cent is included in the illustration of aggregate national budgets.

total public expenditure can and should be allocated to education. By 1980—through a series of relatively small increases in proportions—the educational systems could be placed on sound educational and financial bases with considerably less than half of total national effort consumed. If economic theorists are correct—that improved education, particularly in those areas closely related to economic productivity, leads to improved economic status—then by 1980, the Central American nations should have the requisite human resources to man the economic development already undertaken.

The specific means, however, by which the five nations can or should seek to finance these new levels of expenditure fall outside IIME's field of study. Given broad acceptance of the principles and illustrations for planning set forth in this series of documents, and further, given a working plan for each country, the specific problems of financing should then become the object of serious study in each country.

DECISIONS AND ACTIONS REQUIRED

In the previous five sections of this document, it has been demonstrated that (a) significant educational improvement in Central America is needed and possible, (b) practical plans for its accomplishment can be formulated and (c) adequate financing for actions called for by the plans appears to be feasible.

Given these as probabilities, what decisions must now be made by responsible officials of the five nations, and what actions should be taken to implement plans? The IIME staff recommends that these steps be taken during 1965-66:

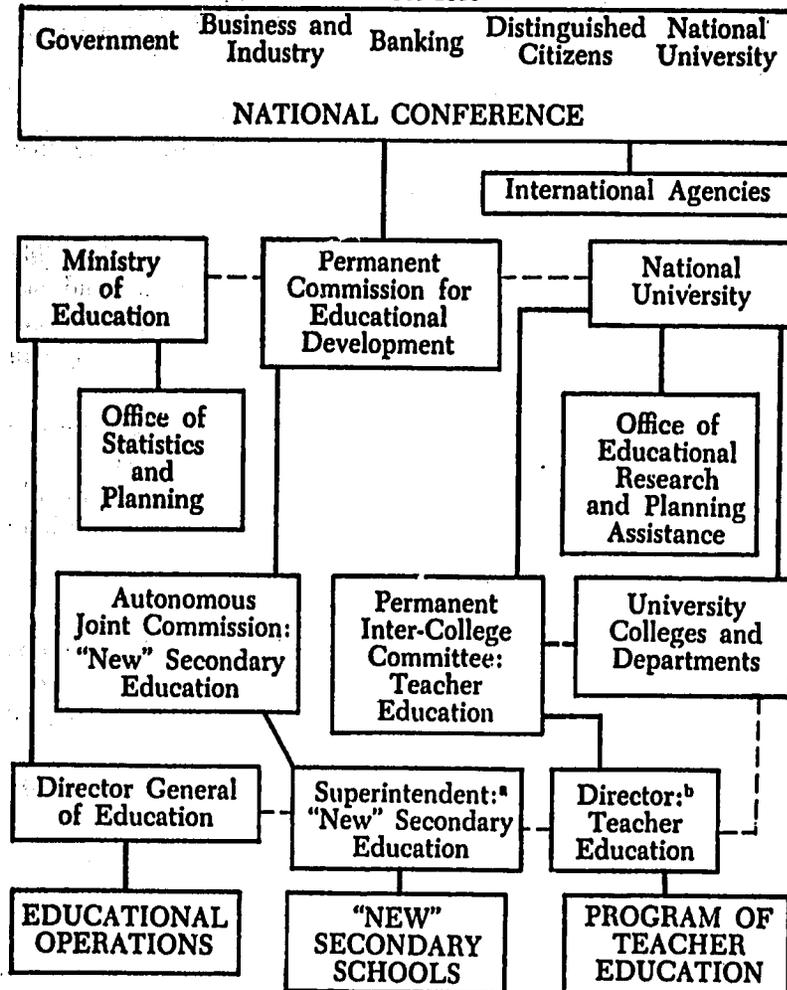
1. Conduct a regional Congress, under joint auspices of ODECA (the regional organization of governments) and CSUCA (the regional organization of national university rectors), of ministers of education, university rectors, and appropriate government and international agency representatives:
 - (a) To focus attention further on the crucial problems of teacher education;
 - (b) To agree on general principles and priorities such as those described in *Plan of Teacher Training* and in this *Plan of Public Expenditure*;

- (c) To create a regional commission to provide continuing and broad leadership for the long-term financing of education in Central America, particularly with respect to student loans.
2. Conduct in each nation a national conference (endorsed by both the national University and Ministry of Education) of representatives of government, education, commerce and banking, and of distinguished citizens:
 - (a) To garner support for subsequent decisions and actions appropriate to the implementation of a plan of action in the nation, and to develop momentum for such actions;
 - (b) To create a permanent national commission (comprised of distinguished representatives of the several sectors of the national economy) to provide continuing leadership within the national community for the development and financing of education, and to resolve student loan program matters.
 3. Within each nation:
 - (a) Establish an autonomous university-ministry joint commission to develop and administer secondary education programs, through the *escuelas nuevas*;
 - (b) Authorize the commission to employ a professional superintendent of "nueva" secondary education, in order to provide continuing professional leadership during the development period, and to articulate the programs of the *escuelas nuevas* with (1) the university director of teacher education and (2) the ministry director general of education;
 - (c) Develop within each ministry and within each university the research and planning assistance capacity to serve the technical requirements of the several commissions and committees.
 4. Within each autonomous joint commission:
 - (a) Identify, recruit and send to an appropriate regional center the first group of graduate students for advanced preparation as school directors and related technical service personnel;

- (b) Recruit the first group of applicants for admission to the university's new teacher training program, beginning in 1966.
5. Within each University:
- (a) Appoint a permanent inter-college teacher education committee (1) to formulate the University's teacher preparation program and (2) to integrate into that program the contributions of the University's several faculties;
 - (b) Appoint a director of teacher education, responsible to the permanent committee, to coordinate and administer the teacher preparation program, and to articulate that program with the secondary school system of the nation;
 - (c) Identify, recruit and contract (with an appropriate foreign university) for the advanced preparation of up to 22 university professors, these to return to full-time teaching positions within the university not later than January, 1967.
6. Within each ministry of education:
- (a) Delegate authority for the responsible administration of the secondary education development program (through the *escuelas nuevas*) to the autonomous joint ministry-university commission;
 - (b) Allocate funds sufficient to support the work of the commission, and that of its professional staff;
 - (c) Adopt a differential salary and financial support scale for secondary education, patterned after that illustrated in the *Plan of Public Expenditure*.

An organizational framework within which these actions may be effectively taken is shown in Graph 2.

GRAPH 2
A PATTERN OF NATIONAL ORGANIZATION FOR ACTION
1965-1980



NOTE:

a. It is assumed that the office of the Superintendent would—by the end of the development period—be relocated within the regular structure of the ministry of education.

b. In the university in which there exists an administrative officer for education at the level of a dean, the function of the "director of teacher education" would be carried out by that deanship.

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IIME



INSTITUTO DE INVESTIGACIONES Y MEJORAMIENTO EDUCATIVO

The Institute for Educational Research and Improvement (IIME) is an administrative unit of the University of San Carlos of Guatemala.

Presently, IIME's principal activity is the **PROGRAMA INTERUNIVERSITARIO**, a program of educational studies conceived and conducted jointly by the University of San Carlos and Michigan State University.

The Institute's programs are conducted in the five Central American republics: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

The Inter-university Program has been incorporated into the plan of regional integration developed by the Central American University Superior Council (CSUCA: *Consejo Superior Universitario Centroamericano*). The Program includes regional studies in secondary education, higher education, technical education, teacher education, and special education and rehabilitation. The first two years of Program activities were financed by a contract between Michigan State University and the Agency for International Development.