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A qualitative and quantitative study of teacher corps in selected Sub-Saharan countries with recommendations for inservice program development based on statistical projections.

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A QUALITATIVE AND QUANTITATIVE STUDY OF TEACHER CORPS IN SELECTED SUB-SAHARAN COUNTRIES WITH RECOMMENDATIONS FOR IN-SERVICE PROGRAM DEVELOPMENT BASED ON STATISTICAL PROJECTIONS

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A DISSERTATION

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ABSTRACT OF DISSERTATION
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Title A Qualitative and Quantitative Study of Teacher Corps in Selected Sub-Saharan Countries with Recommendations for In-Service Program Development Based on Statistical Methods

The purposes of this study were twofold. The first purpose was to demonstrate the need for the provision of adequately trained teachers in Botswana, Kenya, Malawi, Tanzania, Uganda, Zambia, and Zimbabwe (Proposition I). The second purpose was to demonstrate that there are in-service practices the selected countries can adapt from other developing countries (Proposition II).

Chapter two reviewed qualitative and quantitative data between 1960 - 1985 to validate Proposition I. Linear regression analysis ($y = b + mx$) was used to project (1) population, (2) elementary enrollments, (3) secondary enrollments, (4) teacher training enrollments, (5) teachers in service, and (5) pupil/teacher ratios by the year 2000. Observed data were maximally acceptable, and projected data showed that pupil/teacher ratios will continue to deteriorate vis-a-vis the quality of education in the selected countries.

Chapter three reviewed the literature to validate Proposition II. Social, economic, and technical indicators were analyzed and rated to determine each country's potential to adapt the selected in-service practices. In-service practices were selected from Bangladesh, India, Indonesia, kenya, Malawi, Malaysia, Nepal, Nigeria, the Pillipines, and Zimbabwe. The selected in-service practices were evaluated and rated by

a panel which also rated the feasibility of each of the African countries to adapt the in-service practices.

Each country's potential to adapt the in-service practices was rated a high, medium, or low based on the rated indicators of performance. It was concluded that the Sub-Saharan countries need to meet specific infrastructure requirements if the adaptation of the in-service activities is to succeed. Policy design, recruitment, and retention of qualified management, resource development, decentralization of authority, and improvement of economic activities need to be done before adapting and implementing in-service programs from other developing nations. The study also showed that some countries' potentials to adapt the selected in-service practices were better than others.

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Dean of Graduate School Dr. Anthony Barnard

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

Introduction

Developing countries are attempting to provide universal education, especially at the primary level. A major effort in most countries is the creation of an adequate and professional teacher corps. However, increasing educational demands have created a multiplicity of issues to be considered when planning to meet the professional needs of teachers. Planning for teacher development is complicated when considered in context with the political climate, economic conditions, geophysical location, curriculum of instruction, available personnel, facilities available for both urban and rural in-service programs and other issues of crucial consideration within each system.

Another concern for developing countries has been the procurement and dissemination of information pertaining to in-service programs. Demographic projections, migration from rural to urban areas and vice versa, and the high rate of unrecorded births and deaths make it difficult to keep close count of national census data. When such information is accurate and available, concrete planning for teacher development can be undertaken.

The seven countries identified for this study were Botswana, Kenya, Malawi, Tanzania, Uganda, Zambia, and Zimbabwe. These countries, at one time or another, were colonies of Britain. Therefore, the problem of planning in-service programs became complex due to different educational structures, differing standards established to meet graduation qualifications, different languages used as a medium of instruction, and

a wide range of alien social and moral values (Jimenez & Tan, 1987).

Razik (1972) contended that the validity of any educational system naturally has been dependent upon the quality of the teachers and administrative staff and the availability of resources. In order to meet educational challenges and demands, it has been essential for developing nations to determine the appropriate means of training qualified personnel and of constantly developing those personnel already under contract.

Brandt (1980), after reviewing problems in developing countries, offered the following challenge for solving educational problems:

> The shaping of our common future is much too important to be left to governments and experts alone. Therefore our appeal goes to youth, to women's and labour movements; to political, intellectual, and religious leaders; to scientists and educators; to technicians and managers; to members of the rural and business communities. (p. 29)

In essence, Brandt proposed the creation of committees comprised of people from different infrastructure sectors to contribute to educational development because school systems are considered vital subsystems which contribute overwhelmingly to national development. Although developing nations have had a myriad of problems which need to be considered, concerted efforts can be made to qualitatively and quantitatively improve teachers through carefully planned staff development programs.

Background

Beeby (1966) made an analysis which demonstrated that teachers were the key to qualitative changes in classroom practice. Guthrie (1982) stressed that in international conferences in Canberra, Nairobi, and Kingston, teachers and teacher education have been the key issues of discussion. In developing and independent countries, the role of teachers as agents of change has placed upon them the burden of policy implementation. The question of teacher training and teacher trainers also has become a focal issue of discussion when Beeby (1966), Guthrie

(1982), and Coombs (1967) have stressed that quality in education depends very largely on the quality of teachers. They also have noted that quality teachers emerge from quality institutions where high quality educators are found.

In most cases, the problem with developing nations has been the production of mediocre teachers not prepared to meet the political and social challenges in the field. Large class sizes compound the problem. High pupil/teacher ratios indicate the need for more teachers, as well as the need for improvement of those in service.

Coombs (1967), in a study sponsored by UNESCO, observed:

> Perhaps the best preliminary way to describe this crisis is in terms of the maladjustment that has developed between educational systems and their environment. Their environment has changed with fantastic speed during the past 20 years, due to the familiar conjunction of several worldwide revolutions of science and technology, of economics and political maps, of demography and social patterns. Though educational systems, too, have grown and changed with unaccustomed speed, they have not done so nearly fast enough to keep pace with the rush of events around them. (p. 14)

Compounding the already existing economic, political, social and racial crises, as has been the case in most post-colonial countries, has been the task of dismantling colonial policy structures which ensured that disparities existed between racial, economic, and political subgroups. These disparities adversely affected the quality of teachers in rural areas. In Zimbabwe (Rhodesia), which was a British colony from 1890 until 1964 when it unilaterally declared itself independent, Mungazi (1983) observed that:

> ....particularly from 1965 to 1979, the Africans were denied equal educational opportunities because if they were educated in the same way as the whites, they would have threatened the political domination that the whites had enjoyed for so long. (p. 196)

Atkinson (1972), in his earlier studies of educational developments in Zimbabwe, stated that:

> These problems have been further accentuated by a number of special circumstances which have worked to produce a situation that is unique in African conditions....to take their blue prints for educational planning direct from overseas with remarkably little attempt to re-adapt them to the needs of an African background. (pp. 1 and 13)

It could be argued tenably that any system that has had inherent disparities through policy structures can offer only minimal success in development to its professional staff. With proper changes in current policy structures, some of the problems being experienced today in teacher development activities can be eliminated (Klitgaard, 1986).

Several regional studies concerned with the problems of education in developing nations have been published. These problems have had a direct impact on the ability of educational systems to design and implement comprehensive in-service programs for teachers.

The Addis Ababa (1961), Karachi (1961), and Santiago (1972) Study Plans

These three studies were sponsored by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) to focus on educational problems in Africa, Asia, and South America. Eighty-five percent of the population of non-communist developing countries were referenced in these plans. Under the aegis of UNESCO, governmental representatives participated in developmental planning at the conferences. The plans developed basically described in quantitative form, the regional problems confronted by African, Asiatic, and South American countries.

Major problem areas were found to be common in all the regions. Eight areas common to the three plans were identified as: (1) unacceptably low enrollment ratios, especially at the elementary level; (2) shortages of trained teachers for elementary and secondary levels; (3) inadequate educational finances; (4) shortages of trained administrators, supervisors, and educational planners; (5) shortages of classrooms, equipment, and textbooks; (6) a need for new curricula,

especially in rural areas and vocational programs; (7) a lack of coordination between educational and economic planners; and (8) the lack of coverage of educational programs for females, adults, and secondary and higher education students (Bolam, 1980).

International Conference on the World Crisis in Education

Attended by 150 delegates from 52 countries, this conference identified ten broad areas of world education crisis as: (1) educational management; (2) educational aims and content; (3) educational structures; (4) teacher supply and utilization; (5) democratization; (6) educational technologies; (7) educational resources, (8) research to improve education; (9) international cooperation; and (10) graduates who have inadequate skills for employment (Coombs, 1967). Specific recommendations were made relating to the establishment of performance evaluation systems, management and planning mechanisms, teacher recruitment, and salary schemes reflective of performance rather than tenure.

In addressing curriculum which teachers, both qualified and unqualified, have to fully understand in order to teach well, several observations were made during the conference: (1) curriculum must contain relevant subject matter that a student can use later in life; and (2) if the education system is satisfied with traditional, classical education, it will only prepare the student for the ranks of the unemployed (Coombs, 1967).

U.S. Agency for International Development Manual (USAID) (1972)

The purpose of this publication was "to present certain ideas about educational improvement and change that could help meet educational problems that are critical everywhere" (U.S. Agency for International Development, 1972, p. 8). Although the main focus of the document was educational technology in developing countries, other specific problems which hamper the development of educational technology were addressed. Six problems were identified: (1) low enrollments relative to the number

of school-age pupils within the population; (2) inadequate finances to improve the quality of education; (3) shortages of trained teachers; (4) lack of administrative expertise to improve curricula; (5) curricula inconsistent with current needs; and (6) the lack of application of solutions that have been devised and implemented elsewhere to solve similar problems.

The USAID manual noted that in countries where enrollments had increased, the growing number of students outpaced facility construction and teacher supply, resulting in increases in the number of unqualified teachers and high pupil/teacher ratios. Employment of such teachers retarded the quality of education drastically.

The World Bank Study (December, 1974)

Five problem areas developing nations must address concerning education as a tool for overall socioeconomic development were presented:

1. Education systems must do more to provide relevant skills to meet developmental needs.

2. Developing nations have not provided mass participation in education and development.

3. Educational systems and policies have a regressive character which favors urban populations and middle- and upper-income groups. The problem of inequitable selection and promotion policies needs to be corrected.

4. The need to increase efficiency in the definition of objectives, the provision of qualified teachers, the construction of facilities, and the development of good nutritional and health habits is critical.

5. The inadequate demonstration of planning and management skills by school administrators must be addressed and corrected.

The World Bank report further explained that the needed changes identified related to (1) the organization and structure of educational

systems, (2) the mechanisms used to finance the systems, (3) the dissemination of information and research throughout the systems, and (4) promotion of coordination by planners from other sectors within a given nation.

Due to increasing demands to educate the masses, most of the developing countries had instituted mass education at the primary level. Enrollments at the secondary level were, however, still low because most systems still required students to pay school fees.

Synthesis of Educational Needs

Levinger (1977) in summarizing from several documents noted:

> (1) an imbalance between educational opportunities in rural and urban areas, (2) the low internal efficiency of the systems, (3) the low overall external efficiency of the systems, (4) the shortage of funds available to fund the systems, (5) inadequate management practices within the systems, and (6) the inability of the systems to compensate for the physical, nutritional, and mental growth deficiencies of the large number of students who come from impoverished backgrounds. (pp. 16-17)

Illustrated in Table 1 are the growths in enrollments by levels, showing different growth patterns in enrollments at the first and second levels of education for seven countries (UNESCO, 1987). These data indicate that each country had a significant gain at each educational level between 1975 and 1985. Such gains in student and teacher populations require planning for recruitment, training, retraining, and employment of new teachers in order to maintain acceptable pupil/teacher ratios in these countries. The high ratios for pupils per teacher at the teacher training level indicate that the quality of teacher training would not be acceptable by developed country standards.

Coombs (1982) projected that:

> The great bulk of this enormous demographic increase is taking place in developing countries. Their share of the global total rose from 67% in 1950 to 73% in 1975, and is projected to reach 80% by 2000....The African region would have to increase its total enrollments (all levels combined) between

Table 1

Changes in Education for Selected Sub-Saharan Countries

Country	Year	First Level Staff	% Increase Over 1975	Pupils	% Increase Over 1975	Pupil/Teacher Ratio
Botswana	1975	3,509		116,293		33:1
	1980	5,316	51%	171,915	47%	32:1
	1985	6,980	31%	223,608	30%	32:1
Kenya	1975	86,107		2,881,155		33:1
	1980	102,489	19%	3,926,629	36%	38:1
	1985	138,374	35%	4,702,414	20%	34:1
Malawi	1975	10,588		641,709		61:1
	1980	12,540	18%	809,862	26%	65:1
	*1984	14,932	19%	899,459	11%	60:1
Tanzania	1975	29,735		1,592,396		54:1
	1980	81,153	173%	3,367,644	111%	34:1
	1985	92,586	14%	3,169,759	- 6%	34:1
Uganda	1975	28,681		973,604		34:1
	1980	38,422	34%	1,292,377	33%	34:1
	*1982	44,426	16%	1,616,791	25%	36:1
Zambia	1975	18,096		872,399		48:1
	1980	21,455	19%	1,041,938	19%	49:1
	*1984	24,993	16%	1,260,366	24%	50:1
Zimbabwe	1975	21,202		862,736		40:1
	1980	28,118	32%	1,235,036	43%	44:1
	1985	57,519	105%	2,258,340	83%	39:1

Source: UNESCO. (1987). Statistical Yearbook. Paris: UNESCO.
Note: * Data substituted for unavailable data for 1985

Table 1. (Continued)

Country	Year	Second Level (General and Teacher Training) Staff	% Increase Over 1975	Pupils	% Increase Over 1975	Pupil/Teacher Ratio
Tanzania (General)	1975	2,606		52,290		29:1
	1980	3,154	21%	67,292	28%	33:1
	1985	4,329	137%	83,098	23%	DNA
(Teacher Training)	1975	612		9,741		43:1
	1980	679	11%	11,423	17%	DNA
	*1981	938	39%	9,847	- 14%	DNA
Zambia (General)	1975	3,202		73,049		34:1
	1980	4,334	35%	95,771	31%	35:1
	*1984	5,030	16%	125,811	31%	36:1
(Teacher Training)	1975	220		2,246		46:1
	1980	313	40%	3,742	67%	47:1
	*1984	DNA	DNA	3,770	1%	40:1
Zimbabwe (General)	1975	3,737		68,693		41:1
	1980	3,736	0%	74,012	8%	41:1
	*1986	19,540	423%	545,502	637%	41:1
(Teacher Training)	(Data Not Provided)					

Source: UNESCO. (1987). Statistical Yearbook. Paris: UNESCO.

Note: DNA - Data Not Available
* Data substituted for unavailable 1985 data

Table 1. (Continued)

Country	Year	Second Level (General and Teacher Training) Staff	% Increase Over 1975	Pupils	% Increase Over 1975	Pupil/Teacher Ratio
Botswana (General)	1975	540		12,098		53:1
	1980	851	49%	18,325	51%	56:1
	1985	1,283	51%	32,172	76%	53:1
(Teacher Training)	1975	48		489		76:1
	1980	59	23%	844	73%	83:1
	1985	73	24%	1,188	41%	84:1
Kenya (General)	1975	9,189		226,835		36:1
	1980	15,916	73%	407,322	80%	42:1
	1985	21,966	38%	437,207	7%	38:1
(Teacher Training)	1975	541		8,666		38:1
	1980	732	35%	12,126	40%	40:1
	1985	808	10%	12,720	5%	41:1
Malawi (General)	1975	748		14,489		28:1
	1980	834	11%	18,006	24%	29:1
	*1984	1,150	38%	24,343	35%	31:1
(Teacher Training)	(Data Not Provided)					

Source: UNESCO. (1987). Statistical Yearbook. Paris: UNESCO.

Note: * Data substituted for unavailable data for 1985

> 1980 and 2000 by 107 million as compared to 55 million actually added (with enormous efforts and sacrifice) between 1960 and 1980. The corresponding projections for Latin America are 75 million (1980-2000) against 56 million (1960-1980) and for South Asia, 176 million (1980-2000) versus 150 million (1960-1980). (North America and Europe plus the USSR would only have to add 13 million from 1980 to 2000 compared to 49 million added from 1960-1980). (p. 147)

In a study of the growth in admissions of school-age children, Ta Ngoc Chau (1972) showed increases for Ceylon (Sri Lanka), Tanzania, Columbia, and Tunisia. The study was for the years 1970 to 1990. Ta stated that the growth projections were important since they provided planners with information as to how many teachers were needed, what resources were to be provided, and what means were to be used to retrain and upgrade teachers already in service.

It should be stressed that the majority of admission-age children were located in rural areas. Ahmed and Coombs (1975) emphasized the connection between education and development in rural areas. They stated that limited education in rural areas was the prime cause of poverty. Nonexistent or rudimentary teaching equipment, poor teacher morale, lack of communication with the central government or ministry officials, lack of parental involvement, and an absence of policy structures to give rural teachers more autonomy in decision-making were a few of the problems confronted by rural teachers (Moock, 1984). Mugabe (cited in Williams, 1985) blasted rural teachers of Zimbabwe when he stated:

> It is not uncommon to hear of teachers going to school drunk, with bloodshot eyes, especially in the rural areas. It is, therefore, questionable whether such teachers can produce disciplined and responsible future leaders. (p. 10)

Cerych (1965) added another criticism:

> ....rural education in most developing countries makes no contribution to social betterment within the agricultural milieu, which will for a long time be that of the majority of the population.... (p. 80)

Several consequences resulted from the imbalances found between urban and rural schools; these consequences reflect the poor quality of teachers in rural areas. Baum and Tolbert (1985) observed:

> In education as in other social sectors such as health, the bias in providing facilities has been toward urban areas and more prosperous regions. Children in rural or impoverished areas often find the nearest school far from home. Classrooms are likely to be overcrowded and teaching materials scanty. In Brazil in 1979, 74% of the population was urban, but only 26% of the rural children were enrolled in school. Enrollment in 1980 in the impoverished northeastern state of Ceara was 25%, a fraction of the 80% enrollment rate in the more urbanized and affluent southeastern state of Sao Paulo. Similar disparities exist in Sudan between the northern Nile province with 100% enrollment and the Southern Lakes Province with 7.4% enrollment; and in Indonesia between Jogjakarta Province with 58% enrollment in junior secondary school and Kalimantan province with 29% enrollment. Such differences in enrollment are exacerbated by differences in the amount of money spent on each student. Expenditure per pupil in 1980 was four times higher in the southeast of Brazil than in the northeast, and within the northwest it was three times higher in urban areas. (p. 121)

Another result of imbalances between rural and urban schools was that of teacher shortages in the rural schools. The more able, younger, and more highly qualified teachers were reluctant to work in remote, poor, and underequipped schools. With the brighter and more able teachers absent, rural students were left with less qualified teachers. Not surprisingly, there were few curricula innovations (Jimenez & Tan, 1987).

The World Bank Study (1988) recognized that the current problem in Sub-Sahara is not only increasing enrollments but the lack of quality of education, a result of poorly qualified teachers. Between 1960 and 1970, enrollments increased 6.5%. The period 1970 to 1980 saw an 8.9% increase, and from 1980 to 1983 enrollments grew 4.2%. The relative decline in the growth rate for enrollment from 8.9% to 4.2% resulted in a decline in public spending on education in Africa (World Bank 1988). The

study also stated that spending on education fell from $10 billion in 1980 to $8.9 billion in 1983.

In comparing public student expenditures per student, the World Bank stated that $67 was spent for each elementary child in 1970, and only $47 in 1983. For secondary students, $362 was spent per student in 1970 and $223 in 1983. It can be discerned that with the decline in expenditures per child, there was a corresponding decline in the quality of education provided and in the teacher corps.

The quality of education in developing countries was considered to be lower than that of developed countries. The quality of teaching was below acceptable standards due to the poor quality of teachers. Teacher training institutions were not producing competent teachers able to deal with diverse societal problems in urban and rural areas. Constant changes in educational curricula and policies further complicated the problem of retaining qualified teachers.

Statement of the Problem

The major problem for school systems in the targeted African countries of Botswana, Kenya, Malawi, Tanzania, Uganda, Zambia, and Zimbabwe was the provision of adequately trained teachers at the elementary and secondary levels. While an issue here is low teacher numbers, the major problem is the poor quality of the teachers now in place and the poor quality of new entrants to the profession. Without improved teacher quality, the result will be a continuance of poor quality education for elementary and secondary students. These conditions create a critical need for effective in-service education directed at improving the quality of the in-place teacher corps.

Research Propositions

Proposition I: There is a need in selected Sub-Sahara African countries to further develop elementary and secondary teachers through in-service education.

Proposition II: There are potentially effective classical methods which may be useful for providing in-service training for selected Sub-Saharan African countries.

Purpose of the Study

The first purpose of this study was to determine the extent of the need to develop teacher in-service programs in Botswana, Malawi, Kenya, Tanzania, Uganda, Zambia, and Zimbabwe.

The second purpose of this study was to identify potentially effective classical methods, to illustrate that those models and methods are available for planning and for providing adequate in-service programs to assist in meeting the educational needs of the identified African countries, and to recommend country specific in-service practices based on country specific variables.

Methodology

The seven countries selected for this study were chosen because of (1) their similar history as former British colonies; (2) similar geographical settings; (3) similar political, economic, and social backgrounds; (4) availability of documentation in a common language -- English; and (5) the author's interest in identifying possible in-service practices in the selected countries to help develop their own unique solutions to the problem of qualified teacher shortages.

The study brought evidence to both propositions in two phases. The first phase explained those activities which were done to show a need for in-service programs in the selected Sub-Saharan countries -- Proposition I. The second phase described those activities which demonstrate the existence of in-service methods which are applicable to the selected Sub-Saharan countries -- Proposition II.

Proposition I: To demonstrate the need for in-service teacher training programs, individual studies for each country were done through the related literature. This literature was examined in reference to

issues of both quality and quantity of the teacher corps vis-a-vis student enrollments. The related literature came from several sources including UNESCO Annual Reports from 1960 onward, World Bank studies, Europa Yearbooks, reports from selected countries' Ministries of Education, and other literature pertinent to this study. Quantitative data pertaining to (1) country populations, (2) elementary school enrollments, (3) secondary school enrollments, (4) teacher training enrollments, (5) number of teachers in service, (6) pupil/teacher ratios, and (7) educational expenditures were collected for 1960, 1965, 1970, 1975, 1980, and 1985. These data were used for analysis and projection purposes to support Proposition I.

Proposition II: In order to demonstrate that there are potentially effective classical methods which have been successfully used in other less-developed countries (LDCs), a systematic review of teacher in-service approaches was conducted. Specific indicators of performance were established to evaluate each in-service method identified. These indicators related to (1) the staff development itself, (2) the effect of the in-service activity(-ies) on staff, and (3) the impact of the in-service method or activity on the total organization.

Performance indicators related to staff development were:

(a) number of teachers attending in-service programs,

(b) in-course program assessments on staff progress/development,

(c) staff attitudes to in-service activity,

(d) unit costs (if any were revealed),

(e) degree of contact/method of contact, and

(f) clarity of objectives and in-service design.

Performance indicators sought during the search which were related to the effect of in-service methods or activities on staff performance included:

(a) recognition of specified behavior during/after attendance at in-service activities,

(b) increased/decreased teacher involvement in certain areas of concern,

(c) teacher preparedness to undergo further in-service training,

(d) degree sought by staff of management and supervisory staff, and

(e) costs incurred as a result of teacher release to undergo training.

Performance indicators related to impact of the in-service method or activity on modifications included:

(a) increased staff motivation/commitment,

(b) increased/decreased student participation in the area of need,

(c) changes in departmental policy provision,

(d) demands for new or alternative facilities, and

(e) decreased expenditure in using the approaches identified during the search.

Demographic Data

Qualitative and quantitative data in response to the performance indicators 1, 2, and 3 above were analyzed. Qualitative data such as teacher/supervision rating of specific activities, research findings, and government rating of current and past educational practices were analyzed in response to the specific performance indicators within the system.

Country specific indicators were identified to determine the feasibility of each of the selected countries adapting the identified in-service approaches used in other developing countries. Economic indicators, social indicators, and technical indicators were selected to determine each country's performance in these three areas. Each of the indicators was rated, using a four-point system, by an independent panel of African students. Rating averages were derived and used to determine

each country's potential to use those identified in-service approaches from other developing countries in its own educational system.

Relevance of Variables

Country population directly affects enrollments, especially when the birth rates are established and the trend of the rate is either rising or falling. A clear trend would have a direct effect on first-level enrollments, especially grades one and two. These early grade enrollments would affect the number and quality of teachers needed within a system.

Elementary and secondary enrollments were essential to this study because the enrollments established also determine the number of teachers required for (1) each grade level, (2) each subject area, and (3) each geographical location.

Teacher enrollments in teacher training colleges were essential to this study because teacher production should keep pace with teacher needs in any system. Also, teacher preparedness is of paramount importance at graduation.

Currently employed teachers leave the system for a variety of reasons such as death, retirement, and resignation. It was not uncommon for teachers to defect from the teaching profession for more lucrative jobs in the business sectors. Adequate and updated records of teachers under contract are essential; without them, planning for teacher hiring would be inefficient.

Total government expenditures on education directly affect the number and quality of graduates from teacher training institutes. This economic variable in the education or development of teachers determines the kind of resources and facilities to be provided in any teacher program.

Teacher/pupil ratios of 1:50 or 1:60 were not uncommon in the countries under study. Knowledge of these ratios was essential because

they help planners establish target ratios for a certain date. In order to improve the quality of education, teachers working under undesirable conditions with high teacher/pupil ratios need frequent retraining and improvement.

The selected data covered periods between 1960 and 1985. Some variables relating to qualitative data predating the selected time span were also used since they had a direct effect on the quality of teachers during the period under study.

Data analysis for the selected system variables was based on the growth rates of country population, pupil enrollments, teacher training enrollments, and teachers employed.

Analysis of Data

Data for proposition one were analyzed to bring out basic characteristics and trends which must be taken into account when making estimates of future school enrollments. It was at this stage that this research established whether (a) total school enrollment was growing for each succeeding period, (b) the pupil/teacher ratios remained constant, (c) there were any efforts to upgrade the quality and quantity of teachers, and (d) there were any specific variables that did not receive adequate attention in relation to teacher needs.

The various appropriate growth rates were computed using an International Business Machines Personal Computer (IBM PC). Statistical Analysis System (SAS) software for statistical computations was used for projections based on existing data to establish future trends.

Charts were graphically developed on data for each of the selected variables. Finally, an assessment was made as to the relation of each variable to the adequacy of the teacher corps.

Analysis of data for proposition two was done by an independent panel of African students to determine the potential of each country to adapt the in-service approaches used in other developing countries.

Indicators of performance were compared and rated using established international standards as a guideline.

Limitations of the Study

The study was limited in the following ways:

1. Educational problems identified in this study were those identified through the review of the literature.

2. The study focused on those problems that would influence decisions when planning and designing in-service programs for elementary and secondary teachers.

3. Calculations done in this study were specifically designed to enhance projection techniques employed by Ministries of Education for qualitative and quantitative efficiency at the elementary, secondary, and teacher training levels.

4. Detailed analysis was done for the projections of only seven countries.

Organization of the Study

The first chapter of this study was designed to acquaint the reader with current educational problems faced by seven former British African colonies and to state the propositions and methodologies of interest to this study. These problems have a direct effect on the content, quality, and quantity of education provided to elementary and secondary students. They also have an effect on the quality of teacher education and in-service programs. The chapter surveys studies in other less-developed regions to illustrate the fact that these problems were not germane only to the selected countries. The chapter also sets forth the statement of the problem, two research propositions, purpose of the study, methodology, limitations of the study, definition of terms, and organization of the study.

Chapter two is a detailed discussion of proposition one: the need to develop teachers using means other than relying on teachers' academic

credentials. Specific country problems are discussed pertaining to the current quality of teachers at the elementary and secondary levels and to current practices to enhance the quality and quantity of teachers. Statistical analyses for the selected countries were done in this chapter to illustrate trends for selected variables by the year 2000.

Chapter three discusses proposition two and illustrates that there are classical means available in the literature which these countries can use to develop competent teachers through in-service practices so as to meet the need stated in proposition one. A review of the literature and an analysis of key indicators was done to establish each country's potential to adapt the selected in-service approaches used in other LDCs.

Chapter four contains the conclusion and summaries of the study and provides a set of recommendations for the selected countries to follow in order to meet the need stated in proposition one.

Definition of Terms

Colony: A body of people living in a new territory but retaining ties with the parent state. (Webster's Seventh New Collegiate Dictionary, 1967.)

Developing Country: Any country with an annual per capita income of less than $1,500. (UNESCO, 1981).

Drop-out Rate: Number of students as a percentage of the total student enrollment either by level or by country who leave school (UNESCO, 1981).

Enrollment Ratio: The total number of students within a certain age group or range enrolled in school compared to the total population of the same age group or range. (UNESCO, 1981).

First Level: Used synonymously with primary level of schooling which is the first 7 or 8 years of schooling, depending on country standards (UNESCO, 1987).

General Education: Used synonymously with second level and secondary school. Usually takes 4 to 6 years to complete based on country standards. (UNESCO, 1987).

In-Service Education: Used synonymously with faculty or teacher development and denotes those activities designed by a school system to assist teachers in keeping up-to-date in their teaching fields and, at the same time, to provide them opportunities for continuous professional development. (Hoagland, 1983).

Need: A discrepancy between what is and what should be (Kaufman, 1972).

Planning: The selection or identification of several educational goals and objectives to be used in the development and analysis of various alternative courses of action. (Kaufman, 1972).

Professional Staff: Any person in the educational system engaged in a field where he or she has prior training in a particular field of study (Hoagland, 1983).

Second Level: Used synonymously with secondary school, usually consisting of 4 to 6 years of education depending on country standards. (UNESCO, 1987).

Staff Development: Training of existing staff. This includes personnel working in the system. It entails the improvement of staff competency for both current requirements or new applications. Such improvement includes updating on subject matter, teaching techniques, foundation disciplines, and methods and media use. (Bolam, 1981a).

Student/Teacher Ratio: Total number of students divided by the total number of teachers which yields the number of students under one teacher's instruction. Student/teacher ratios, however, reflect a hypothetical situation because some teachers have less and others more students than the computed system or country ratios. (UNESCO, 1987).

Teacher: Used synonymously as faculty member and instructor; refers to the professional charged with the responsibility of motivating, planning, facilitating, and evaluating student learning. (UNESCO, 1981).

Territory: Used synonymously as colony (Webster's Seventh New Collegiate Dictionary, 1967).

Total public expenditure on education: Public expenditure at every level of education. Usually expressed as a percentage of GNP. The weighted total expenditures reflect the real growth. (World Bank, 1988).

Underqualified: Pertaining to the status of one who does not meet the acceptable minimal standards to function as a teacher (Webster's Seventh New Collegiate Dictionary, 1967).

CHAPTER II

REVIEW OF THE LITERATURE - PROPOSITION I

Introduction

The purpose of this chapter was to review the literature in order to determine the validity of the proposition that there was a need to develop teachers in Sub-Saharan Africa using in-service training. Several areas were explored which directly relate to the establishment of sound in-service training programs. Specific teacher needs by country were reviewed for each of the 7 selected Sub-Saharan countries. The latter part of the chapter examines the data on 7 variables in relation to the production of quality teachers. This chapter ends with conclusions relative to the need for in-service education.

Several historical studies have been conducted regarding educational developments in Africa. Scanlon (1964) contended that:

> It is possible to divide the history of African education into four periods. The first was that period in which the coming-of-age ceremonies, the rites of passage, provided the principal education of the African child....The introduction of Western education by European missionaries in the late 19th century marked the opening of the second period.... During the third period, the interbellum era, the metropolitan powers provided financial and professional assistance for the education of Africans. The final period, which began at the close of World War II, saw the emergence of a renewed interest in African education and plans were drawn by all the colonial powers for its extension. (p. 3)

As a result of this interest in African education, an unprecedented expansion of Africa's educational systems in the 1950s was experienced throughout the continent. Today, a re-examination of African educational policies and philosophies is underway. This re-examination cannot be done fully without a basic understanding of educational policies during

the colonial period. Because this study focused on former British colonies and territories mandated to Britain after World War II, Britain's educational policies for tropical Africa were reviewed.

Historical Background on British Education Policy in Tropical Africa

Due to the need for economic development, and the recognition of the principle that the ruling power was responsible, as a trustee, for the moral and intellectual development of the African people, Britain felt an obligation to create structured educational systems in its African colonies.

Adams and Bjork (1972) observed:

> Although the policies of these powers reflected their own political, social, and economic attitudes ...the African was of little concern except as a means toward that end, but his usefulness seemed to increase as he gained at least some education.... (p. 49)

They also observed that, regardless of policies, much of African education, especially at the secondary level, was provided by missionaries. Since British rule could be characterized as "indirect," policy implementation was left to the territorial governments. Consequently, there evolved differentiation in educational structures. Separate educational institutions for Africans, Asians, and Europeans were regarded as appropriate. Since educational budgets were established by territorial governments, disparities in budgetary appropriations created separate and unequal educational institutions (Adams & Bjork, 1972).

The use of syndicated Cambridge and London examinations undermined the African educational environment. The structure of those examinations influenced the language of instruction, subject content, curriculum of instruction, and the mode of instruction. In essence, African education was "non-African."

In 1944, a memorandum regarding the problems of educating Africans using the British and differentiated system of education stated:

> These problems are social, political, and economic. It is impossible to separate the elements which are interwoven at any stage. The problems are also largely universal though some are of more special importance in colonial areas. (Scanlon, 1964, p. 108)

The same 1944 study of mass education in Africa identified several plausible recommendations although implementation was left to the local levels. These recommendations were:

1. The wide extension of schooling for children with the goal of universal school within measurable time;

2. The spread of literacy among adults, together with a widespread development of literature and libraries, without which there is little hope of making literacy permanent;

3. The planning of mass education of the community as a movement of the community itself, involving the active support of the local communities from the start; and

4. The effective coordination of welfare plans and mass education plans so that they form a comprehensive and balanced whole (Scanlon, 1964).

These recommendations were implemented, but the venture was not without its problems. As illustrated in Table 2, the school-age population increased up to 1984 and is projected to continue to increase through 2000. This increase resulted in higher enrollments, concentrated mainly at the grades one and two. However, the dropout rate was exceedingly high. Only 4% of students entering school in Tanzania completed elementary education in 1961, only 8% to 9% in Zambia in 1964, and only 25% in Malawi in 1964. These percentages represent dropout rates of approximately 96%, 92% and 75% respectively (Sheffield, 1967).

Although there were increases in enrollments, the relative rate of increase for each country declined. This relative decline in the rate of enrollment increases resulted in a decline in public spending on education in Africa (World Bank, 1988). The study also stated that

Table 2

School Age Population Projections Between 1984-2000

Country	Year	Elementary (Millions)	Secondary (Millions)	As % of Total Population
Botswana	1984	0.2	0.1	33.0%
	1990	0.3	0.2	
	2000	0.4	0.2	33.5%
Kenya	1984	4.5	2.7	36.4%
	1990	6.0	3.6	
	2000	8.1	5.7	37.7%
Malawi	1984	1.5	0.6	31.0%
	1990	1.8	0.7	
	2000	2.5	1.0	31.1%
Tanzania	1984	4.2	2.7	31.8%
	1990	5.0	3.5	
	2000	7.5	5.0	33.9%
Uganda	1984	3.0	2.0	33.4%
	1990	3.8	2.5	
	2000	5.3	3.6	36.2%
Zambia	1984	1.3	0.7	30.6%
	1990	1.6	0.9	
	2000	2.2	1.3	31.4%
Zimbabwe	1984	1.6	1.3	35.8%
	1990	2.0	1.6	
	2000	3.0	2.4	37.1%

Source: World Bank. (1988). Education in Sub-Saharan Africa: Policies for Adjustment, Revitalization and Expansion, p. 158.

spending on education fell from $10 billion in 1980 to $8.9 billion in 1983. In comparing public student expenditures per student, the World Bank study stated that $67 was spent for each elementary child in 1970 and only $47 in 1983. For secondary students, $362 was spent in 1970 and $223 in 1983. It can be discerned that with the decline in expenditures per child, there was a corresponding decline in the quality of education.

Country Studies

This section of the literature review focused on specific country problems of providing quality teachers. The countries selected for the study were Botswana, Kenya, Malawi, Tanzania, Uganda, Zambia, and Zimbabwe.

Botswana

Pre-Colonial Education

As was the case in many other African countries, Botswana's educational metamorphosis revolved around missionary activities (Loram, 1917). Alongside these religious educational establishments evolved schools built to "...instruct these evangelist-teachers to understand the scripture and be able to reiterate it to their companions" (Livingstone, 1858, p. 98). Early teacher training "consisted of secular thought, reading and interpreting the Bible, writing, and leading a sound moral life" (Hull, 1987, p. 384).

According to Hull (1987), at the Moffatt Memorial Institute which was opened in 1876 for the training of teachers, a list of criteria for selection of trainees was drafted which included (1) ability to preach the gospel, (2) ability to cope with white men, (3) ability to understand elementary business transactions, and (4) ability to understand the value of the land (cited in David Livingstone, 1858). The same institute was closed in 1897 because of a shortage of qualified teachers, reopened two years later, and again closed in 1902.

Hull (1987) reported that endeavors were made to rectify weaknesses in the educational system in (1) narrow curriculum, (2) absence of spoken English, (3) poor teacher qualifications, (4) lack of equipment, and (5) limited financial resources.

With the British government gradually asserting itself, the educational options provided for teacher trainees held no better hope for Botswana's Africans than before. Hull (1987) reported that the British advocated the teaching of weaving, clay molding, wood carving, and stringing beads, all of which were of no significance to the 20th-century citizen. At the same time, Britain was assuming an indirect role by delegating the responsibility to the tribal leaders who had little or no planning skills.

Post-Colonial Efforts to Develop Teachers

At the time of independence in 1966, the educational system was in a state of flux. Several experiments had to be made including a restructuring of the whole system. With such experimentation came a vast shortage of trained teachers and Botswana had to rely on expatriates (Hull, 1987). The World Bank (1988) stated that between 1960 and 1980, primary enrollment grew at an average annual rate of 8.1% and at a rate of 4.9% between 1980 and 1983. Secondary enrollment grew 18.5% between 1960 and 1980, and 6.0% between 1980 and 1983. The number of students enrolled as a percentage of age group for gross primary enrollment ratio rose from 39% to 96%. For the same period, gross secondary enrollment ratio rose from 1% to 21%. Pupil/teacher ratios declined between 1970 and 1983 from 36:1 to 31:1 respectively for primary schools, rose from 15:1 for 1970 to 18:1 for 1980, and declined to 16:1 for 1983. The World Bank report (1988) also observed that 5.8% of elementary and 32.1% of secondary students were enrolled in private schools. Total public expenditure for education as a percentage of total government expenditure rose from 12.3% to 18.5% between 1970 and 1983.

It was interesting to note that although total expenditure on education as a percentage of total government expenditure rose significantly, public recurrent expenditure on elementary and secondary levels fell from 58% to 43% and from 30% to 29% respectively while at the tertiary level it rose significantly from 9% to 24% between 1970 and 1983 (World Bank, 1988).

The Problem of Teacher Provision

Cameron, Cowan, Homes, Hurst, & McLeon (1983) observed:

> The most serious problem at the primary level is the great shortage of good teachers. Whether trained or untrained, their quality is poor -- about half of the trained ones and 4/5 of the untrained ones have themselves no more than a primary education. The percentage, too, of the latter is increasing because of the rapid expansion of the primary school system. Not surprisingly teacher status and morale are both low, and there is great reluctance to serve in rural areas. (p. 26)

Another problem which caused poor morale among elementary school teachers was the disparity between primary and secondary teacher salaries paid in 1983 ($2,811 for primary and $4,987 for secondary, World Bank, 1988). Disparities between urban and rural teachers tended to demoralize rural teachers. In addition, mushrooming business opportunities in Botswana have caused mass defections from the rural areas (Cameron, et al. 1983).

The Botswana Ministry of Education (1986) cited an overwhelming number of expatriate teachers as another major problem in Botswana's developmental plans for education. Cameron et al. (1983) figured that 75% of the teachers at the secondary level were expatriates. The Ministry of Education (1986) stated, "the shortage of teachers in certain subjects, such as mathematics and science in particular, is being tackled through in-service training programme" (p. 12). The same report also stated the urgent need for specialized teachers in vocational type courses and stressed, "additional staff will be necessary to cope with

the new type of primary education, which is to include vocational training" (p. 10).

Current efforts to offer in-service training embody three types of approaches: short courses, seminars, and workshops (Botswana Ministry of Education, 1986). The projected provision of nine in-service centers was envisioned to "...create a comprehensive network of institutions for in-service teacher training for 2500 teachers and non-residential course for another 1800 annually...." (Botswana Ministry of Education, 1986, p. 9).

The Botswana Ministry of Education envisaged, in its current education plan, a total production of "all the teaching posts at the primary TTC's by the end of the present National Development Plan (1985-91)" (Botswana Ministry of Education, 1986, p. 9).

Such an ambitious plan can only be achieved through the stability of several educational variables; a steady or declining birth rate; an increase in the provision of quality teacher instructors, facilities, and other essential instructional resources; a steady and sound economic index; political stability; and general interest and participation from the community and businesses (Moock, 1984).

Kenya

Pre-Colonial Education

At the time of its independence, December 12, 1963, Kenya estimated it had 34.7% of its African pupils of the first age group level enrolled in schools. The ratio for the secondary African age group was estimated at 1.3%. Percentages for Europeans were 77.6% and 98.9% for elementary and secondary level age groups (Sheffield, 1971).

Such disparities in enrollment ratios based on racial lines were typical of the British colonial educational systems in Africa. A committee established in 1925 issued a memorandum which categorically stated that African education had to be community oriented, and that

missions would accomplish this goal with subsidies provided by the government to approved mission schools through grants-in-aid. Mission schools basically were committed "to religious training and character training in schools" (Sheffield, 1971, p. 9). Sheffield also observed the three-tiered educational system which evolved in Kenya. One level was for Africans, one for Asians, and one for Europeans. In 1926, educational expenditures per pupil annually were $33.40, $37.00, and $180.50 for Africans, Asians, and Europeans respectively (Sheffield, 1971).

The first teacher training school for Africans was established in 1925 at Kabeta to train "Africans of high character and tactful disposition, but not of high intellectual attainments" (Kenya Colony Protectorate, 1926, p. 13). These African teachers were to keep rural education relevant to local rural needs, which were irrelevant to total economic and country developments.

Sheffield and Diejomoah (1972) stated:

> For example, although 310,854 children were attending school out of an estimated school-age population of 1,216,000, over 100,000 were in unaided institutions (those lacking proper facilities and/or trained teachers). Furthermore, the dropout rate ("wastage") was so severe that only 40% went beyond the second year, 5% beyond the sixth year, and less than 1% beyond the eight year. (p. 13)

In the process of teaching large numbers of students on a daily basis, Kenyan teachers found themselves with other responsibilities outside the classroom. "The unfortunate primary teacher, with his sketchy educational and professional background, must be prepared to do everything...." (Cameron, 1970, p. 54)

There were inherent organizational weaknesses which affected the quality of teachers being trained in Kenya. According to Cameron (1970), these organizational problems were:

1. Missionary attitude towards teacher education differed in many ways from the government's attitude.

2. Teacher training was mainly emphasized at the elementary level, with little or no emphasis placed on secondary teachers.

3. Teacher education institutions were too small and inadequately facilitated to produce quality graduates, and quite often they were affiliated with some other recognizable entity such as a secondary school or church.

4. As late as 1964, the Kenyan government had not established a teacher college for Africans.

Teacher supervision was established in Kenya in an attempt to disseminate and make uniform the community-oriented curriculum (Cameron, 1970; Thompson, 1981). Concerning those attempts to train teachers at the very base of the intellectual hierarchy, Sheffield and Diejomaoh (1972) observed:

> ...the financial basis on which many programmes were operating was extremely shaky. In a number of cases there was excessive dependence upon external aid, even in theoretically self-financing projects, with the consequent danger of programmes contracting or collapsing with the eventual phasing out or withdrawal of this aid. (p. 253)

By 1968, primary teacher training in Kenya was taking place in 24 training colleges. These colleges were reduced in 1974 to 17. Different categories were labeled as P-1, P-2, and P-3, meaning primary one, two, and three. Sheffield observed that 90% of the trainees in 1968 were at the elementary level and, of those, 50% had never attended secondary school. This is illustrated in Table 3.

Kenyatta College housed a teacher training institution and an upper secondary school. Sweden contributed 90% of the costs of the teacher training in 1975.

Technical Assistance for Teacher Development Programs

Beginning in 1968, opportunities for a post-primary education were offered through Radio/Correspondence for primary school teachers. Sheffield (1971) stated that these programs were for "...persons, mostly

Table 3

Kenya Teacher Categories and Qualifications (1966)

Primary Teachers' Certificate		Secondary Teachers' Certificate	
P 4	Full primary course, but failed KPE + 2 years training	S 1	(a) Complete Form VI and obtained HSC + 1 year teacher training
P 3	Complete primary course + KPE + 2 years teacher training		(b) Complete Form IV and a Division II + 3 years teacher training
P 2	(a) Complete 2 years Secondary school + 2 years teacher training		
	(b) Complete 4 years Secondary school, but failed CSC, + 2 years teacher training		
P 1	Complete 4 years Secondary school + CSC + 2 years teacher training		

Source: Adapted from Cameron, J. (Ed.). (1970). The Development of Education in East Africa. New York:NY. Teachers College, pp. 135-136.

teachers, who are unable to attend full-time secondary institutions" (p. 35). In order to move from P-3 up to P-2, one had to pass at least five subjects to hold a Kenya Junior Secondary Examination Certificate. By 1970, there were "1711 enrollees for English, 917 geography enrollees, 794 history enrollees, and 1711 mathematics enrollees" (Sheffield, 1971).

Another radio broadcast program was designed for teacher training students. Coupled with this effort was a program designed and implemented for teachers already in service.

Development of Teacher Education and In-Service Training (1986-1988)

Kenya's Ministry of Education (1989), in its Report to the Forty-First Session of the International Conference of Education, outlined six different levels of teacher classification: pre-primary, primary, special education, secondary, adult, and technical. In spite of

the attempts Kenya made to formally train her teachers, recent pupil/teacher ratios remain high with 37:1 for 1983, 37:1 for 1984, 31:1 for 1985, 33:1 for 1986, and 33:1 for 1987 per teacher at the elementary level. At the secondary level, the numbers of pupils per teacher were 26:1 for 1983, 24:1 for 1984, 20:1 for 1985, 21:1 for 1986, and 21:1 for 1987. The numbers of elementary and secondary facilities increased between 1984 and 1987, hence the steady decline in the ratios.

The same report also stressed the importance of specific problems and the difficulties experienced during 1986-88. Specifically cited problems were:

1. Inadequate provision and expansion of physical facilities such as teachers' houses, dormitories, classrooms, laboratories, and workshops.
2. Inadequacy of teacher training facilities.
3. Shortage of educational materials and equipment, especially for practical subjects. (p. 42)

Although the pupil/teacher ratios cited above might seem impressive to some degree, the Ministry Report cited:

> In 1986, out of a total of 137,766 teachers in primary schools, some 41,574 were untrained. In secondary schools, out of a teaching force of 21,966, 9,986 were untrained. The problem of untrained teachers has continued to be the cause of concern to the Government because of its effect on the standard of education. (p. 43)

Malawi

Pre-Colonial Education

Malawi gained its independence in July of 1964 following the breakup of the Federation of Rhodesia and Nyasaland (Malawi). In observing the British attitude about the economic potential of Malawi, Cameron, et al. (1983) wrote: "And indeed there has been little commercial exploitation because there is so little to exploit" (p. 215).

Prior to independence, Malawi's history and economic development had been of little significance to the British as compared to Northern

Rhodesia (Zambia) and Southern Rhodesia (Zimbabwe), the other two members of the Federation of Rhodesia and Nyasaland.

Britain took over control of Malawi from the missionaries who had established themselves in the 1860s and 1870s. Cameron et al. (1983) stated "Nyasaland saw a steady accretion of European missionaries, traders, and administrators, but very few settlers as government revenue was very small" (p. 215). With the creation of the Federation in 1953, Malawi did benefit educationally. Cameron et al. (1983) noticed, however, that the Federation was perceived in Nyasaland as "...an obstacle to freedom and a potential disincentive to treating Nyasaland as an economic entity with its own developmental potential and needs" (p. 215).

Educational Development for Teachers after Independence

Teacher preparation in Malawi had always been done at different levels. Cameron et al. (1983) categorized and observed teacher qualifications in assisted schools for 1976-77 as shown in Table 4. The qualifications are reached in the following manner: the Malawi Certificate of Education (MCE) is achieved after four years of secondary school, the Junior Certificate of Education (JCE) after two years, Primary School Leaving Certificate (PSLC) after eight years of elementary school, and Standard Five (Std V) upon completion of a fifth grade education. For the MCE, JCE, AND PSLC, a student was required to successfully pass the exit examinations (as was required in most British colonies in Africa).

Cameron et al. (1983) stated that T_4 training (see Table 4) was discontinued in 1970 and that there were five such mission colleges in 1976/77 with a total capacity of 700 trainees. The Government had three training colleges with about 540 students each, and an annual intake of 270 students.

Table 4

Teacher Stock in Assisted Schools of 1976-1977

Classification	Number of Teachers	Qualifications	%
Diploma	4	MCE + 3 years	0.1
T_2	1,051	MCE + 2 years	10.6
T_3	4,363	JCE + 2 years	43.9
T_4	2,834	PSLC + 2 years	28.5
T_5	366	Std V + 2 years	3.7
Temporary	1,311	Unqualified	13.2
Total	9,929		100.0

MCE - Malawi Certificate of Education
JCE - Junior Certificate of Education
PSLC - Primary School Leaving Certificate
Std V - Standard Five

Source: Cameron, J. et al. (1983). International Handbook of Education Systems, (p. 227).

Cameron et al. (1983) observed Malawi's attempts to upgrade the quality of teachers, and stated:

> Upgrading courses, mainly from T_4 to T_3, are run for about 250 candidates a year in conjunction with the Malawi Correspondence College....However, a pressing need for more teachers had led to a new plan for the setting up of short introduction courses for 300 school leavers per year to turn them into 'assistant' or 'pupil' teachers. (p. 229)

Kurian (1984) also studied the number of teachers for 1977 and found that there were 11,115 at the elementary level and 707 at the secondary level. He also noticed that there were 1,283 teacher trainees in 1974 in 13 two-year teacher training colleges and secondary school teachers at the University of Malawi. At the secondary level, three quarters were expatriates. The pupil/teacher ratio was 61:1 in primary schools and 21:1 in secondary schools.

Inherent in the teacher supply scheme were problems which overwhelmingly contributed to the poor quality of teachers. Cameron et al. (1983) wrote:

> Teachers are unevenly distributed and in short supply and the production of teachers from the colleges has not been able noticeably to remedy the situation....It is difficult to see how this situation can be remedied for a long time to come. The poor conditions in schools, the low remuneration levels (an average salary of approximately 200 pounds a year) and low status of the primary teacher all combine to discourage would-be entrants to the profession and to cause trained teachers to seek employment elsewhere. The result is a high wastage rate from the trained teacher cadre. This is having a significant effect on the staffing position, e.g., while 556 teachers qualified at T_3 and T_2 levels in 1974, the increased number of qualified teachers in schools was only 198. (p. 243)

The World Bank (1988) study of education in Sub-Sahara Africa analyzed the percentages of all secondary students enrolled in different types of educational programs. For Malawi, the study showed a decline in teacher training from 7% in 1970 to 6% in 1983, while the general and vocational sectors gained from 91% to 92% and 2% to 3% respectively for the same periods. Conversely, total enrollment increased 133% during the same period. The gross primary enrollment ratio rose 61%, and the secondary gross enrollment ratio rose by 200%. The study considered an enrollment ratio of between 50% and 80% as medium and Malawi, at the time of the Bank study, had a ratio of 58% for primary education. The gross enrollment ratio for secondary education was 4%. The study also projected the average annual growth rate of primary and secondary school age children for 1980 - 2000 to be 3.3%, a major increase from a rate of 2.9% for the years 1970-1980.

These statistics pointed out that Malawi needed to establish:

> Measures for improving quality and further expanding the education systems...to strike a balance between demands for education and the scarcity of resources, and...comprehensive, and internally consistent sets of policies along three dimensions: adjustment to current demographic and fiscal realities, revitalization of the existing educational infrastructure

> to restore quality, and selective expansion to meet further demands. (World Bank, 1988, p. v)

The Malawi Ministry of Education and Culture (1984) published its Education Development Plan (1985-1995). Among the plan's specific goals were:

1. To substantially increase capacity to educate primary school teachers (pre-service and in-service) from 2,000 to over 4,000 residential places.
2. To continue to improve the quality of primary teacher education by means of associating pre-service activities with in-service activities.
3. To ensure the provision of in-service training opportunities for teachers' college staff.
4. To actively involve all teacher colleges in in-service training activities (at times in association with the Institute of Education).
5. To provide facilities for the in-service education courses to serve secondary school teachers with a number of years of practical experience and above average teaching grades (as assessed by the Ministry). (pp. 14-15)

In order to achieve at least some of the goals/objectives of the development plans, policy initiatives were also prescribed which required the Malawi Institute of Education to (1) develop and strengthen its capacity and capability in curriculum development, (2) focus on primary and secondary teacher education, (3) be involved in the design and implementation of in-service training programs for the supervision of student teaching in the proposed 3-year teacher education program, and (4) use the facilities at Domasi and other colleges to increase participation in in-service activities. Administrative activities were also recommended which involve (1) accounting functions, (2) personnel functions, and (3) support functions in order to meet the projected goals by the target date.

Tanzania

Pre-Colonial Education

Bigelow (1961) stated:

> There can be no doubt that an increase in the quantity and quality of teachers in African schools is among Africa's most fundamental needs. This has been emphasized by, among others, the Ashby Commission, the World Confederation of Organizations of the Teaching Profession's Commission on Educational Policy in Africa, the Conference on Education in East Africa...and the Addis Ababa Report. (p. 33)

Releases from the conferences and commissions cited above had revealed the proportion of qualified teachers in African primary and secondary schools to be extremely low. Tanzania, being one of the first African countries to gain independence, tackled the problems inherited from the colonial government, which had pursued a segregated educational policy resulting in most African schools being poorly equipped and staffed.

Worth noting was the fact that the Ashby Commission, referenced by Bigelow (1961), had emphatically recommended utilization of expatriate teachers, which, in essence, was a temporary panacea since the former eventually had to leave the continent. Still, there were other inherent problems which plagued educational structures expected to produce competent African teachers.

One such problem in Tanzania was the percentage of elementary pupils completing their primary courses. Adams and Bjork (1972) stated that only 4% of elementary pupils completed their course in 1961. Other problems in Tanzania were the disparity between rural and urban schools, poor planning for manpower needs, unavailable facilities, monetary constraints, poorly staffed teacher training institutions, poor child health care systems, and lack of home support for pupils to attend school regularly (Coombs, 1967; Adams & Bjork, 1972; UNESCO, 1972; World Bank, 1988). Coombs (1967) stated "whenever manpower studies have been made...they have almost invariably revealed large discrepancies, both current and prospective..." (p. 75). He attributed the acute problem of teacher shortage to three specific facts:

> The first fact is that education is a mass production, labor-intensive industry, still tied to a handicraft technology. The second fact is that education, in contrast to other industries, is both a producer and a consumer of high-level manpower, if it is to serve all other consumers of manpower well...it must constantly recoup enough of its own best output to reproduce a good further crop. The third fact, tied to the other two, is that in the competition to win back enough of its own best quality products, education is usually at a disadvantage. It often ends up with a high proportion of second choice candidates. Education is at a disadvantage because other competitors with larger purses set the standards for attractive salaries. (p. 34)

Tanzania has had several education plans dating from as far back as 1948, including plans established in 1961 and 1963. The 1948 plan was for a 10 year period, the 1961 plan for a 3 year period, and the 1963 plan for a 5 year period (1964-69) (Mwingira & Pratt, 1967). Of specific importance to the three plans were:

> (a) the number of teachers serving at the beginning of the plan period classified according to the qualifications, which must be presumed to be directly related to the tasks of which they are capable;
>
> (b) the proportion of all serving teachers who should be professionally trained for their task;
>
> (c) the availability of candidates for training as teachers at various educational levels; and
>
> (d) the rate of withdrawal of teachers from service in the various categories. (Mwingira & Pratt, 1967, p. 72)

Mwingira and Pratt (1967) recorded the number of teachers serving in Tanzania's public schools as 12,044 in primary schools, 919 in secondary schools, and 203 in teachers' colleges for 1964. Primary school teachers were provided with three different qualifications, Grades A, B, and C. Grade C teachers were the least educated with only eight years of primary education plus two years of teacher training. Grade B teachers were those who had two years of secondary education plus two years of teacher training, or those promoted from Grade C. Grade A

teachers had to have four years of secondary education plus two years of teacher training.

Secondary school teachers were usually expatriate degree graduates with some in-service education provided in local educational systems. Although there seemed to be a good supply of teachers at the secondary level for 1964, Mwingira and Pratt (1967) observed that "...there is a small over-all shortage of staff, but this becomes larger when allowance is made for the 61 laboratory assistants..."(p. 76). Samoff (1987) also pointed out that schools in Tanzania "were poorly equipped and had a teaching staff whose own education had not gone much beyond that of their students" (p. 337). This position was verified by Kurian (1988a) when he observed that "the introduction of universal...education has ironically led to a shortage of teachers and as a consequence, downgrading in the quality of education" (p. 1585).

Teacher Development 1984-1988

The education budgets compared to total government budgets for 1983/84, 1984/85 and 1985/86 were 14.6%, 14.6%, and 19% respectively. Of the education budget, teacher training was allocated 6.48% for 1983/84, 8.16% for 1984/85, and 5.83% for 1985/86 (Tanzania Ministry of Education, 1986).

During the period under review, the main pre-service thrust was on "...raising the academic level of the student teachers to that of form 2 secondary education" (p. 21). These teachers were to teach standards I-IV in primary schools. For upper primary teachers, an Ordinary Level Certificate and two years of teaching courses were required.

To teach in secondary schools, the Development Plan provided a residential program of preparing teachers for lower secondary schools. The program was generally taken by students with an Advanced Certificate of Secondary Education or its equivalent. The award of a teaching certificate was contingent upon (1) character assessment, (2) attitude

toward work, and (3) the passing of a written examination (Tanzania Ministry of Education, 1986). To teach in the upper secondary schools, a degree in education was required.

Apart from the formal training of teachers, in-service training courses were also implemented. Between 1983 and 1986, the majority of teachers opted for in-service short courses (Table 5). Although the total figures in the table denote a significant increase from 1983-1985 and a decline for 1986, it should also be noted that the majority of teachers for each year were being retrained for upgrading purposes through in-service.

The 1984-86 plan had nine different categories of teacher qualifications for entry into the teaching profession (Table 6). The lowest entry qualification was discontinued in 1985 in favor of 4 years of full-time residential coursework at a teacher training college rather than 3 years of on-the-job training. For a comparison of the 1984-86 and 1986-88 differences in teacher training programs, Table 7 was included in this study. For the 1986-88 plan, there were only eight entry qualification categories whereas there were nine for the 1984-86 period. The 1986 Ministry of Education Report cited the specific problems which contributed to the shortage of teachers:

> A shortage of foreign exchange has been one of the major constraints to import sufficient materials.... The shortage of teachers' houses contributes to difficulties in the allocation and retention of teachers.... The high pupil per classroom ratio makes it difficult for teachers to give individual attention to pupils. (pp. 55-56)

In its Education Report to the International Conference on Education, the Tanzania Ministry of Education (1988) stated its specific goals to improve the quality of teachers by:

> Providing student teachers with adequate knowledge, skills and attitudes for professional use...by providing serving teachers with further training to improve their academic and professional skills and by improving the status of teachers in the country by making their terms and conditions of

Table 5

Teacher Training Enrollment 1983-1986

Type of Course	1983	1984	1985	1986
Grade C	2,210	2,136	1,999	2,106
Grade A	4,501	4,144	5,083	5,749
Diploma:				
* 2 year Diploma	552	662	817	847
* 3 year Diploma	476	365	306	251
Degree				
* BA (Ed)	311	345	362	356
* BSc (Ed)	153	202	300	320
In-Service Courses				
* Short courses	5,031	5,474	9,542	8,136
* 1 yr Special Certificate	252	310	324	540
* 2 yr Special Certificate	58	89	90	70
* Upgrading C-A	110	114	96	98
* Upgrading A-Diploma	200	145	335	313
Total	13,854	13,986	19,254	18,786

Source: Tanzania Ministry of Education (1986). Development of Education 1984-86. National Report of the United Republic of Tanzania, Dar Es Salaam: Tanzania. p. 23.

Table 6

Type of Teacher Training Programs 1984-1986

Entry Qualification	Period of Professional Training	Level of Teaching and Professional Qualification
1. Primary School Leaving Certificate (PSLC)*	3 years on-job-training Distance Teacher Training Program (DTTP)	Primary classroom teacher Grade C Certificate
2. Primary School Leaving Certificate	4 years full-time courses at a residential teacher training college	Primary classroom teacher Teacher grade B Certificate
3. Certificate of Secondary Education	2 years residential course	Primary school teachers Grade A Certificate
4. Advanced Certificate of Secondary Education or (A-level)	2 years residential course	Secondary and college teacher Diploma in Education
5. Certificate of Secondary Education with good passes for entry into Form 5	3 years taken concurrently with A-level studies	Secondary and college teacher Advanced Certificate Secondary Education and Diploma in Education
6. Grade A Certificate 3 years Minimum working experience and A-level passes	2 years up-grading course	Secondary and College teacher Diploma in Education
7. 'A' level passes for entry into university	3 years university course with education	Secondary and College teacher BA or BSc degree with education
8. General BA, or BSc degree	1 year university postgraduate diploma in education	Secondary and College Teacher Post-graduate diploma in Education
9. BA or BSc degree with education or B.Ed.	2 years MA/MSc or MEd degree course	Secondary, college or University teacher. MA/MSc or MEd degree in Education

Note: *This teacher training program was discontinued in 1985. Prior to it, the training was 2 years up to 1980 when it was extended to 3 years.

Source: Tanzania Ministry of Education. (1986). p. 19.

Table 7

Type of Teacher Training Programs 1986-1988

Entry Qualification	Period of Professional Training	Level of Teaching and Professional Qualification
1. Primary School Leaving Certificate	4 years full-time courses at a residential teacher training college	Primary school teacher Teacher grade B Certificate
2. Certificate of Secondary Education	2 years residential course	Primary school teachers Grade A Certificate
3. Advanced Certificate of Secondary Education or (A-level)	2 years residential course	Secondary and college teacher Diploma in Education
4. Certificate of Secondary Education with good passes for entry into Form V	3 years taken concurrently with A-level studies	Secondary and college teacher Advanced Certificate Secondary Education and Diploma in Education
5. Grade A Certificate 3 years Minimum working experience and A-level passes	2 years up-grading course	Secondary and College teacher in Education
6. 'A' level passes for entry into university	3 years university course with education	Secondary and College teacher BA or BSc degree with education
7. General BA, or BSc degree	1 year university postgraduate diploma in education	Secondary and College Teacher Post-graduate diploma in Education
8. BA or BSc degree with education or B.Ed.	2 years MA/MSc or MEd degree course	Secondary, college or University teacher. MA/MSc in Education or MEd

Note: *This teacher training program was discontinued in 1985. Prior to it, the training was 2 years up to 1980 when it was extended to 3 years.

Source: Tanzania Ministry of Education. (1986). p. 19.

> service more attractive and by monitoring them. (pp. 3 and 9)

Although the government of Tanzania had made several strides in its attempt to improve teachers' quality, several factors plagued the system. These factors were a poor economy; national policy requirements demanding a doubling of secondary school enrollments by the year 2000; diversification to teach industrial and commercial courses such as agriculture, home economics, and fine arts and music; and most of all, the drop-out rate of trainees from training colleges as exemplified in the 1986 Report of the Ministry of Education.

Uganda

Pre-Colonial Education

The first educational institution in Uganda was established in 1921. Prior to this date, education had been operated and managed by missionaries since 1866. Cameron (1970) stated that Uganda, for most of its educational history, had no government teacher college. He further pointed out that "...all other numerous teachers colleges were in the hands of the Christian voluntary agencies" (p. 56). By 1966 the majority of teachers were underqualified (Table 8).

The problem of teacher provision in Uganda was particularly acute at the primary level. This was due to:

> The reluctance on the part of government to enter the field of teacher training...but there was another factor which has not benefited the status of teacher education. Teacher education was, in the eyes of too many education officials and expatriate teachers, regarded as an inferior form of activity as compared with secondary education. It was too readily pointed out that most of the students admitted to teachers colleges were...those who had failed to secure entry to a secondary school. By implication those who taught in teachers colleges were not fit to teach in secondary schools. (Cameron, 1970, p. 57)

With regards to the small teachers' colleges established by missionaries, Cameron (1970) and Mwingira and Pratt (1967) identified specific disadvantages as (1) teacher trainees having contact with a very

Table 8

Uganda Teacher Categories and Qualifications (1966)

Grade	Qualifications
I	6 years primary education + 3 years teacher training
II	7 - 8 years primary education + 4 years teacher training
III	4 years secondary education + 2 years teacher training or a promotion
IV	Promotion grade from Grade III
V	6 years secondary education + 2 years teacher training or 4 years secondary education + 3 years teacher training or promotion from Grade IV

Source: Adapated from Cameron, J. (Ed.). (1970). The Development of Education in East Africa. New York: Teachers College Press, pp. 135-136.

limited number of adult minds, (2) inability of training colleges to provide a balanced curriculum, (3) inability of colleges to provide enough general and professional library resources, (4) inability of staff to conduct research work due to lack of facilities and incentive, and (5) encouragement of tribal jealousy and friction due to localization of curriculum and partiality in college admissions.

The Government made the teaching profession unattractive by using and applying segmented lateral and horizontal structures. Disparities between primary level teacher salaries and secondary level salaries discouraged prospective primary teachers. Teachers in government schools were provided with more fringe benefits than their counterparts in private schools (Cameron, 1970). Four main problems were identified by Cameron as:

(a) The raising and maintenance of professional standards,

(b) The importance of general education in the curriculum of a teachers college,

(c) The content and bias of the professional courses, and

(d) The control and direction to be exercised by government in teacher education. (p. 61)

Although the government tried to eradicate the problem of high pupil/teacher ratios in Uganda by hiring more teachers, Cameron (1970) stressed that:

> In consequence, the trained teaching force has been seriously diluted, overall teaching standards have been lowered, and the children, especially in primary schools, have suffered. (p. 61)

Teachers in private schools were required to adhere to rigid moral codes, and this made them defect to government schools which had more relaxed moral standards. Consequently, private or church-related schools were left with a higher proportion of untrained teachers. This insidious problem was, however, eradicated with the creation of the Unified Teaching Service (UTS) which sought to abolish disparities between private and government schools. Cameron (1970) stated that "all [enjoyed] the same terms of service and the same privileges and benefits, including a contributory pension scheme" (p. 71).

Changes in the educational structure and courses offered after independence in 1961 aggravated the already existing problem of teacher shortage. For an example,

> In 1968, English was made the official language of instruction from the first grade, but because of the shortage of qualified teachers, in some schools English was not introduced until the fourth grade. (Bray & Zimmer, 1987, p. 1284)

Educational structure changes where mission schools were absorbed into the government controlled system elated some teachers, but frustrated others because of the bureaucratic red tape which was involved during the process. Curriculum changes which placed emphasis on departure from the textbooks developed under the colonial era provided further problems for teacher development.

Bray and Zimmer (1987) noted that "...there was a particular shortage of teachers in mathematics, physics and in technical and commercial subjects" (p. 1291). They further observed:

> As the government places priority on the expansion and reform of basic education, large numbers of trained primary-school teachers becomes necessary.... Approximately 1,300 teachers are graduated each year, yet a severe teacher shortage continues.... Since 1972 teacher output from the two institutions has increased; however, there is a particular shortage of teachers.... (p. 1921)

Husen and Postlethwaite (1985) also studied the Ugandan educational system and concluded:

> Given the high rate of teachers' employment mobility, it is virtually impossible to obtain reliable statistics on numbers of teachers. There is, however, a persistent and acute shortage of professional and technical personnel....There are still many unqualified primary school teachers in schools. (pp. 5334-5335)

Adams and Bjork (1972) also stated that:

> Most critical is the shortage of teachers at every level and of individuals prepared for the scientific and mathematics occupations....In order to supply the high level manpower needed to attain her desired economic growth rate, Uganda must increase her university graduates....The educational problems of Uganda are even greater at the secondary levels. (p. 71)

Chesswas (1969) stressed:

> The demand for primary education is so great that all teachers available for development must be used as far as possible for additional classes, the primary teacher in Uganda being generally a class teacher as distinct from a subject teacher. (p. 45)

It was quite apparent that with current shortages of qualified and quality teachers in Uganda, a variety of in-service activities must be used to develop and upgrade unqualified teachers and to keep qualified teachers abreast of new developments in subject matter and instructional methodologies.

Zambia

Pre-Colonial Education

Modern education was introduced by missionaries in 1882 despite

lack of support from the British South Africa Company, which was responsible for administering the territory called Northern Rhodesia until its independence in 1964. The basic curriculum, taught by preachers, consisted of studying catechism, alphabet, hygiene, and arithmetic.

Government involvement was quite significant after 1924, when the British assumed full responsibility for the territory (Kurian, 1985). Massive expansion of African primary education was experienced from the 1930s onwards (Kurian, 1985; Husen & Postlethwaite, 1985). By 1939 there were 39 teacher training institutions operated by missionaries and one government institution at Muzabuka (Mwanakatwe, 1968; Kurian, 1985). Progress within secondary education did not keep pace with that of the primary level. The first secondary school was established in 1939 (Kurian, 1985). The enrollment growth in secondary schools was from 100 in 1938 to 7,050 in 1963.

Although the literature did not specifically spell out teacher shortage as a problem, specific indicators which call for in-service education were identified. The National Development plans introduced after independence called for a total overhaul of the education system through (1) expansion of free primary education, (2) provision of more in-house training for untrained teachers, (3) localization of the Cambridge School Certificate, (4) development of local education materials, (5) revision of the curricula, and (6) writing of local textbooks (Kurian, 1985). Maimbolwa-Sinyangwe (1988) also suggested that the mass exodus of teachers from the profession to other sectors was a major problem in the educational system. They also stated that:

> Efforts to extend school opportunities to a greater proportion of the population and to improve the quality of instruction and the training of personnel have been slowed by economic problems. (p. 642)

Although the government tried to make the teaching profession more attractive in the early 1980s by raising teachers' salaries and providing

such side benefits as better housing, the brunt of the support for education was left to local communities (Husen & Postlethwaite, 1985). With a poor economic backdrop, local communities were unable to cope with the revenue demands necessary to build teacher housing. Consequently, the more able and qualified teachers abandoned the teaching profession (Cameron et al., 1983).

The Third National Development Plan 1980-84

In order to encourage better education, this plan provided the basis for Zambia to implement educational reforms, some of which were a carry-over from previous National Development Plans.

At the primary level, the plan called for 806 new grade-one classes and 936 new grade-five classes. This provision called for (1) double sessions in all primary schools, (2) self-help schemes, and (3) erection of new schools and teachers' housing. Of major significance was the fact that the plan took into account the need for "...improving teacher education and supplying teachers with adequate materials, equipment, textbooks, etc." (Cameron et al., 1983, p. 512).

At the junior secondary level, the plan aspired to improve the progression rate from primary to junior secondary level with a target of 21.8% by 1984. Other specific quantitative improvements were envisioned such as opening 90 eighth-grade classes in existing facilities, building 40 new eighth-grade classrooms, and having 24 more eighth-grade classes ready by 1984 (Cameron et al., 1983).

The plan did not call for substantial quantitative changes at the senior secondary level. It did call for the development of new curricula for grades 10 to 12 and for the creation of 980 places for grade 12 from existing facilities.

With regard to meeting staffing demands there were many quantitative changes at the primary and secondary levels. The plan proposed to

increase the "...output of teachers and improve in-service education" (Cameron et al., 1983), by

> (a) expanding college facilities by making more boarding places available and taking day students
>
> (b) constructing a new teacher training college to accommodate 500. (p. 513)

Since there were also changes in the technical and vocational education, continuing education, and special education areas, the plan recognized the need for improving staff competence, redressing the imbalance in the use of existing facilities, and increasing in-service teacher education and expanded teacher education in specialized areas (Cameron et al., 1983).

To achieve the goals of this plan, much bilateral support was required -- hence Zambia's dependence on foreign aid. Cameron et al. (1983) identified numerous international organizations such as UNESCO, the World Bank, the United Nations Development Program (UNDP), USAID, and the Educational Development Fund (EDF) which helped to refurbish Zambia's infrastructure by providing needed economic and personnel assistance.

Zimbabwe

Pre-Colonial Education

Of the seven countries selected for this study, Zimbabwe, in 1980, was the last to achieve its independence. After 90 years of colonial rule, Zimbabwe, formerly called Southern Rhodesia, faced many problems within its education system.

First and foremost were policies which were indicative of a society which "...was stratified mainly on racial criteria, which were the bases for ordering nearly all social relations" (Dorsey, 1989, p. 41). Kurian (1987c) stated that "the first African educational system in Zimbabwe did not begin until the beginning of the 20th Century" (p. 1605).

As was the case in the other Sub-Saharan territories, education originated from missionary activities which established schools where

religious, academic and industrial subjects were taught. Although the colonial government extended financial assistance and ordinances, day-to-day management was left to the missionaries. Dorsey (1989) observed that whites constituted only 3.5% of the population, but controlled the economic and political structure. Consequently, the financial support afforded the mission schools which educated Africans was very minimal when compared to that allocated for European education (Mungazi, 1983; Atkinson, 1972; M'bow, 1981).

Table 9 illustrates the disparities which existed in the enrollments of students at white schools and at black schools.

Table 9

Rhodesian Primary and Secondary School Enrollments (1959 - 1975)

Year	African Division		European Division	
	Primary	Secondary	Primary	Secondary
1959	449,906	3,000	36,689	17,450
1960	484,299	4,139	39,525	18,754
1965	627,800	11,495	37,220	22,363
1970	671,457	23,418	39,725	26,132
1975	810,908	37,462	39,613	29,448

Source: Atkinson (1985). Zimbabwe: System of education. p. 5644.

When looking for manpower to place in African institutions, it would have been easily discerned that as a percentage of the population the proportion of Africans who had a secondary education was far below that of their white counterparts. Dorsey (1989) observed that

> ...a legacy of inequality from the colonial era...had encompassed all aspects of life: social, economic, political, and educational. The society was stratified mainly on racial criteria, which were the bases for ordering nearly all social relations. (p. 41)

Atkinson (1972), in his earlier studies of educational developments in Rhodesia (Zimbabwe), stated that:

> These problems have been further accentuated by a number of special circumstances which have worked to produce a situation that is unique in African conditions...to take their blue prints for educational planning direct from overseas with little attempt to re-adapt them to the needs of an African background. (pp. 1 and 13)

De facto segregation perpetuated the production of unqualified African teachers. This was due to high attrition rates enforced by Rhodesian government policies for education at the seventh, tenth, and twelfth grades. This problem was emphasized by Chivore (1986) when he wrote:

> The teachers in European primary schools (all Europeans) were better trained than the typical teacher in African schools. A very small proportion of Africans completing primary school entered secondary school, and most were assigned to a course of study that terminated at the junior secondary level. (p. 235)

Post-Independence Efforts to Train Teachers

The surge of pupil enrollments after independence did not help the critical need for qualified teachers in Zimbabwe (Rhodesia).

> The massive growth in enrollments to 1982 and the expectation of continuing growth, even if at a slackening rate, through the 1980's required the training of substantial numbers of teachers. Until independence all but a few of secondary-school teachers of whatever race were qualified and the new government apparently intended to maintain a similar level...after the surge of enrollment, about 1/4 to 1/3 of primary school teachers were thought to be untrained and 2/5 to be not fully qualified.... (Chivore, 1986, p. 237)

To raise the qualifications of those teachers who were in service, and to provide the large numbers of teachers needed at the primary and secondary levels, additional teacher training colleges had to be erected. The Zimbabwe Integrated National Teachers' Education Course (ZINTEC) was instituted. This course comprised a 16 week period of formal academic training to be followed by 4 weeks of in-service training. Supervision

of study and work was done by instructors. Another component of the program was participation in weekend courses.

The Zimbabwe Secretary for Education (1983) stated:

> The overall response to increased educational opportunities particularly in rural areas, has had to be met by a marked expansion in teacher-training education facilities. It has also been necessary to employ increasing numbers of unqualified teachers in primary schools and to recruit foreign teachers for secondary schools. ...The problem of the alleviation of acute staff shortages in rural areas has, however, been very considerably assisted by ZINTEC, which became fully operational this year.... (p. 1)

At the time of the Secretary's report, there were 22,654 trained and 15,119 untrained teachers at the primary level and 4,608 trained and 266 untrained secondary level teachers (Makura, 1983). By 1984, of the 54,086 primary teachers, 23,999 were untrained while at the secondary level there were 7,856 teachers, of whom 3,633 were untrained (Chanakira, 1985). During the same year there were 7,734 teacher trainees in formal teachers' colleges and 516 individuals attending ZINTEC (Chanakira, 1985). The Secretary of Education in 1984 identified the different teacher qualifications and revealed that a large percentage of teachers at the elementary and secondary levels were subqualified (Tables 10 and 11).

The Ministry of Primary and Secondary Education (1988) in its Education Development Report stated:

> The employment of a large number of untrained temporary teachers has resulted in a high mobility rate of teachers. The teaching force at the secondary level is generally young, untrained or underqualified, except for established schools. When taken together with the lack of qualified substantive heads at secondary schools, and the inadequacy of supervision, it is easy to see that the quality of education suffers. Some of the characters described above are responsible for certain disciplinary problems faced by the teaching force today. (p. 20)

Provisional statistics presented in the same report for 1988 were 2,221,906 elementary students; 654,166 secondary students; 6,080 teacher

Table 10

Zimbabwe Teachers by Qualification: Primary School (1984)

Qualification	Total Government and Private Primary Schools Male	Female	Total
Certificated Honours Graduate	2	6	8
Certificated Graduate	21	38	59
Bachelor of Education	9	19	28
Uncertificated Honours Graduate	--	2	2
Uncertificated Graduate	4	8	12
"O" Level + 3 years teacher training			
Primary	1,869	2,525	4,384
Secondary Academic	14	19	33
Secondary Technical	6	3	9
"O" Level + 2 years teacher training			
Primary	1,122	324	1,446
Secondary Academic	2	1	3
Secondary Technical	1	--	1
Jr Certif. + 3 years teacher training	786	543	1,329
Jr Certif. + 2 years teacher training	3,177	1,664	4,841
Standard 6 + 2 years teacher training	6,160	3,638	9,798
5 years teacher training	--	2	2
4 years teacher training	15	19	34
Journeyman	45	14	59
Zintec Trainee	3,737	1,922	5,659
Student Trainee	1,245	1,118	2,363
Unrecognized	4	3	7
Untrained	13,235	10,764	23,999
Total	31,454	22,632	54,086

Source: Zimbabwe Secretary for Education (1985), p. 56.

Note: -- No data were provided.

Table 11

Zimbabwe Teachers by Qualification: Secondary School (1984)

Qualification	Total Government and Private Primary Schools Male	Female	Total
Certificated Honours Graduate	315	145	460
Certificated Graduate	748	462	1,210
Bachelor of Education	163	76	239
Uncertificated Honours Graduate	296	96	392
Uncertificated Graduate	480	195	676
"O" Level + 3 years teacher training			
Primary	1,605	611	2,216
Secondary Academic	1,254	534	1,788
Secondary Technical	400	365	765
"O" Level + 2 years teacher training			
Primary	198	39	237
Secondary Academic	143	75	218
Secondary Technical	53	48	101
Jr Certif. + 3 years teacher training	42	21	63
Jr Certif. + 2 years teacher training	51	24	75
Standard 6 + 2 years teacher training	54	20	74
5 years teacher training	20	8	28
4 years teacher training	50	39	89
Journeyman	36	3	39
Zintec Trainee	185	62	247
Student Trainee	811	393	1,204
Unrecognized	59	31	90
Untrained	3,329	1,179	4,508
Total	10,292	4,426	14,718

Source: Zimbabwe Secretary for Education (1985), p. 52.

trainees for secondary schools; and 9,129 teacher trainees for elementary schools.

Although the figures for teacher trainees looked impressive by African standards, the Ministry acknowledged the persistent problem of teacher shortage. The Ministry set forth plans:

> ...to redress these problems [by] increasing the enrollment of existing teachers colleges. Recruitment of secondary teachers from abroad has continued. ...In 1986 for example, 237 such expatriate secondary teachers were recruited. (pp. 20-21)

Specific objectives outlined in the report called for constant training and retraining of teachers to:

> (a) provide education for all at all levels, including non-formal education, eradication of illiteracy, and appropriate education for the disabled
>
> (b) transform and develop the curriculum to make it more relevant to Zimbabwe's cultural, socio-economic and skilled manpower requirements, and
>
> (c) improve the quality and standards of learning and teaching. (p. 2)

With the concept of "Education with Production," the Zimbabwe government put into practice the idea that education should produce productive citizens. Pilot programs were established to experiment with this concept. Agricultural projects, woodwork projects, cookery, craft and building activities were included in the curricula, which called for the production and/or recruitment of teachers in these specialties. As more and more schools adopted the concept, more and more teacher training colleges were established in those fields. Also, in order for those teachers to stay abreast of modern technology and developments in specialty areas, more in-service programs were required.

Evidence in Support of Proposition I

World Bank Regional Projections

The World Bank (1988) stated that Africa's population between 1970 and 1980 grew at a rate of 2.9%. Between 1980 and the year 2000, the

rate of population growth is projected to grow at about 3.2% a year for the whole region.

This high population growth rate is a reflection of the decline in infant mortality, attributed to improvements in the health sector. The rapid increase in population, however, creates several problems for educational developers. The World Bank Study (1988) stated that "one in three persons is of primary or secondary school age in Africa" (p. 18). The study projected that by the year 2000 there will be about 200 million school-age people, about 70% more than there were in 1984.

With such a dynamic projected increase in population will also come the need for an increase in educational expenditures. The study also projected that if costs continue to rise at the same rate as they were in 1983 ($50 per primary pupil and $250 per secondary pupil), the total cost for education in the year 2000 would be $9.4 billion. This does not include facility construction, equipment, and other capital costs.

Another factor that will affect education costs is the problem associated with the low population density in rural areas. The World Bank's (1988) position was that "Low population density implies high unit costs in education, especially in rural areas" (p.20).

Other factors such as a weak economy, poor planning, bad policies, and unstable political activities all tend to discourage investment in Africa by some developed countries. This brings educational improvement almost to a standstill. An exploding population combined with economic problems would mean a decline in the quality of education.

Study Projections

Several factors should be considered when reading and translating the data presented in this study. Chapman and Boothroyd (1988) examined several factors which influence the quality of data generated from developing countries. They mentioned seven areas which pose a threat to

the quality of data from developing areas; these included mistakes due to:

1. maintaining and reporting,
2. treatment of missing data,
3. transferring and summarizing school level data,
4. lack of consensus about data definitions,
5. the inability to merge data sets across departments or across years,
6. low reliability and/or validity of data collection instruments, and
7. failure of information analysts to understand the assumptions of their analytic programs. (p. 417)

With this background in mind, several strategies were undertaken to present accurate data in this study by (a) resorting to primary sources for data collection, (b) cross-referencing the acquired data to determine if there were inconsistencies in the data sources, (c) relying on more recent data where possible, (d) substituting data from other sources for years in which data were not reported or discovered, and (e) relying more on institutionally generated data.

Data were collected on observed variables for population, elementary student enrollments, secondary student enrollments, teacher training enrollments, teachers employed, educational expenditures as a percentage of total current government expenditures, and teacher/pupil ratios for years 1960-1985 in five-year series. Observed data for all the selected countries were for 1960, 1965, 1970, 1975, 1980 and 1985. The rationale for choosing 1960 as the base year was to include the period before the countries gained independence. There were inherently designed disparities in the educational systems for each of the countries due to British policies on education in her colonies. These policies adversely affected the quality of teachers and education in general, especially in the rural areas.

Data projections were computed for all the selected variables except for educational expenditures. Projections for teacher/pupil ratios were performed by dividing the total projected number of teachers into the total enrollments for elementary and secondary levels. Elementary student projections were calculated as a function of the country population. Secondary student projections were calculated as a function of both the general population and the number of elementary students. Teacher trainee projections were calculated as a function of population, elementary, and secondary enrollments. Teacher projections were calculated as a function of population, elementary, secondary and teacher trainee enrollments.

The statistical formula was $y = b+mx$ where y is the population, b is the constant, m is the slope and x is the year. The same formula was used in the calculations performed for all the projections for the seven countries. Projections were performed utilizing the SAS computer software for statistical computations.

Charts were developed for observed and projected data on six variables. Plots for observed and projected data were presented to show trends for the selected years between 1960 and 2000. Charts were presented for (1) population, (2) elementary students, (3) secondary students, (4) total student population for elementary and secondary students, (5) teacher trainees, and (6) teachers in service.

A scatterplot was also prepared on population, students and teachers to present a linear relationship for observed and projected data. This was done to establish whether there was a direct relationship among population trends, student enrollments, and teacher needs. From this relationship, it could be determined whether there were characteristics for specific years which did not fit a linear trend. Wherever outliers were found, an effort was made to establish the causes of such discrepancies.

Data Analysis for Botswana

Data from the literature for 1960-1985 are presented in Table 12. Projected data are presented to show trends for the selected variables for years 1990, 1995 and 2000.

Between 1960 and 1965 there was not a significant change in the population of Botswana. From 1965 to 1985 there was a steady increase, as shown in Figure 1. The World Bank (1988) projected the population to continue to rise unless measures are taken to slow the process.

Figure 2 displays elementary student enrollments. The enrollments for the observed years show a continued trend of increasing enrollments. The sharpest increases were experienced between 1980 and 1985. The trend is projected to show an increase to the year 2000.

Increases for secondary student enrollments (Figure 3) were not very large between 1960 and 1965. This probably was a reflection of colonial policies which did not provide opportunities for African pupils to continue into secondary schools (World Bank, 1988).

Between 1980 and 1985 there was a sudden increase in enrollments. This increase can be attributed to two specific factors: the decline in the drop-out rate, and flexible policies which allowed more students to continue into secondary schools. The trend is projected to continue.

The general trend for both elementary and secondary pupils is presented in Figure 4. The projected increase in student population signifies a need to train more teachers for both secondary and elementary levels.

The projections for teacher trainees (Figure 5) reveal a very uneven pattern for the period between 1960 and 1970. A significant increase was experienced between 1970 and 1985. The trend is projected to decline slightly between 1985 and 1990, but is projected to show an even increase up to the year 2000.

Table 12.

Botswana*

Year	Population	Elementary	Secondary	Teacher Trainees	Teachers Employed	Education Expenditures As % Of Gov't Spndg	Teacher Pupil Ratio
1960	510,000	36,287	683	93	1,182	12.9	1:31
1965	520,000	66,061	1,830	271	1,743	10.1	1:39
1970	624,000	83,002	5,197	283	2,628	12.3	1:34
1975	754,000	116,293	14,286	489	4,369	18.8	1:30
1980	915,000	171,914	20,969	844	6,453	16.0	1:30
1985	1,108,000	223,608	36,144	1,188	8,655	19.2	1:30
1990	1,154,333	244,940	37,566	1,268	9,495	--	1:30
1995	1,274,190	281,724	44,532	1,479	11,016	--	1:30
2000	1,394,048	318,509	51,498	1,691	12,537	--	1:30

Sources: 1. UNESCO. (1985). African Socio-economic indicators. Paris: UNESCO.
2. UNESCO. (1960-1987). Statistical Yearbook. Paris: UNESCO.
3. Europa Yearbook. (1961-1987). London: Europa Publications.

Note: -- projections not performed on variable.
* Known as Bechuanaland Protectorate before 1965

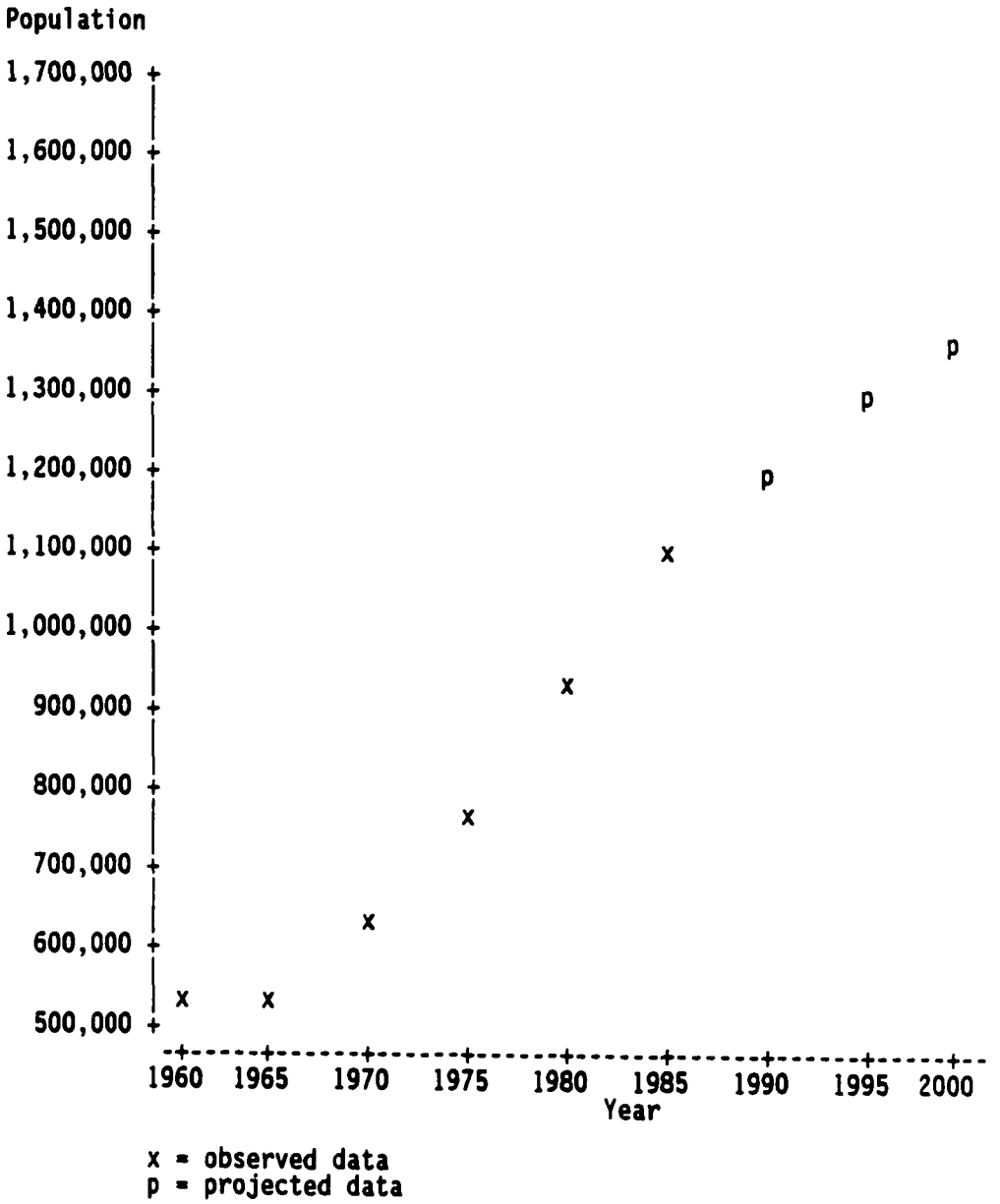

Figure 1. Teacher Projections - Botswana
Plot of Population/Year

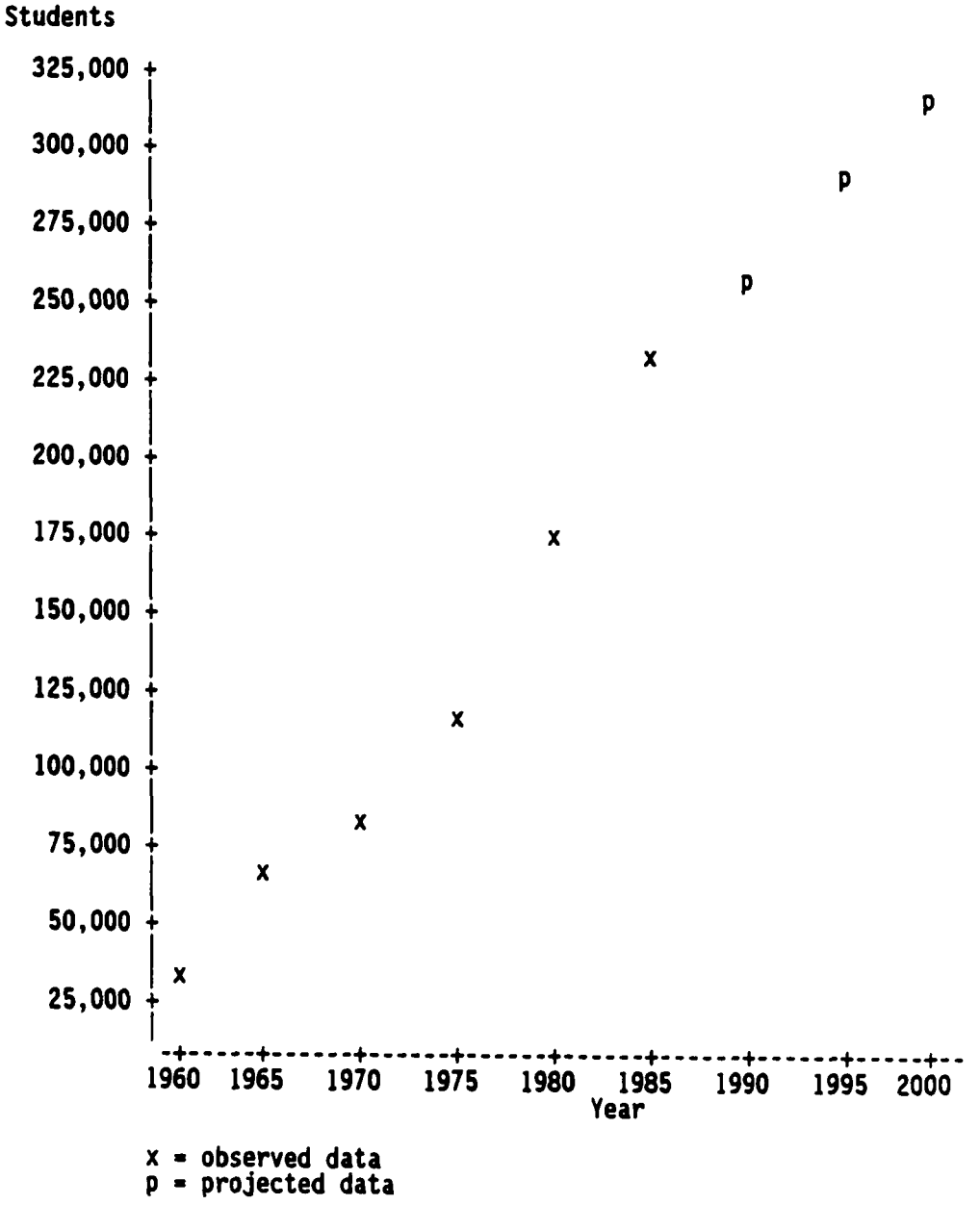

Figure 2. Teacher Projections - Botswana
Plot of Elementary Students/Year

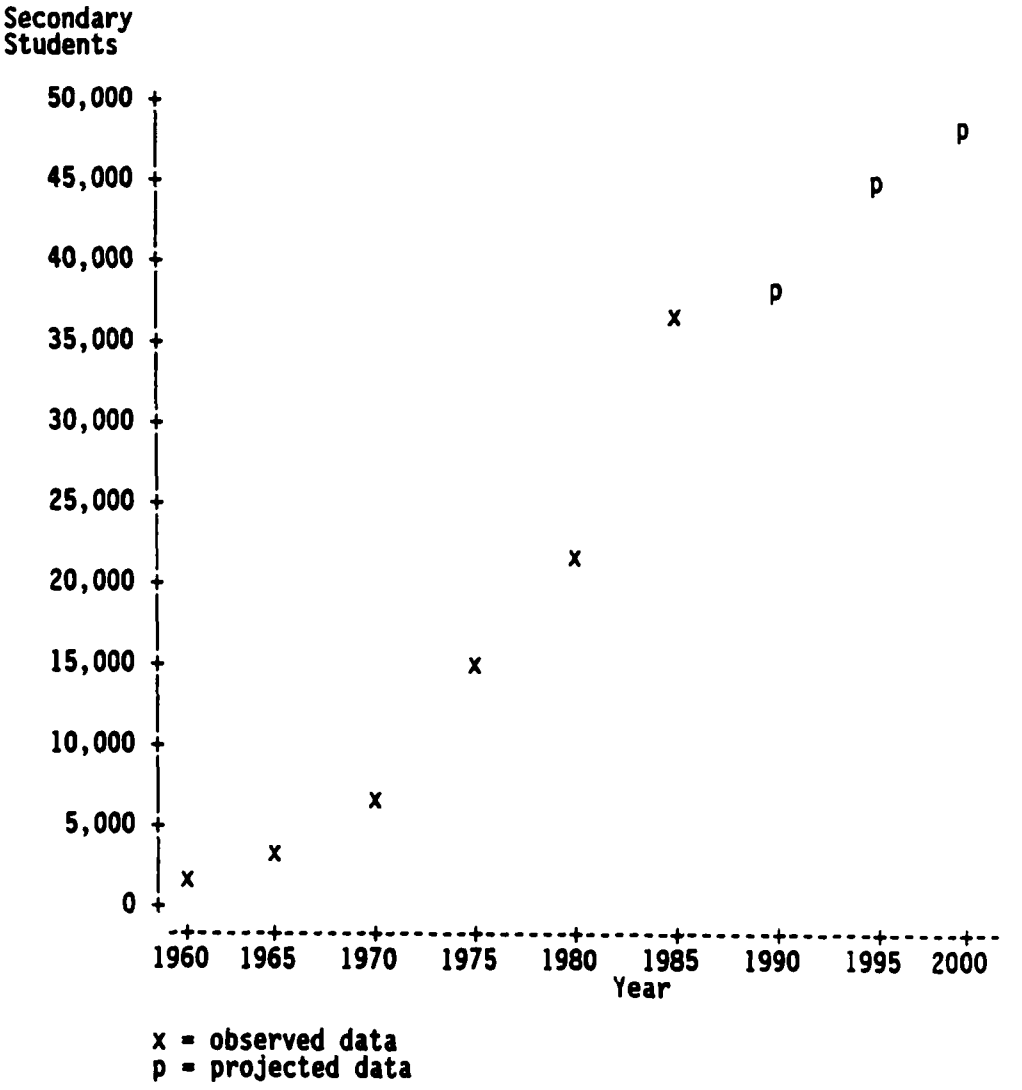

Figure 3. Teacher Projections - Botswana
Plot of Secondary Students/Year

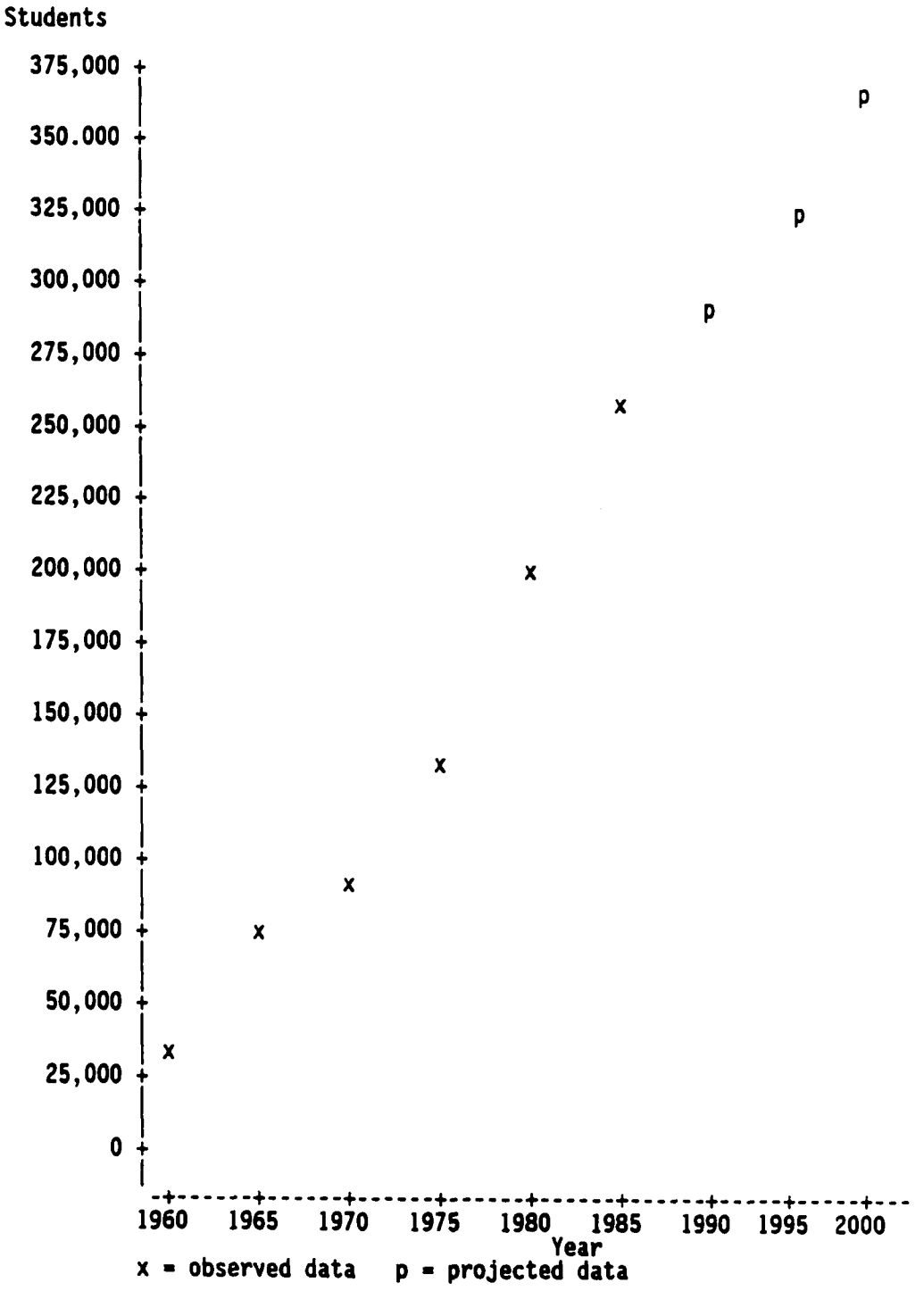

Figure 4. Teacher Projections - Botswana
Plot of Students/Year

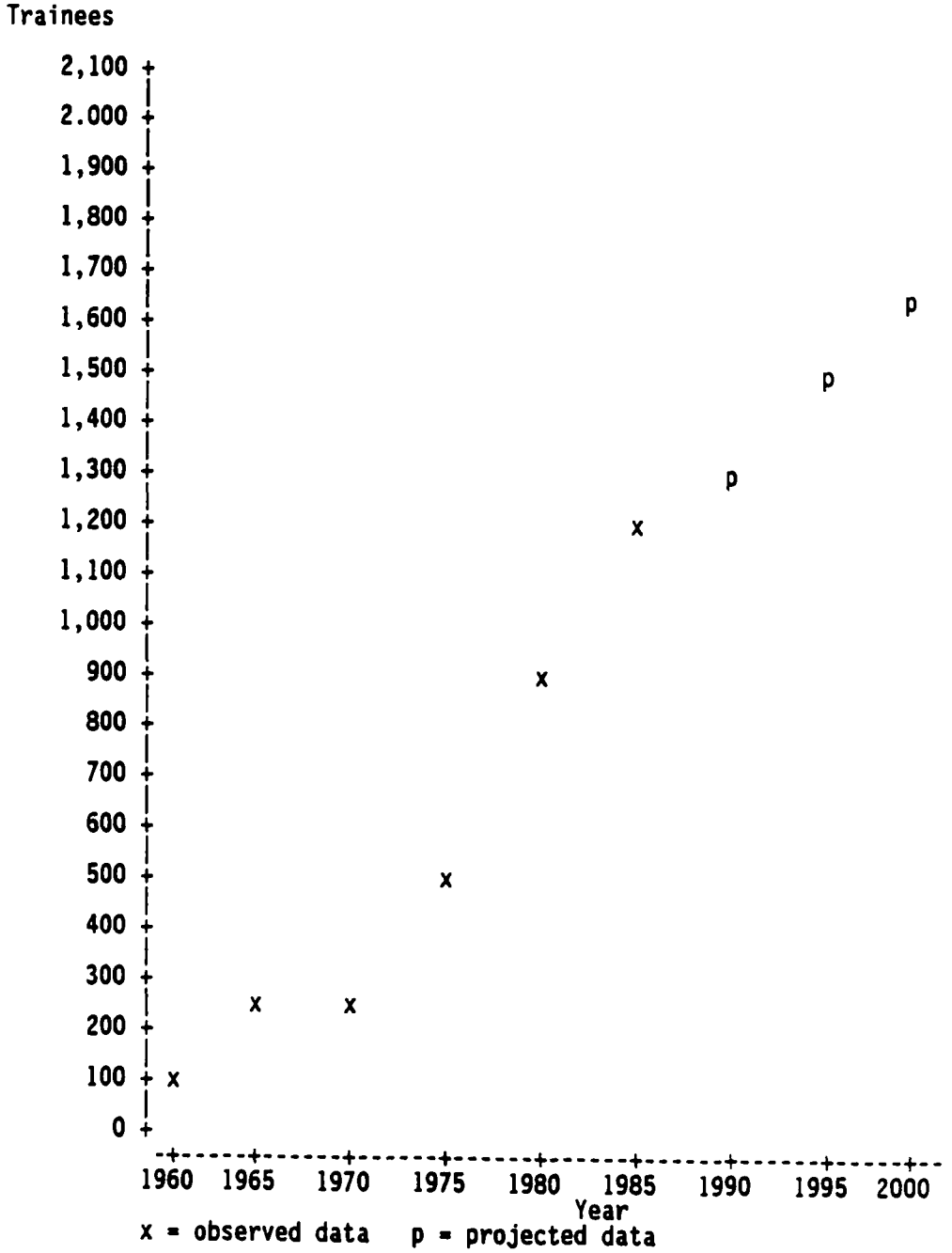

Figure 5. Teacher Projections - Botswana
Plot of Trainees/Year

Figure 6 is a projection for teachers in service. There is a curvilinear trend between 1960 and 1985. The increase between 1960 and 1970 was very gradual but rose sharply between 1970 and 1985. This probably was a response to the student increases experienced at the elementary and secondary levels during the same period. There is a gradual projected increase between 1985 and the year 2000.

The scatterplot (Figure 7) shows the linear relationship for population, students, and teachers for past and projected trends in Botswana. Whereas there is a gradual increase projected in population and teachers, a significant increase is projected for pupil enrollment. The rise in student enrollments will be greater than the growth in teacher supply if the trend follows patterns revealed in the figure. Several factors can change this situation: (1) a reduction in the birth rate, and (2) an increase in the number of teachers. The number of teachers can be increased by (1) training more trainers, and (2) providing more incentives, such as in-service education, to prevent teacher wastage.

Data Analysis for Kenya

Observed and projected data for Kenya on the seven variables are provided in Table 13. The population of Kenya as shown in the plot chart (Figure 8) showed a steady increase between 1960 and 1985. The trend is projected to increase up to the year 2000. If no other variables intervene, the population is projected to be about 27 million by the year 2000.

The projection for elementary students (Figure 9) shows a gradual increase between 1960 and 1970 and a sudden rise in pupil enrollments for the period 1970 to 1985. The same trend is projected to continue up to the year 2000. There seems to be a direct relationship between population increase and the increase in student enrollment.

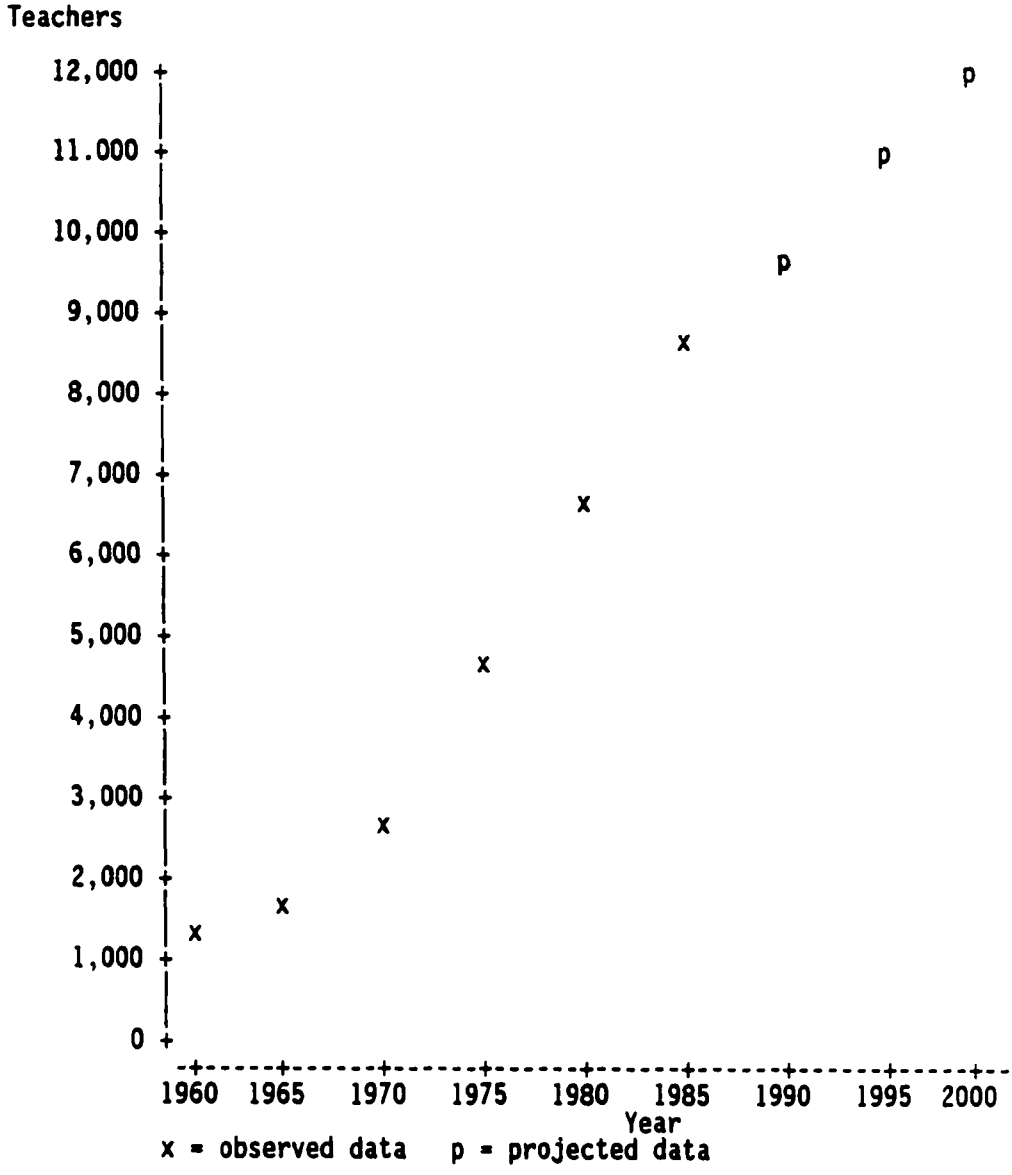

Figure 6. Teacher Projections - Botswana
Plot of Teachers/Year

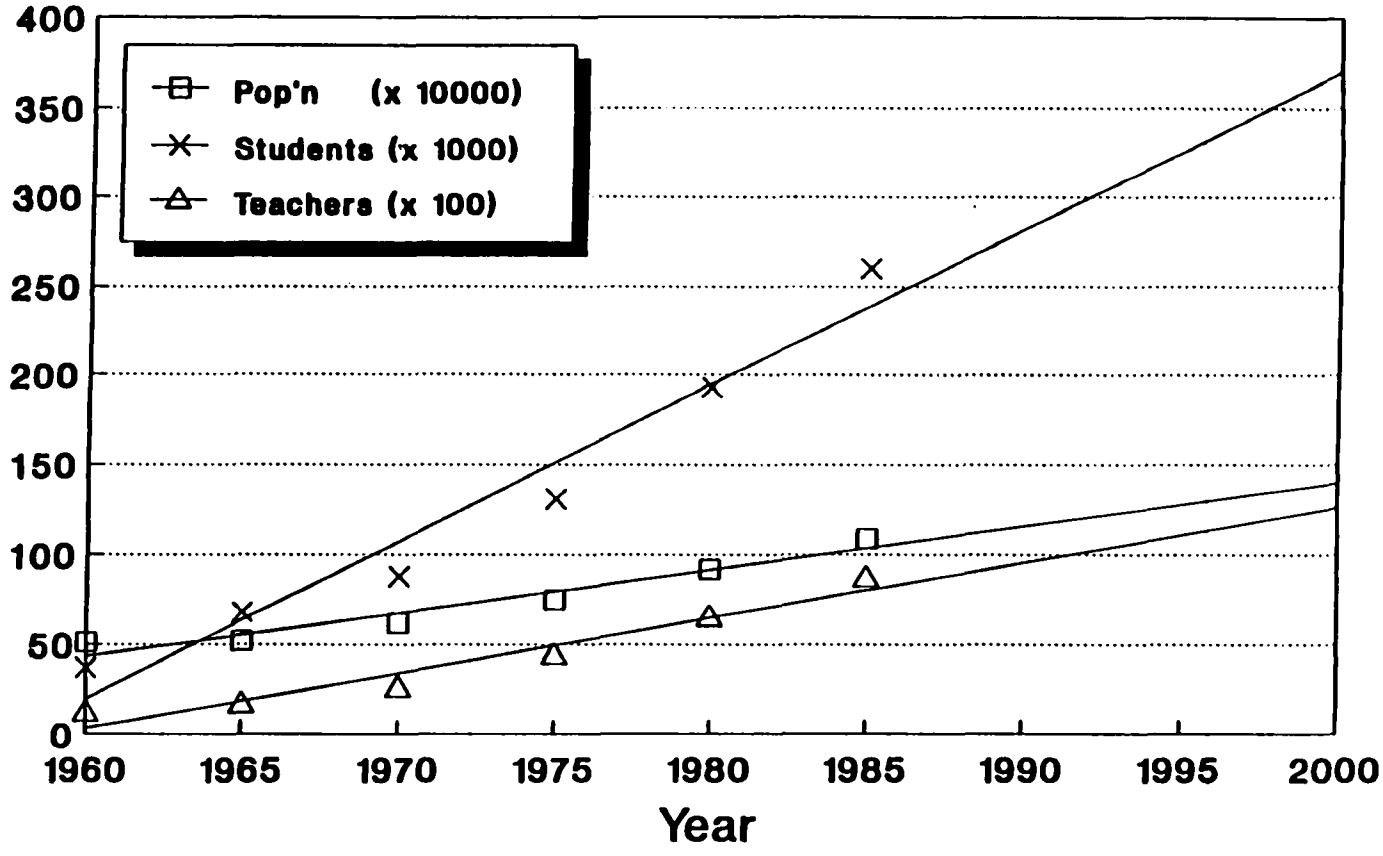

Figure 7. Population, Students, Teachers
Past and Projected for Botswana

Table 13.

Kenya

Year	Population	Elementary	Secondary	Teacher Trainees	Teachers Employed	Education Expenditures As % Of Gcv't Spndg	Teacher Pupil Ratio
1960	8,115,000	781,295	27,168	4,444	19,812	20.4	1:42
1965	9,530,000	1,042,146	54,069	4,846	33,585	18.4	1:34
1970	11,291,000	1,427,589	136,030	4,749	48,078	14.4	1:34
1975	13,702,000	2,881,115	240,969	8,666	95,837	19.6	1:33
1980	16,766,000	3,926,629	428,023	12,126	119,570	18.1	1:38
1985	20,241,000	4,702,414	533,071	12,720	159,004	14.8	1:34
1990	21,749,067	5,431,455	612,187	14,772	179,482	--	1:34
1995	24,170,467	6,280,386	719,510	16,633	208,101	--	1:34
2000	26,591,867	7,129,316	826,833	18,494	236,720	--	1:34

Sources: 1. UNESCO. (1985). African Socio-economic indicators. Paris: UNESCO.
2. UNESCO. (1960-1987). Statistical Yearbook. Paris: UNESCO.
3. Europa Yearbook. (1961-1987). London: Europa Publications.

Note: -- projections not performed on variable.

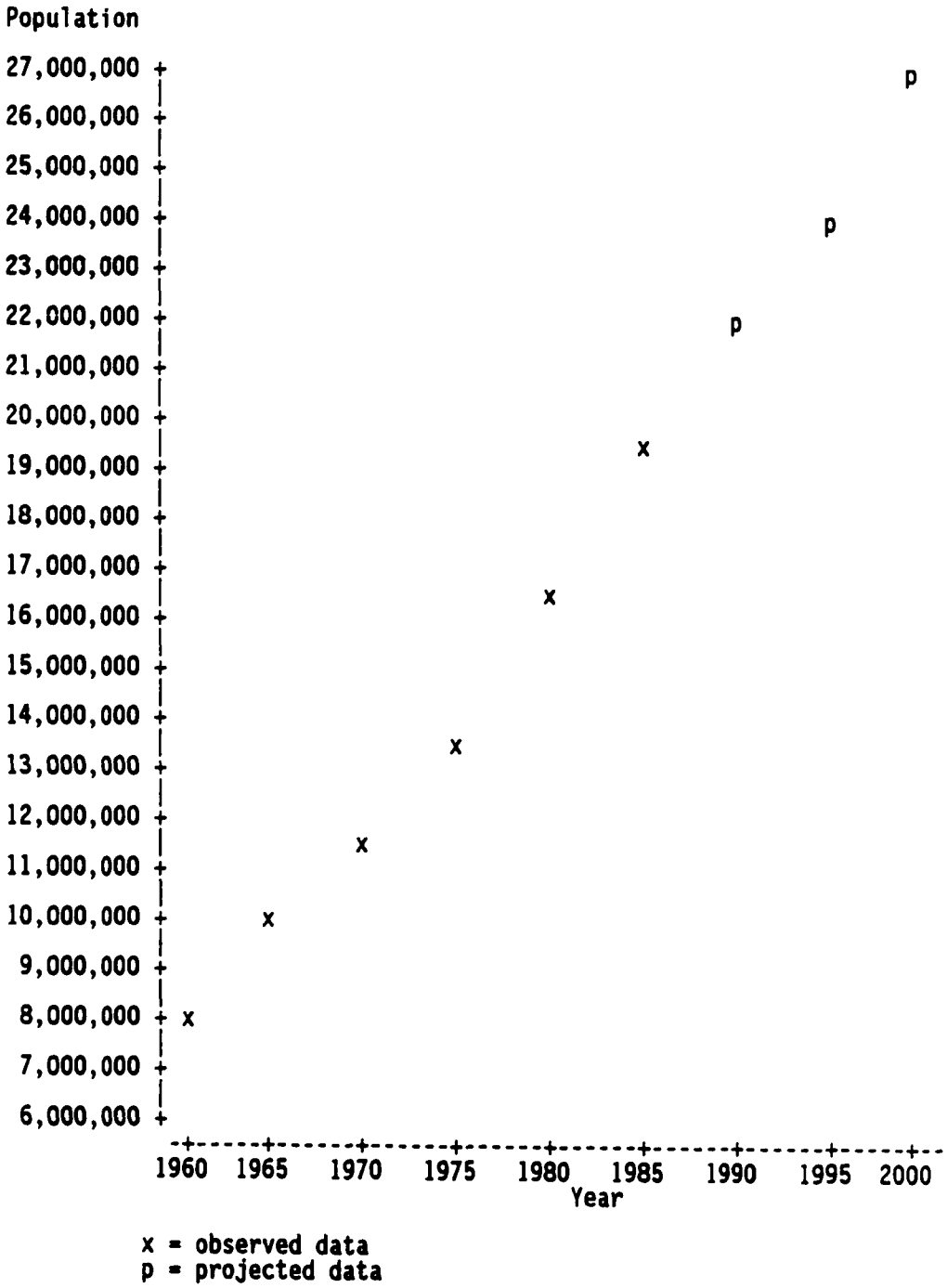

Figure 8. Teacher Projections - Kenya
Plot of Population/Year

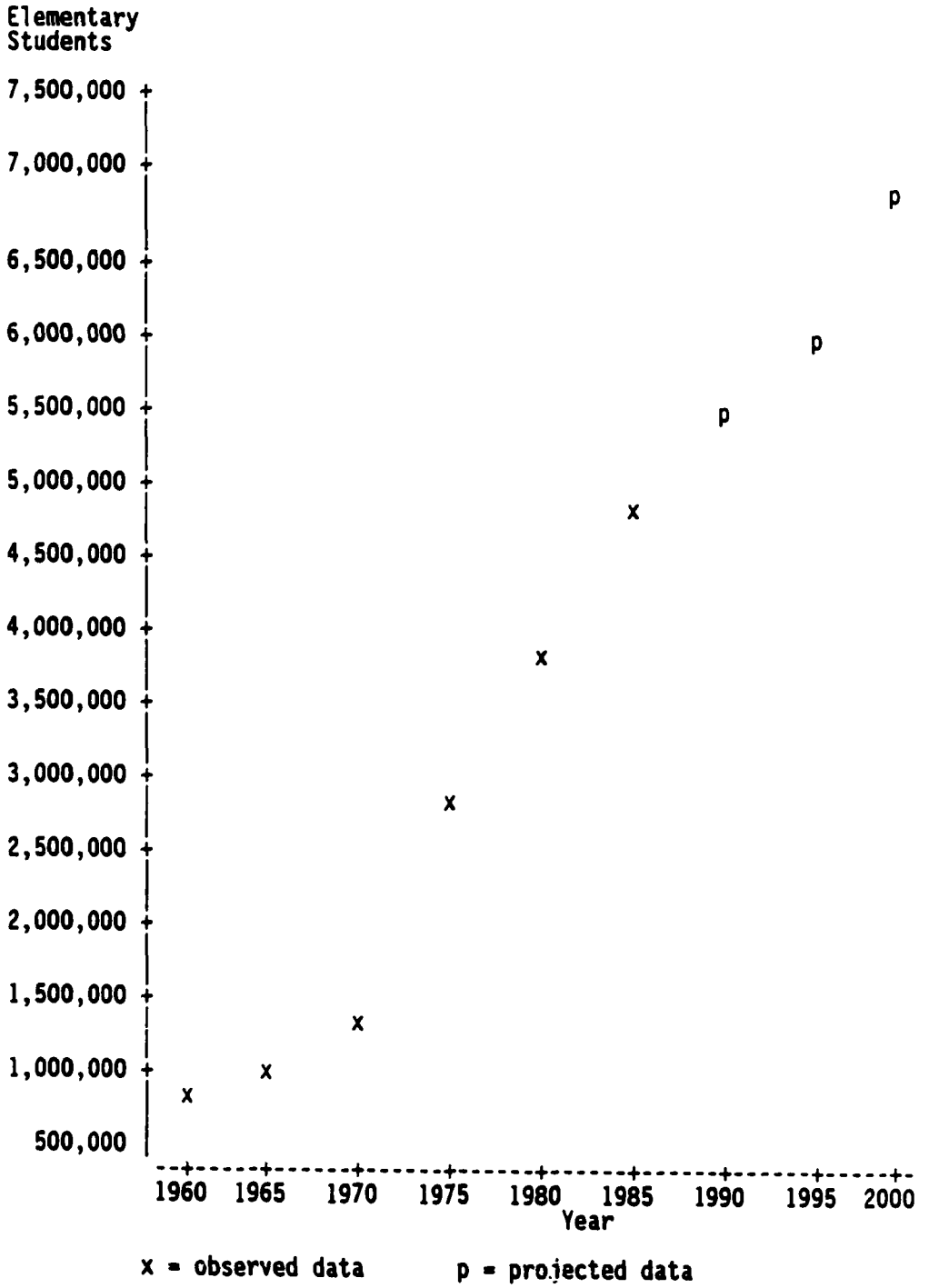

Figure 9. Teacher Projections - Kenya
Plot of Elementary Students/Year

Secondary student enrollment was gradual for the period between 1960 and 1970 as shown in Figure 10. The trend, however, changed from 1970 to 1985 and is projected to show a steady increase to the year 2000.

Teacher trainee enrollments did not show a significant increase between 1960 and 1965 or between 1980 and 1985 (Figure 11). The percentages of increase of these periods were 9% and 4.6% respectively. The biggest change was between 1975 and 1980 where there was a 28.5% increase. The increase is projected to grow gradually. The growth is projected to be 45.4% over the 1985 enrollment. The projected pupil/ teacher ratio is 34:1 by the year 2000, a ratio not significantly different from what currently exists. If stress is placed on quality, then dramatic changes are required in terms of teacher retraining and development.

Total student populations for elementary and secondary schools showed a steady increase between 1960 and 1985. This linear progression in Figure 12 is expected to continue in a positive direction. The estimated total student enrollment by the year 2000 will be 52% over the 1985 total enrollment.

Figure 13 is a chart for elementary and secondary teachers for the years 1960 to 1985 for observed data, and 1985 to 2000 for projected data.

Between 1960 and 1985, teacher population increased by 702.6%. Between 1985 and 2000, teacher population is projected to increase by 48.9%. This will represent an annual increase of 3.26%. The projected student annual increase is 3.46%. Therefore, there is a need to develop teachers in larger numbers than those projected from teacher training.

Scatterplots showing the linear relationship among population, students, and teachers for past and projected trends up to the year

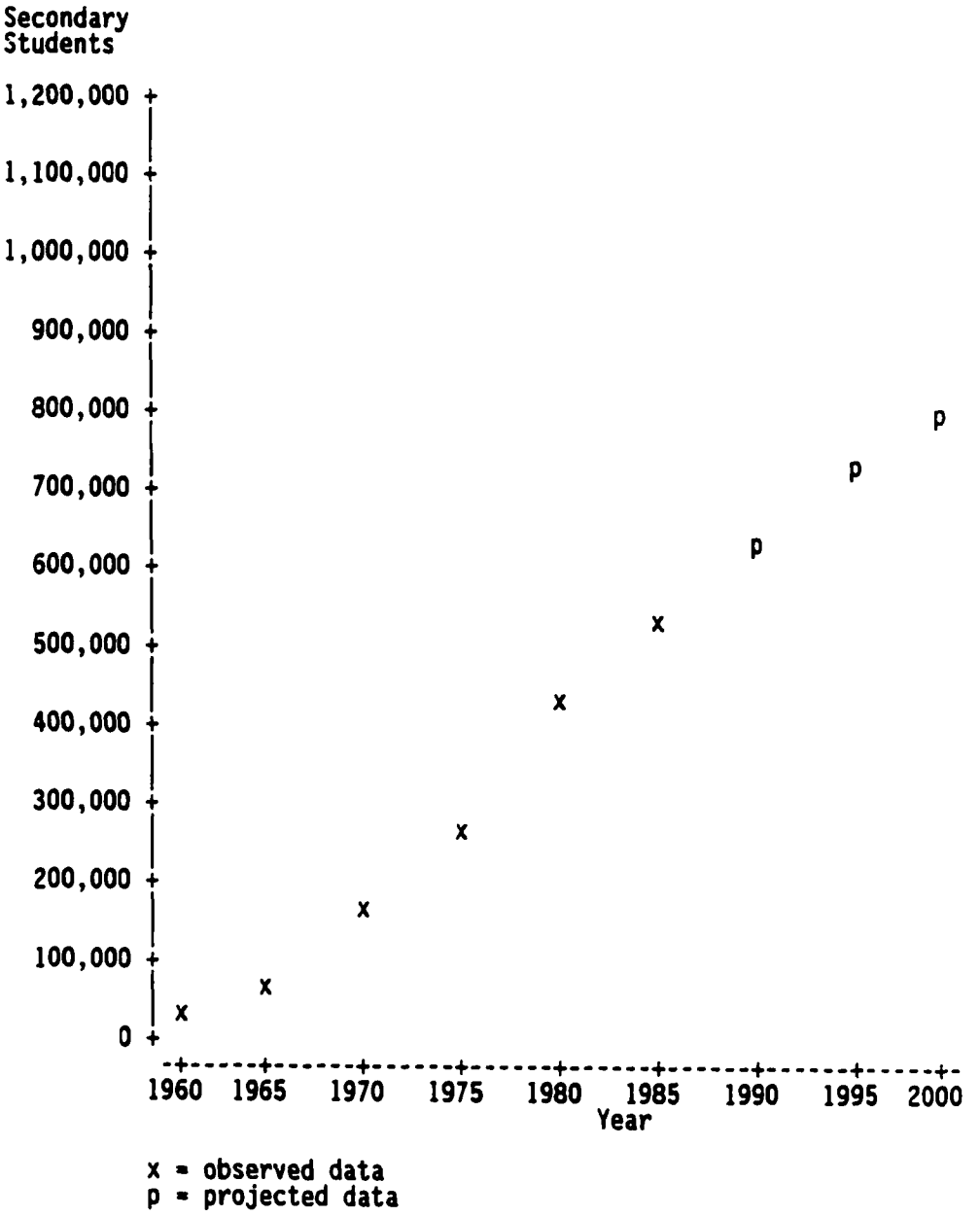

Figure 10. Teacher Projections - Kenya
Plot of Secondary Students/Year

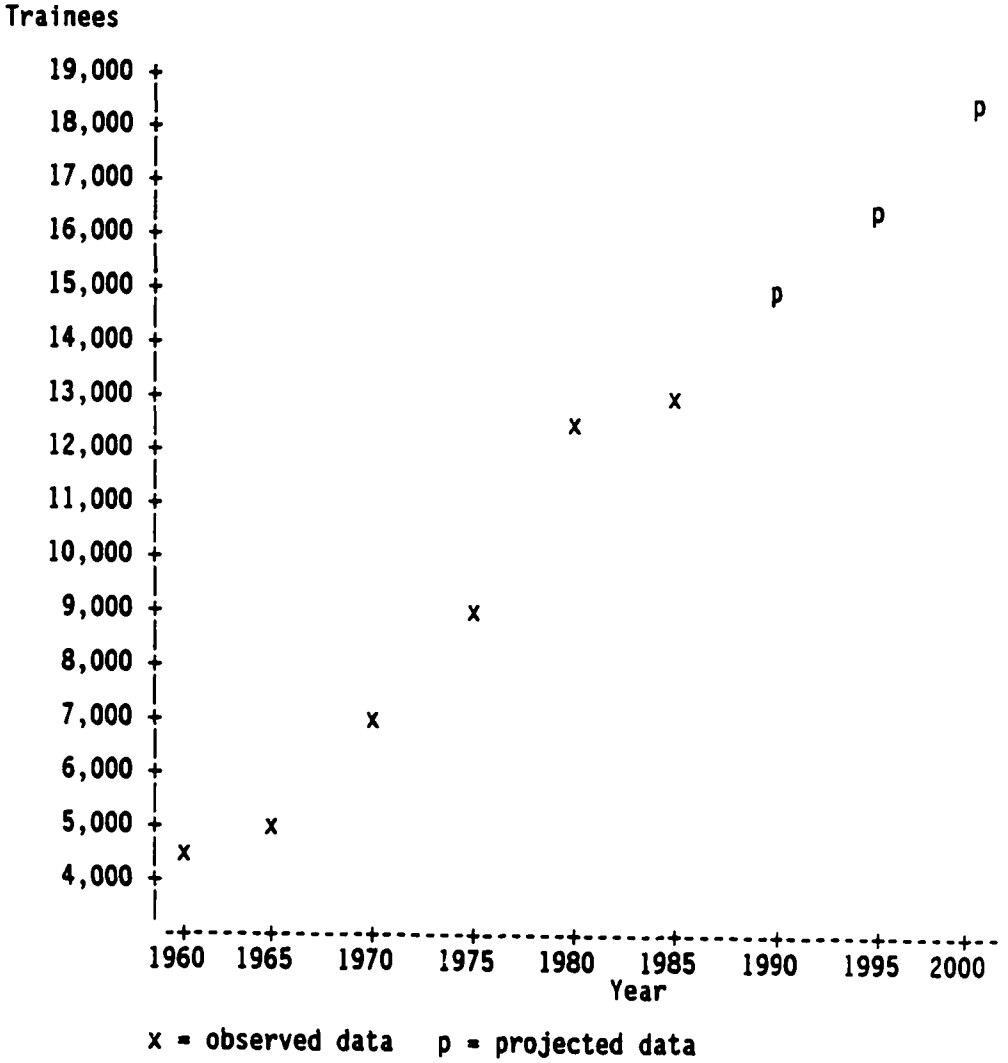

Figure 11. Teacher Projections - Kenya
Plot of Trainees/Year

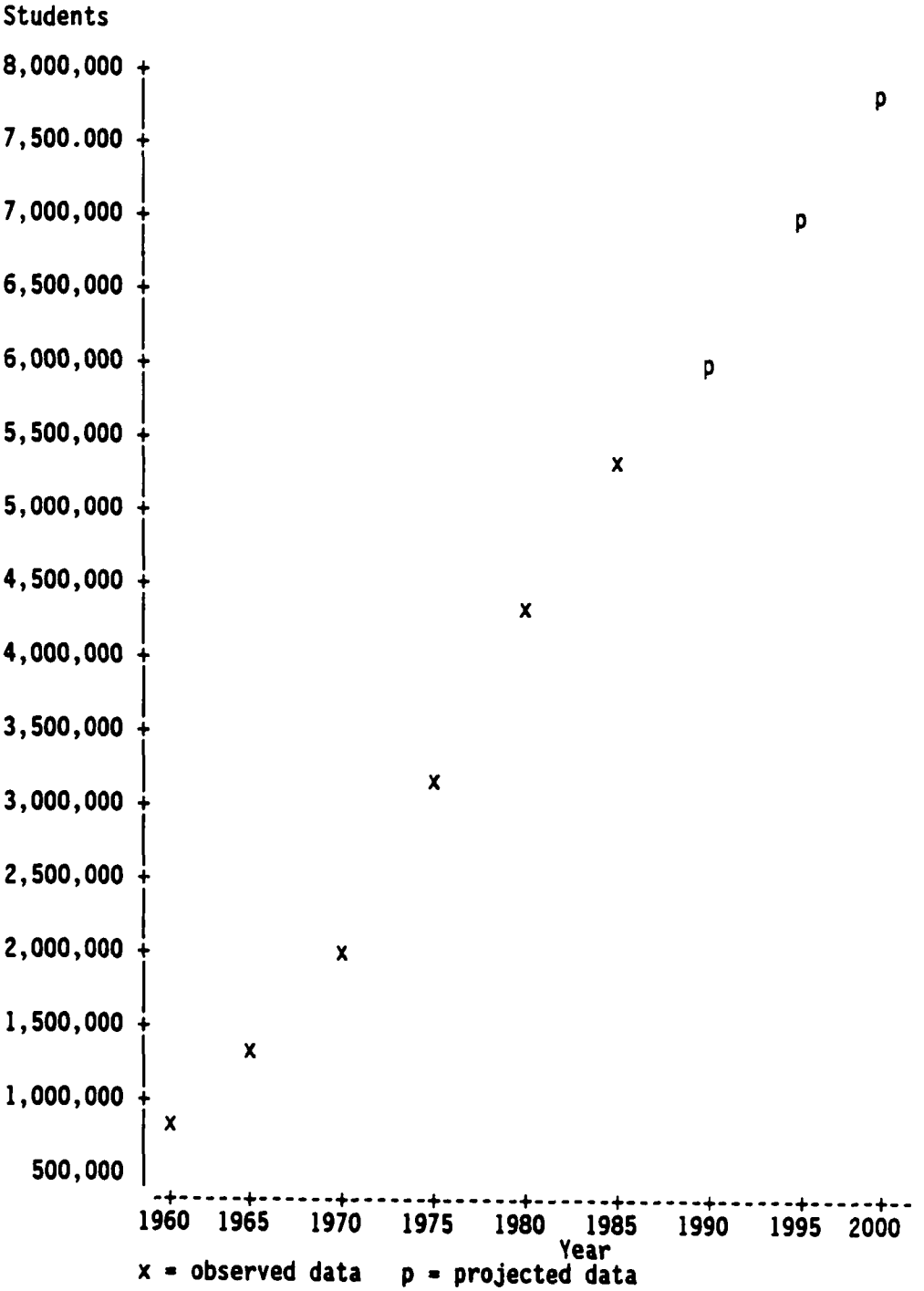

Figure 12. Teacher Projections - Kenya
Plot of Students/Year

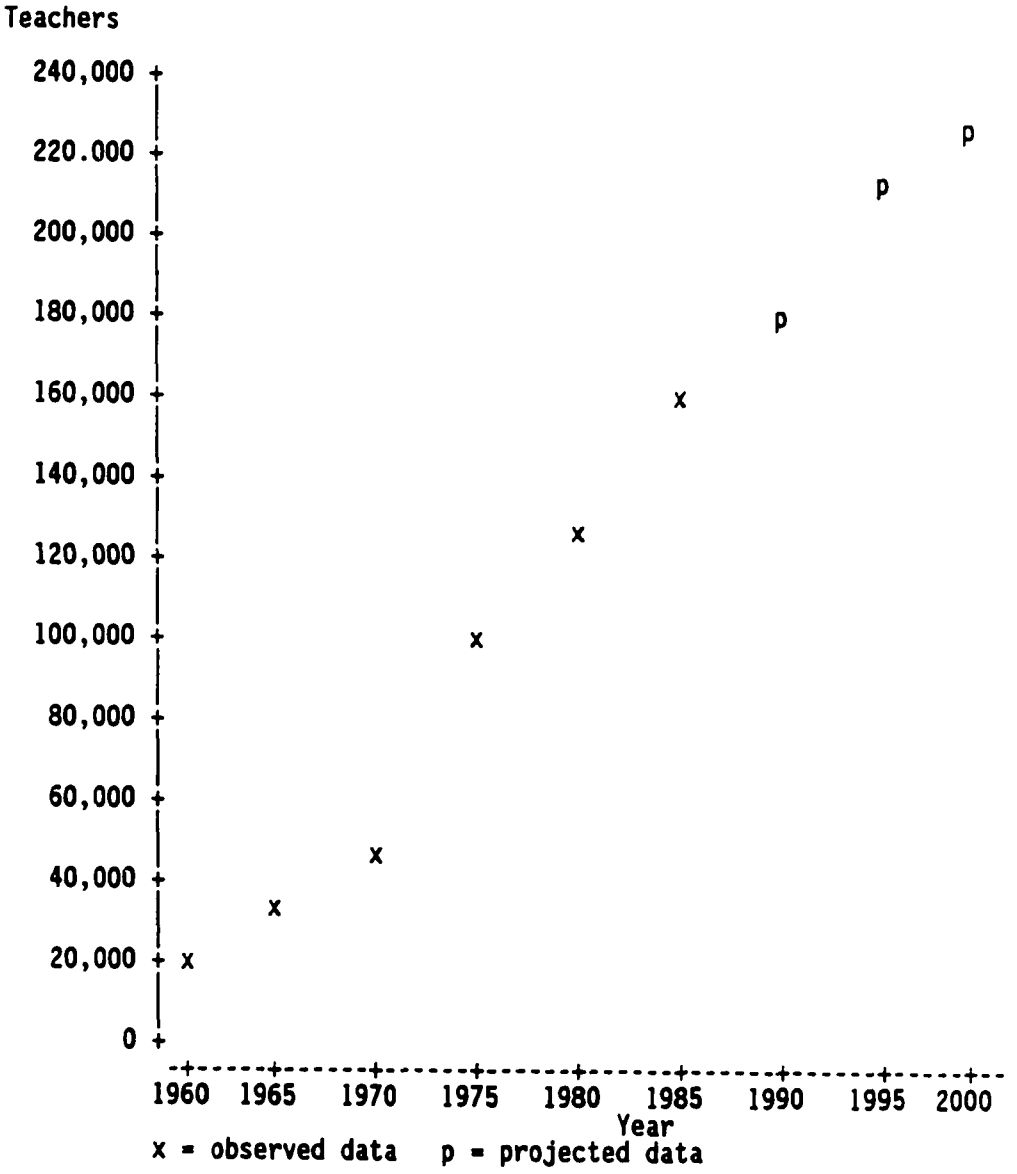

Figure 13. Teacher Projections - Kenya
Plot of Teachers/Year

2000 are presented in Figure 14. Although the rate at which teachers are produced seems to be growing at a higher rate than pupil enrollments, the pupil/teacher ratios still continue to fall far short of the desired ratios. All these variables show normal regressional trends, although the 1985 population and 1970 and 1960 teacher plots tend to locate themselves outside the line of regression.

Data Analysis for Malawi

Table 14 presents observed and projected data for the seven selected variables for Malawi. Observed data are for 1960 to 1985 on population, elementary enrollments, secondary enrollments, teacher trainee enrollments, teachers in service, educational expenditure as a percentage of current government expenditure, and teacher/pupil ratios for observed and projected periods. Between 1960 and 1985, the population rose by 113.5%. As shown in Figure 15, there was a gradual population increase between 1960 and 1975. Between 1975 and 1985, there was a 40.9% increase. This represented a 4.09% annual increase for the 1975-85 period. The projected population will reach 9.5 million at the year 2000, a 31.9% increase over the 1985 figure.

Between 1960 and 1970 there was a gradual, but slow, increase in the elementary school population. The increase was 27%, but between 1970 and 1980 there was a 123.4% increase. Projected elementary student population, shown in Figure 16, is estimated to be slightly over 1.3 million by the year 2000.

Figure 17 is a projection for secondary student enrollment. There was a dramatic increase in enrollment of 229.7% over the five year period between 1960 and 1965. The trend, however, became curvilinear as it changed pace between 1970 and 1985. Between 1970 and 1985, there was a 113.7% increase representing a 7.6% annual increase as opposed to the period between 1965 and 1970 which had a 45.94% annual increase.

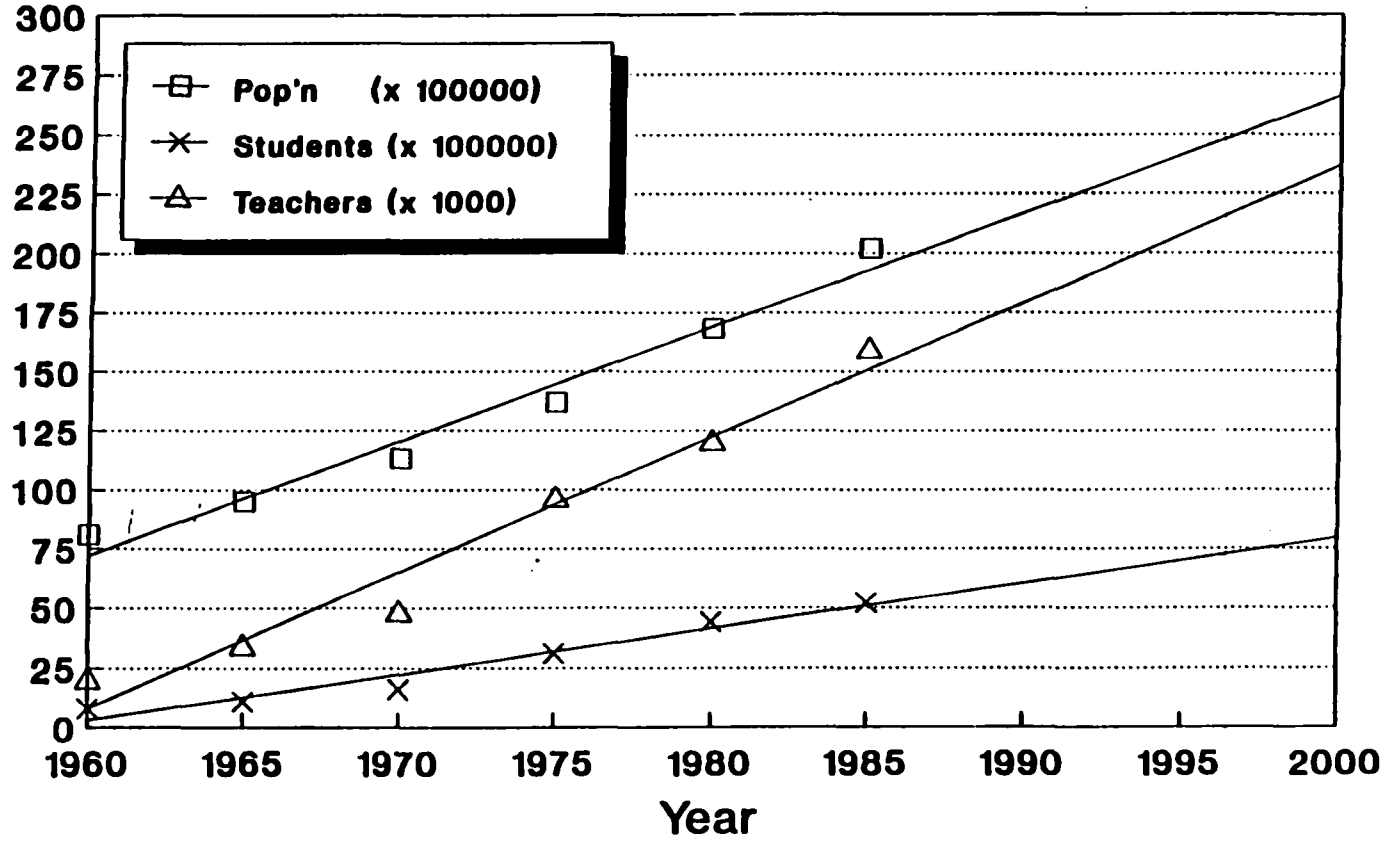

Figure 14. Population, Students, Teachers Past and Projected for Kenya

Table 14.

Malawi*

Year	Population	Elementary	Secondary	Teacher Trainees	Teachers Employed	Education Expenditures As % Of Gov't Spndg	Teacher Pupil Ratio
1960	3,410,000	285,163	3,183	831	7,070	N/A	1:41
1965	3,908,000	337,711	10,493	1,397	9,157	14.4	1:38
1970	4,520,000	362,561	11,629	991	9,104	13.2	1:41
1975	5,166,000	641,709	15,018	1,100	11,382	9.6	1:57
1980	6,522,000	809,862	18,653	1,754	13,408	14.7 (81)	1:62
1985	7,278,925	899,459	24,843	1,954	16,134	8.5 (83)	1:57
1990	7,917,417	1,032,786	27,586	1,751	17,078	--	1:62
1995	8,712,635	1,168,988	31,477	1,916	18,802	--	1:64
2000	9,507,852	1,305,190	35,368	2,082	20,526	--	1:65

Sources: 1. UNESCO. (1985). African Socio-economic indicators. Paris: UNESCO.
2. UNESCO. (1960-1987). Statistical Yearbook. Paris: UNESCO.
3. Europa Yearbook. (1961-1987). London: Europa Publications.

Note: -- projections not performed on variable.
* Known as Nyasaland before 1964

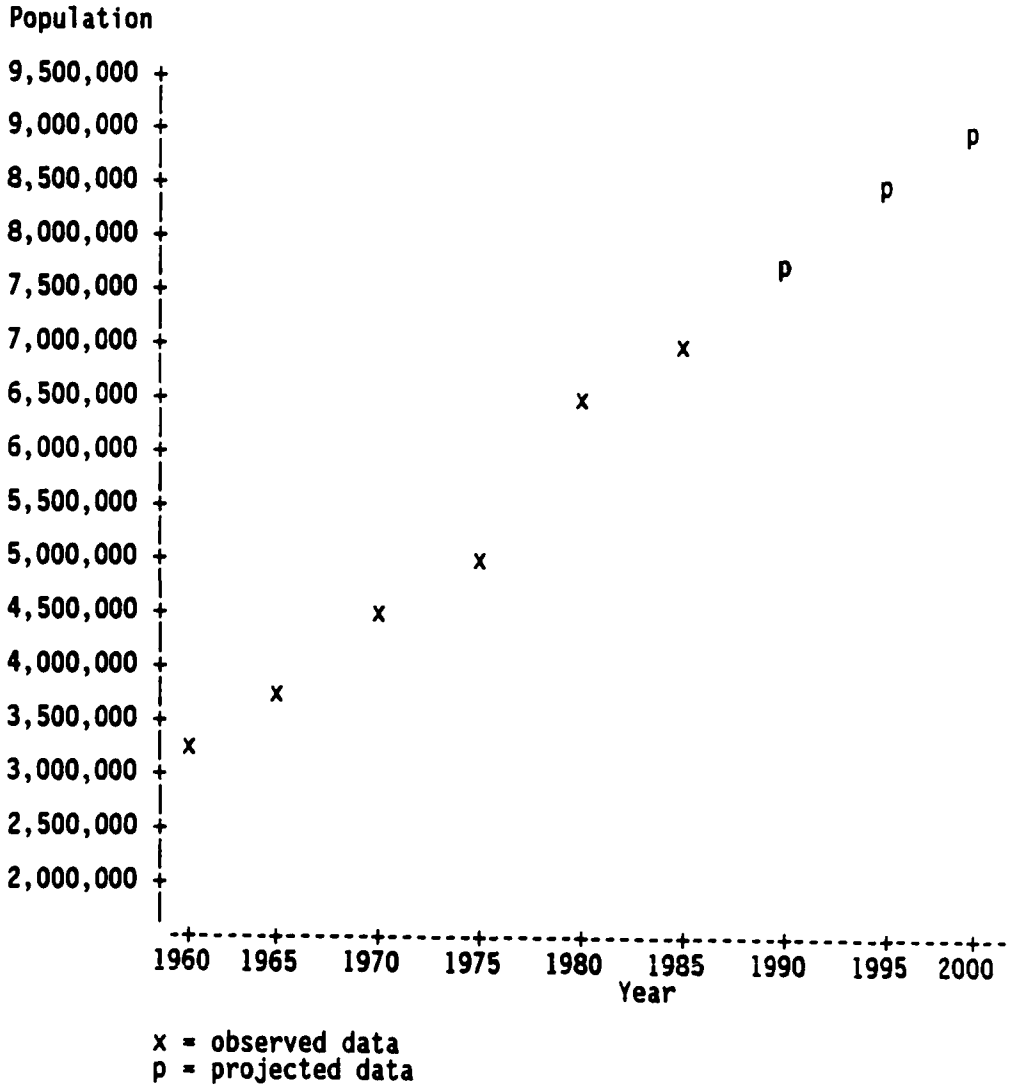

Figure 15. Teacher Projections - Malawi
Plot of Population/Year

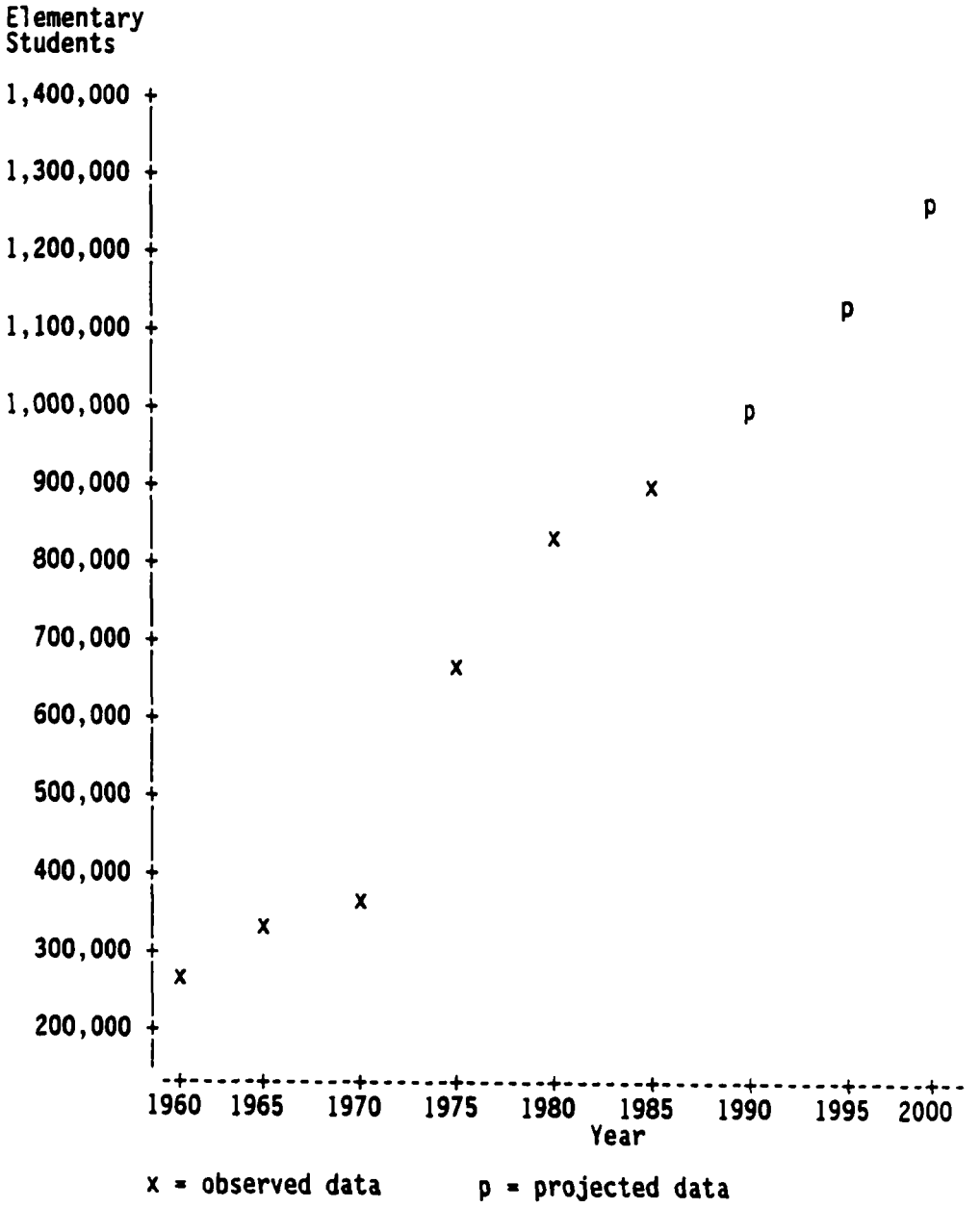

Figure 16. Teacher Projections - Malawi
Plot of Elementary Students/Year

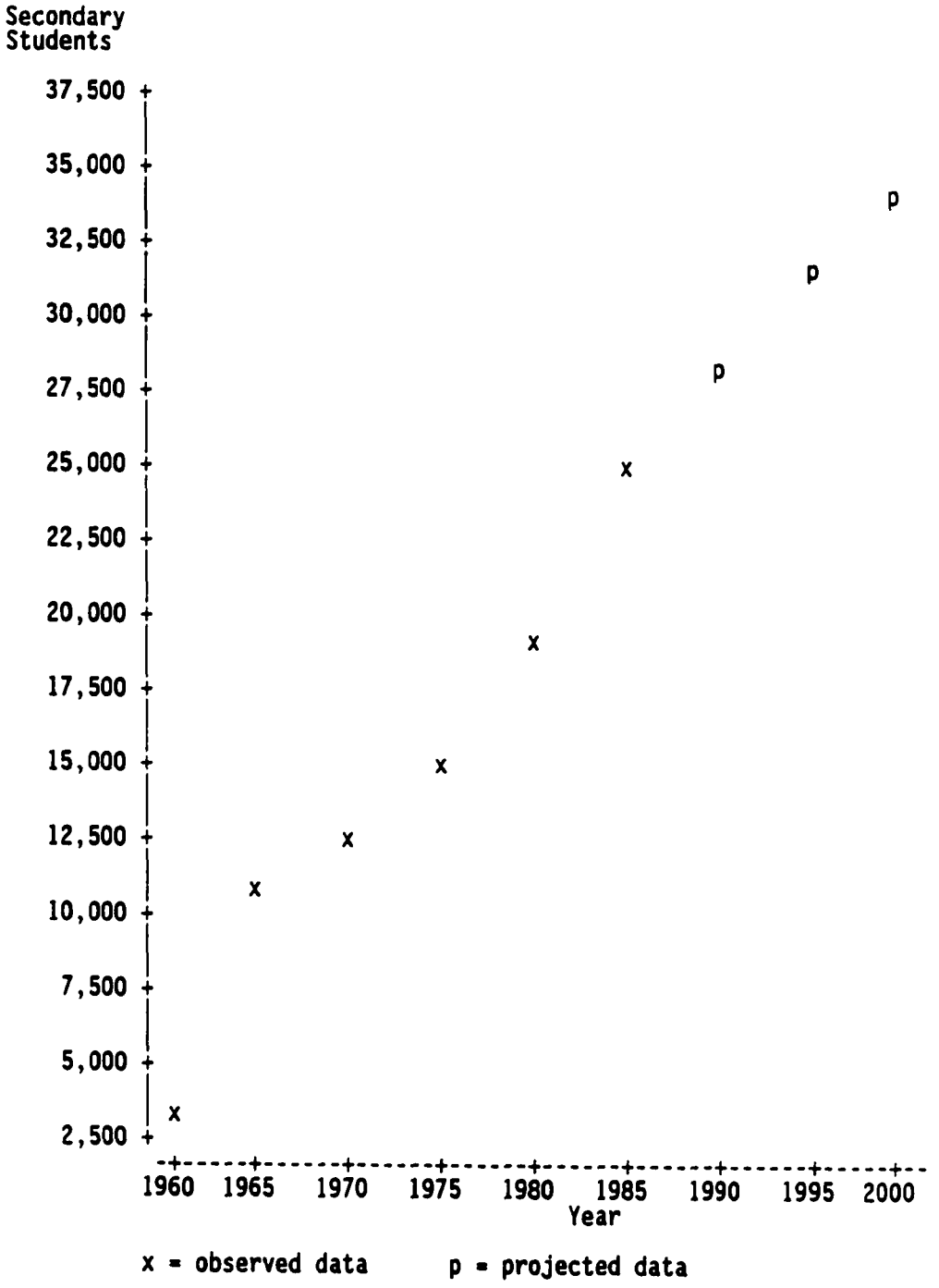

Figure 17. Teacher Projections - Malawi
Plot of Secondary Students/Year

The projected increase is expected to grow uniformly unless other factors interfere with the trend.

Figure 18 is a projection of total student population. Overall, there was a gradual student population increase between 1960 and 1970. Between 1970 and 1975, there was a sudden rise in pupil enrollments. Overall pupil enrollment is expected to increase to over 1.3 million giving Malawi a pupil/teacher ratio of 65:1 by the year 2000. This indicates that a growing quality problem in education will exist unless there is an increase in the number of properly trained teachers.

Figure 19 shows some very unusual characteristics for teacher trainee population. The sudden increase between 1960 and 1965 was followed by a sudden decline during the period between 1965 and 1975. The following would partially explain the cause for this decline. In 1964, primary school education was designed to last seven years. Starting in 1966, changes were made to lengthen primary education. These changes meant that there were no Form I students in 1966 and no Form III students in 1968. This resulted in a constant decline of enrollees in teacher training simply because there were not enough eligible candidates (Nelson, Dorbert, McDonald, McLaughlin, Marvin, & Whitaker, 1974). Nelson et al. (1974) also pointed out that during the 1964-1971 period, capital expenditures on education averaged only 9% of the government's capital budget. Between 1975 and 1980 there was an increase of 1600% in the number of trainees, from 100 to 1,754.

Outliers for 1965, 1970, 1975, and 1980 adversely affected the trend of the regression line. For practical purposes, Malawi would be better off to rely on recent data, if projections are to be made, than to go back into the '60s and '70s because changes then were of an experimental nature and produced dramatic and unpredictable results.

The trend for teacher population is displayed in Figure 20. The sudden increase from 1960 to 1965 contrasted with the decline from

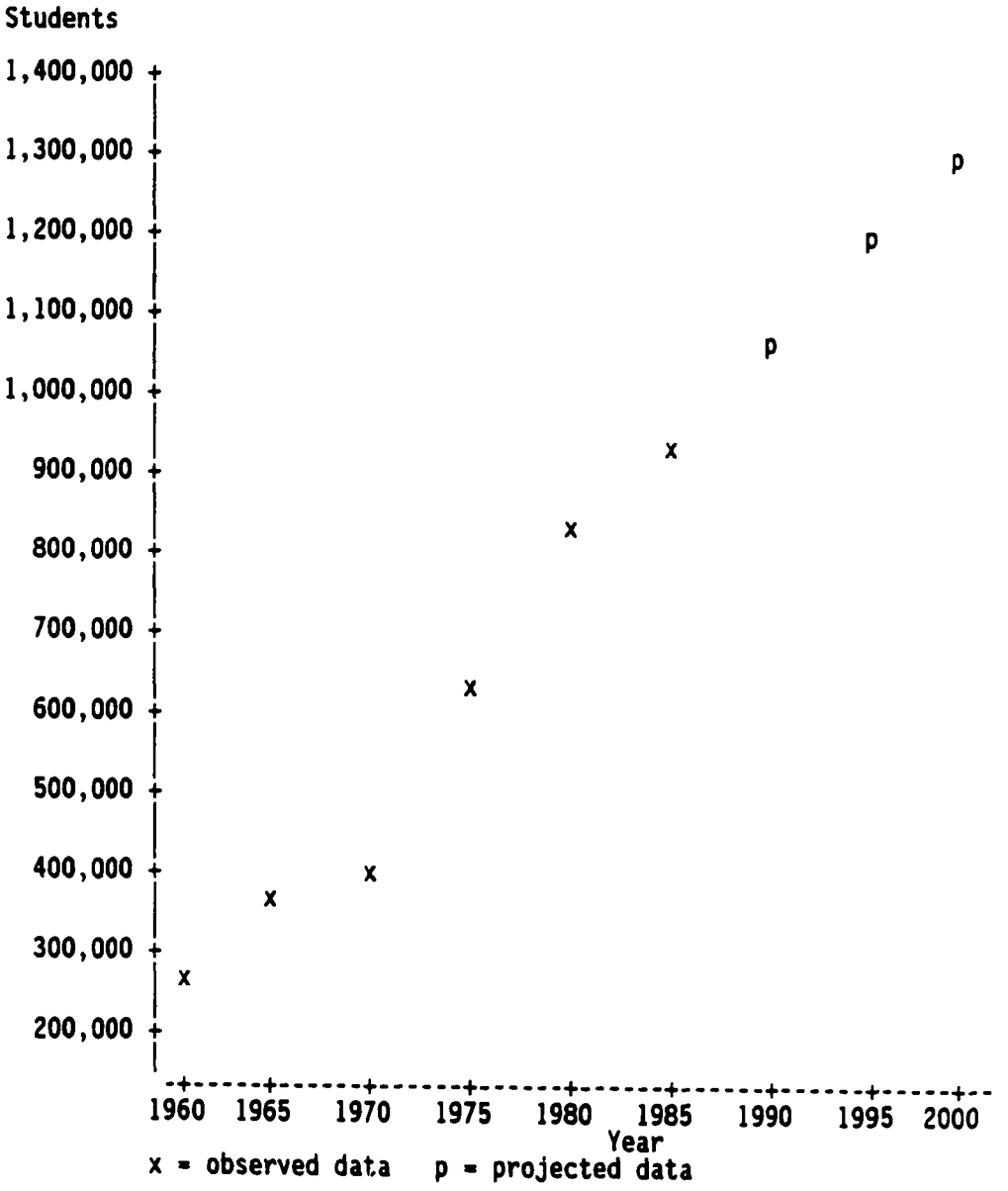

Figure 18. Teacher Projections - Malawi
Plot of Students/Year

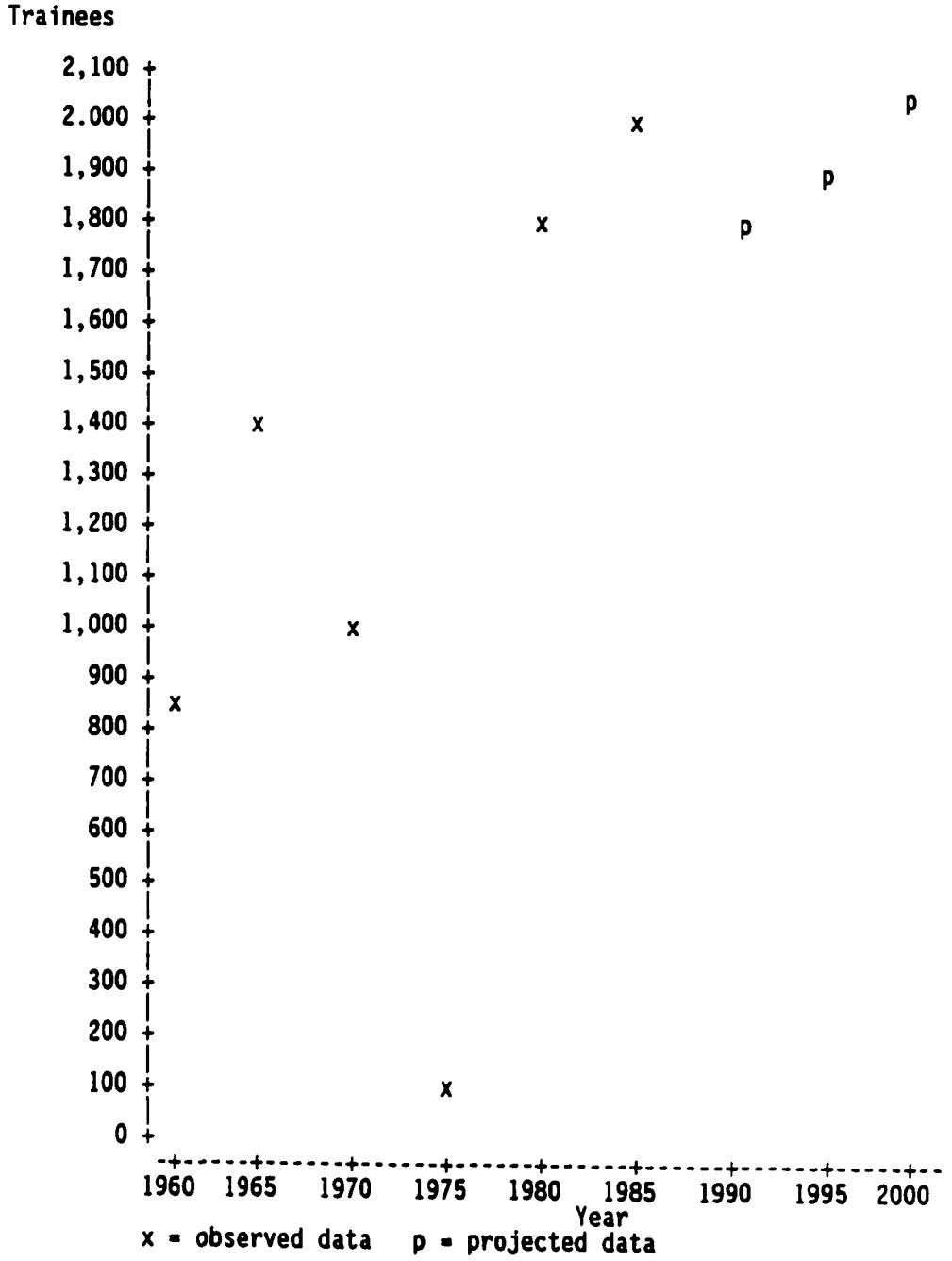

Figure 19. Teacher Projections - Malawi
Plot of Trainees/Year

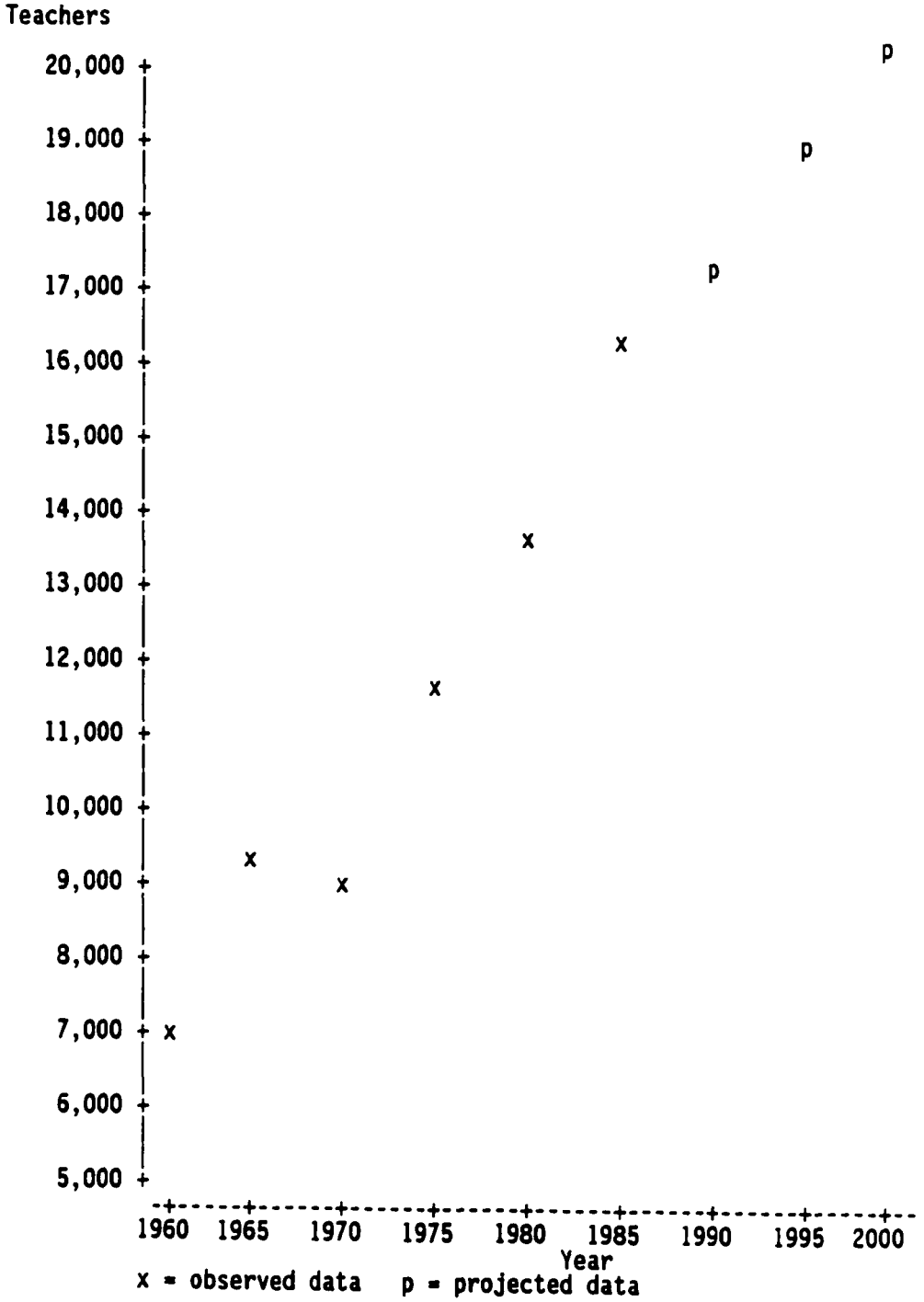

Figure 20. Teacher Projections - Malawi
Plot of Teachers/Year

1965 to 1970. Again, this could have been in response to changes in the education system as cited by Nelson et al. (1974). From 1970 to 1985, there was a steady increase of 147% in the number of teachers. For the projected data, the trend is expected to continue up to the year 2000. The projected number of teacher trainees by the year 2000 is 2,082 trainees.

Figure 21 is a scatterplot showing the regression patterns for population, students, and teachers for past and projected data for Malawi. For the most part, the plotted points regress towards the line, which shows a somewhat uniform trend. For teachers and students, significant outliers can be observed for 1970. This again is probably an indication of the changes instituted in 1966 concerning elementary school years, and in 1967 concerning secondary education (Nelson et al., 1974).

Data Analysis for Tanzania

Table 15 displays observed data for the period 1960 - 1985 and projected data for 1990-2000 for Tanzania. In 1960, there were over 10 million people in Tanzania. Between 1960 and 1985, the population rose gradually and is expected to continue to rise steadily up to the year 2000 with a projected population of over 28 million (Figure 22).

In 1960, Tanzania had over 400,000 students in its elementary schools. After independence in 1961, there was an increase in 1975 from the 1970 elementary student population (Figure 23). Between 1960 and 1965 there seemed to be a leveling off in the elementary student population. The sudden rise in enrollments from 1970 onward can probably be attributed to the 1963 education plan which paved the way for universal education introduced in 1978. In this endeavor villagers were encouraged to build schools to accommodate burgeoning enrollments. Kurian (1985) observed that total enrollments increased by 75%. He

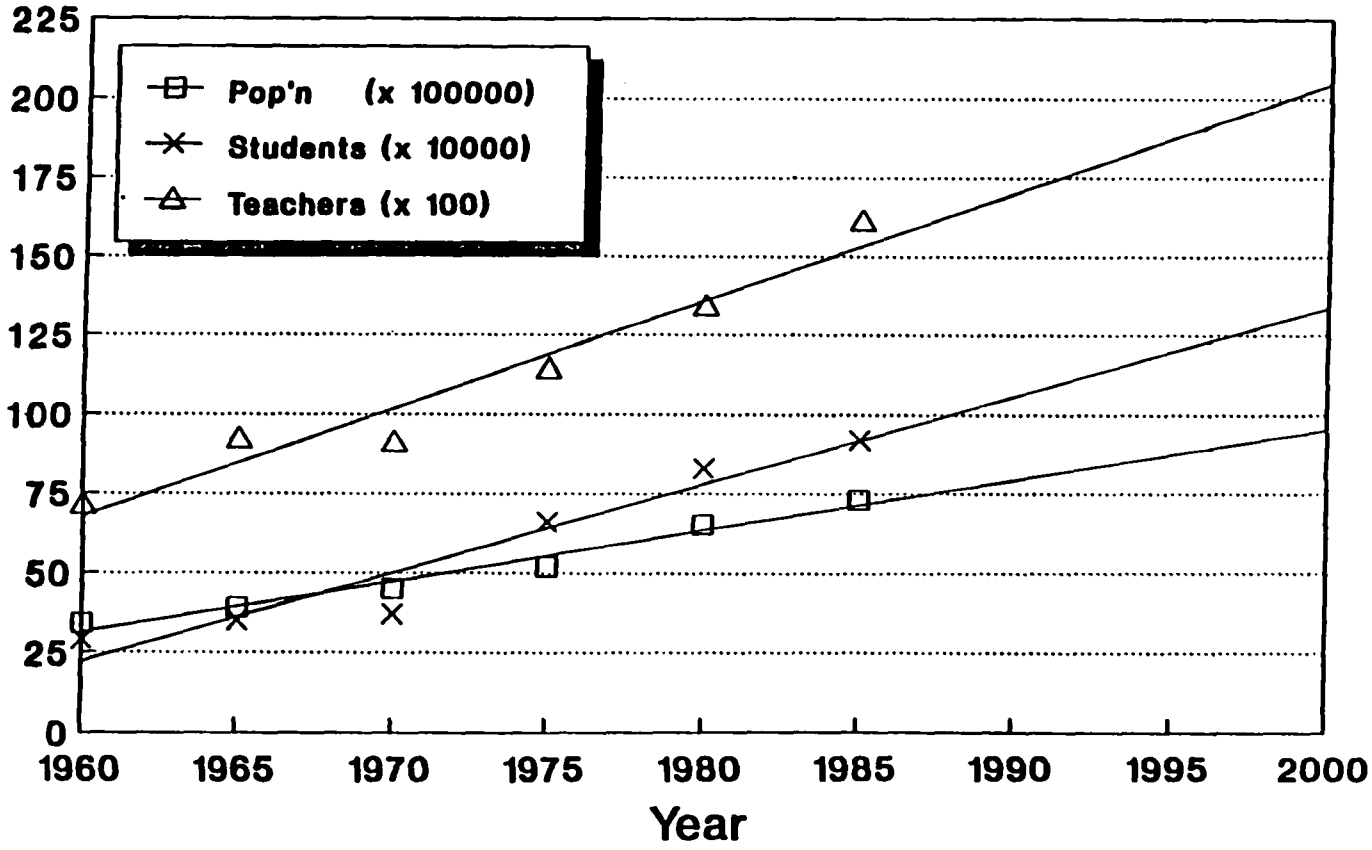

Figure 21 Population, Students, Teachers
Past and Projected for Malawi

Table 15.

Tanzania*

Year	Population	Elementary	Secondary	Teacher Trainees	Teachers Employed	Education Expenditures As % Of Gov't Spndg	Teacher Pupil Ratio
1960	10,328,000	455,293	22,352	1,626	10,060	N/A	1:45
1965	11,647,000	769,351	28,195	2,157	16,232	23.7	1:52
1970	13,513,000	856,213	44,941	3,762	20,762	15.4	1:47
1975	15,901,000	1,592,396	63,187	9,741	32,953	17.8	1:54
1980	18,868,000	3,367,644	80,036	11,423	85,140	14.3	1:41
1985	21,880,000	3,169,579	94,394	9,847	98,067	19.0	1:34
1990	23,533,667	3,912,115	108,915	13,914	109,764	--	1:37
1995	25,868,810	4,543,641	124,172	16,054	128,591	--	1:36
2000	28,203,952	5,175,166	139,428	18,193	147,418	--	1:36

Sources: 1. UNESCO. (1985). African Socio-economic indicators. Paris: UNESCO.
2. UNESCO. (1960-1987). Statistical Yearbook. Paris: UNESCO.
3. Europa Yearbook. (1961-1987). London: Europa Publications.

Note: -- projections not performed on variable.
N/A - Data not available
* Known as Tanganyika before 1961

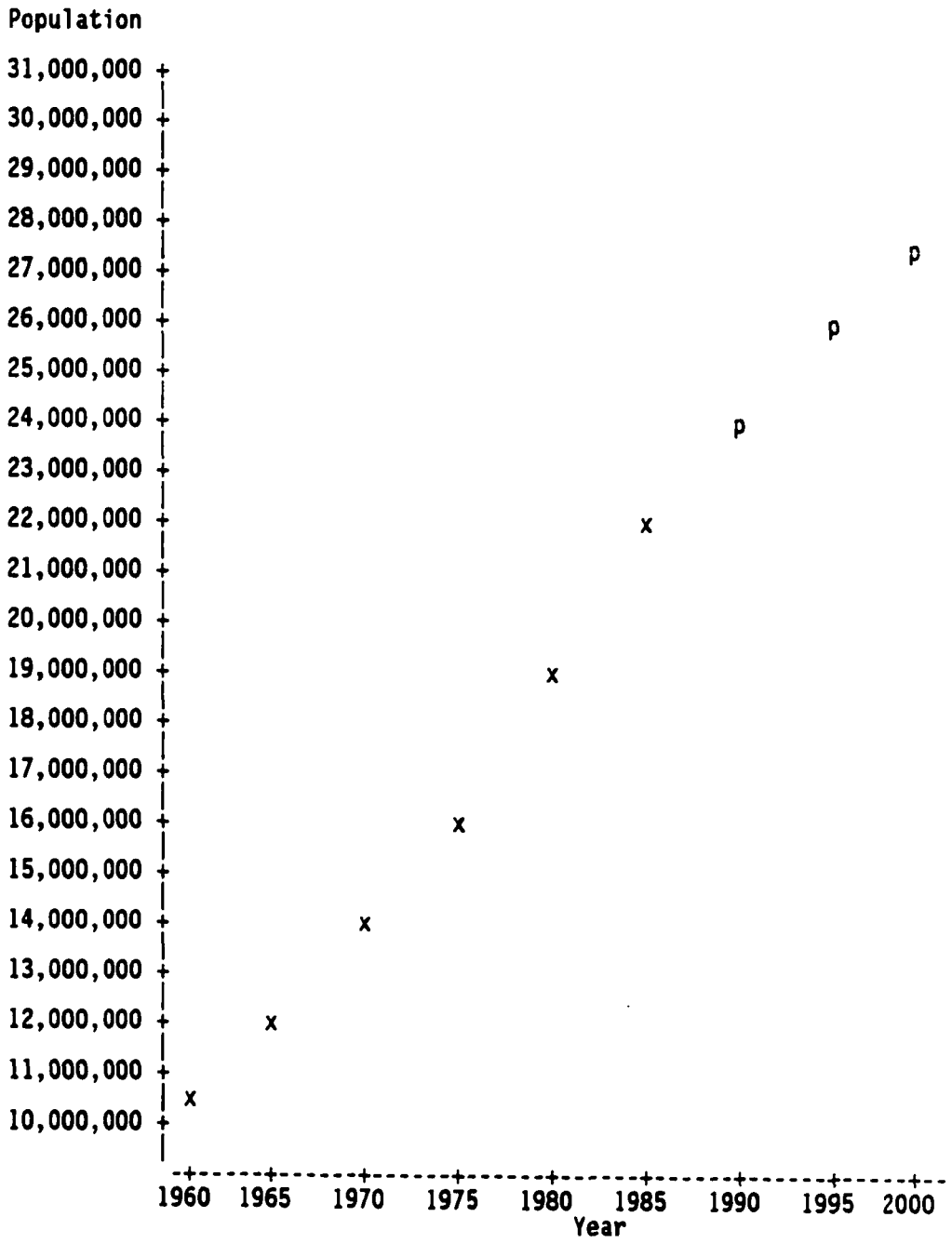

Figure 22. Teacher Projections - Tanzania
Plot of Population/Year

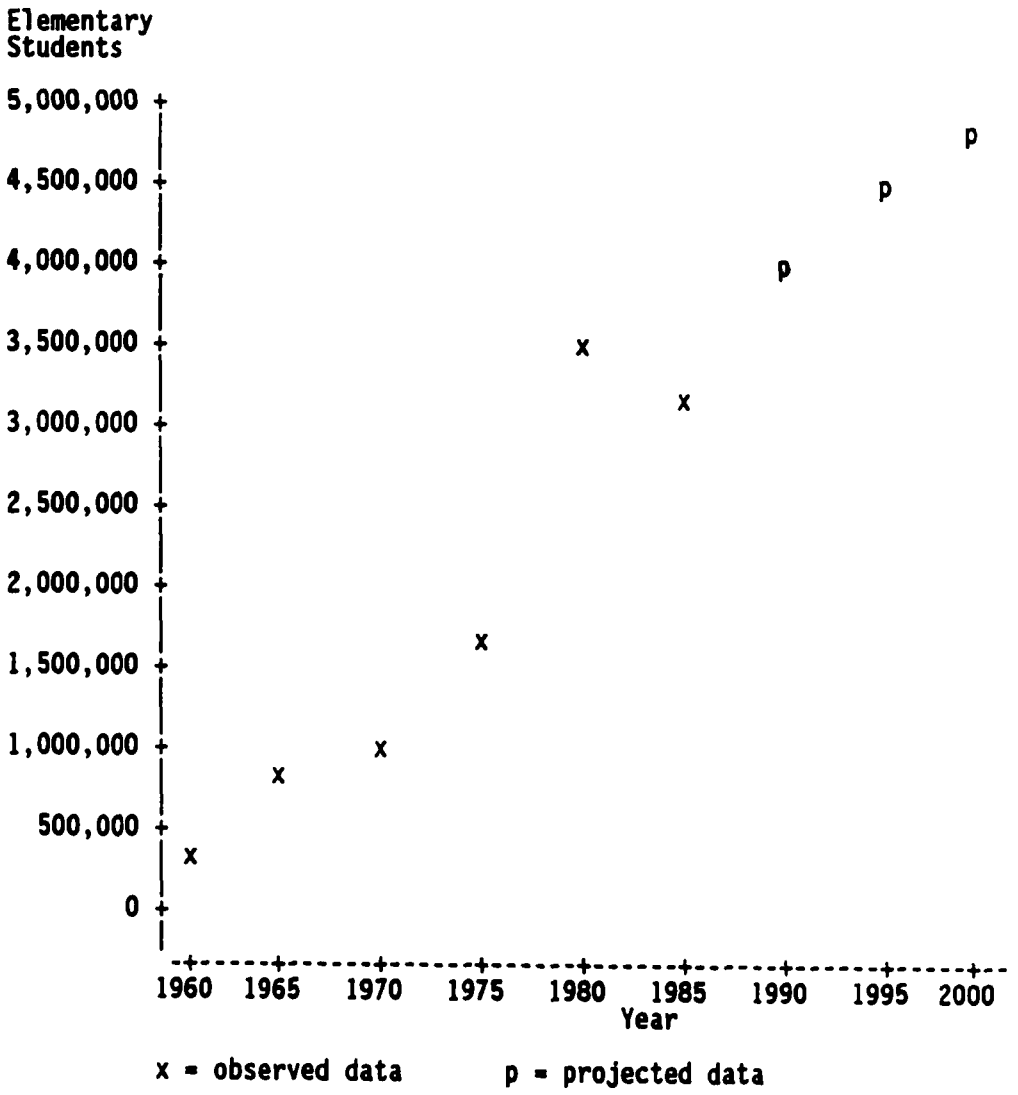

Figure 23. Teacher Projections - Tanzania
Plot of Elementary Students/Year

also stated that "by 1979, nearly 93% of the age group 7 to 14 were attending school" (p. 1582).

Figure 24 shows the trend for secondary student population between 1960 and 2000. As a result of several factors, secondary student enrollments were few when compared to elementary student enrollments. In the early 1970s, there was a shift in emphasis from secondary to elementary education. Secondary admissions were limited to 30% of elementary graduates (Kurian, 1985), which limited the places available to a few graduates from elementary schools. Another factor was that most secondary schools were located in or close to urban areas. Also, the majority of secondary schools were boarding schools, which made it very hard for rural children to attend. Sheffield (1979) wrote:

> Tanzania has decided to hold back expansion of general secondary education and has specifically prohibited the establishment of any new private secondary schools thereby eliminating the option pursued by parents in ... other African countries .... (p. 107)

If the same trend continues up to the year 2000, only 18.3% of the country population will be attending secondary school.

The number of teacher trainees as a percentage of all students enrolled for the first and second levels for 1960 was 0.34% of all students enrolled. If the same trend continues, it is projected that the percentage of teacher trainees will be the same by the year 2000. Kurian (1985) cited several factors which probably negatively influenced the recruitment of young graduates into the teaching profession as (1) low teacher salaries, (2) poor facilities, and (3) classification system which gives teachers no prospects for upward mobility in the profession.

According to the Tanzania Ministry of Education (1986), there were about 8,867 teacher trainees in conventional colleges. During the same year, there were 10,387 enrollees in in-service courses ranging

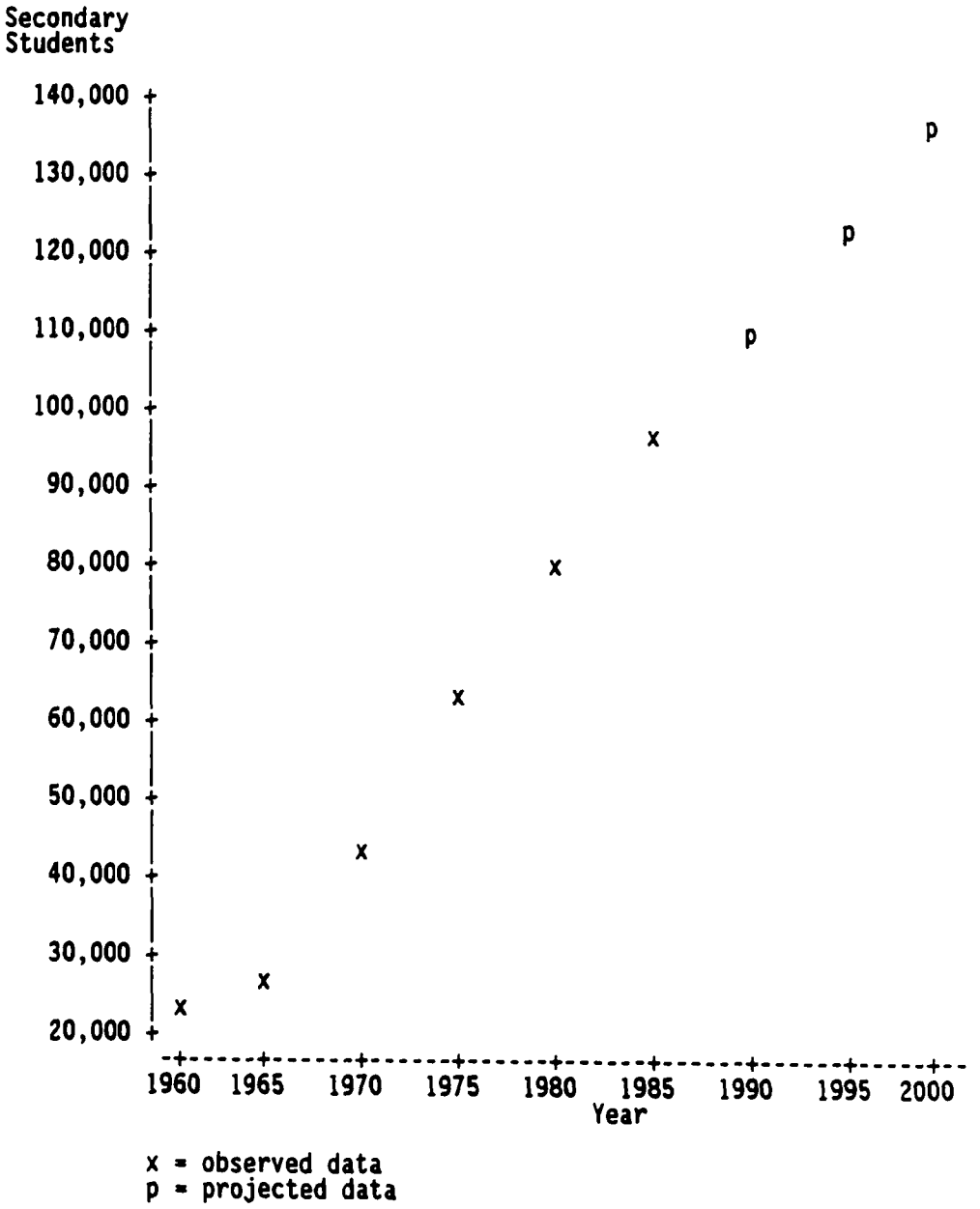

Figure 24. Teacher Projections - Tanzania
Plot of Secondary Students/Year

from short courses to a year of special certification activities. This probably explains the sudden decline in 1985 (Figure 25) where there were only 9,847 students cited in the study. Again there is no logical reason to explain the difference between the Ministry (1986) and UNESCO (1987) figures.

When analyzing total pupil enrollments, it can be observed that there was a significant increase from about 900,000 in 1970 to about 1.7 million in 1975. This can be attributed again to the "government policy of decentralizing, shifting many of the policy-making and administrative responsibilities to 21 regions and 80 districts..." (Sheffield, 1979, p. 101). The decline between 1980 and 1985 was highly significant because of the effect it had on budgeting and teacher supply. The projected trend is one of a uniform growth up to the year 2000. If the trend continues wihout disruptions, the projected pupil/teacher ratio will be 36.1:1 by the year 2000. This situation will call for the training of more teachers so as to reduce this ratio.

The teacher trainee projection (Figure 26) for Tanzania reveals an uneven trend for the period 1960 to 1985. Between 1960 and 1970 there was a curvilinear trend, with the sharpest increase between 1970 and 1975. This sharp change was in response to government policy on education which provided universal education soon after independence. In order to keep pace with increased elementary and secondary enrollments, more teachers needed to be trained.

Enrollments, however, declined between 1980 and 1985. This trend was in response to the decline in student population. The projected trend for 1990-2000 rises.

Teacher population (Figure 27) showed a curvilinear trend with a gradual increase between 1960 and 1975. There was a sharp increase between 1975 and 1980. The trend, however, also increased between 1980

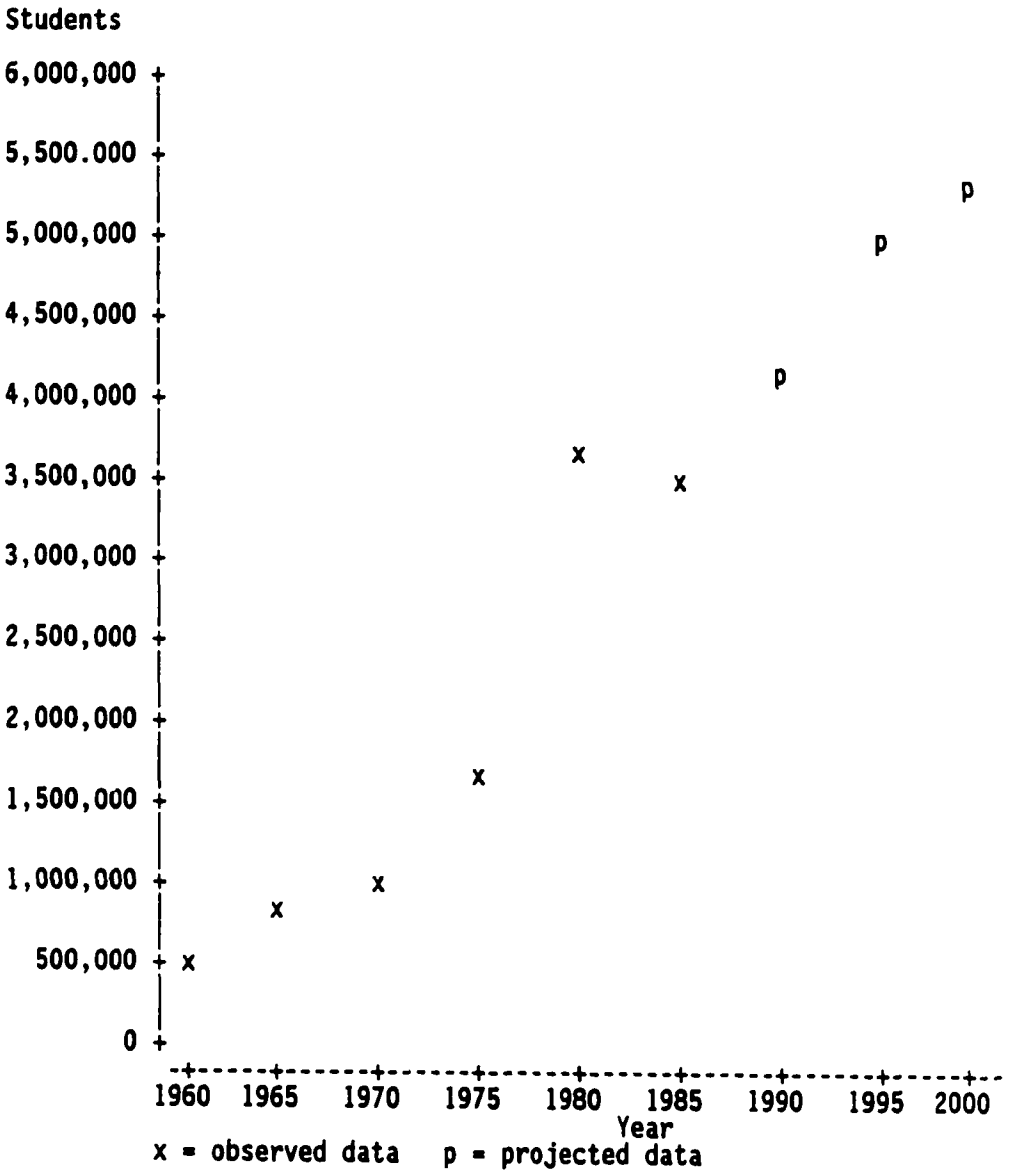

Figure 25. Teacher Projections - Tanzania
Plot of Students/Year

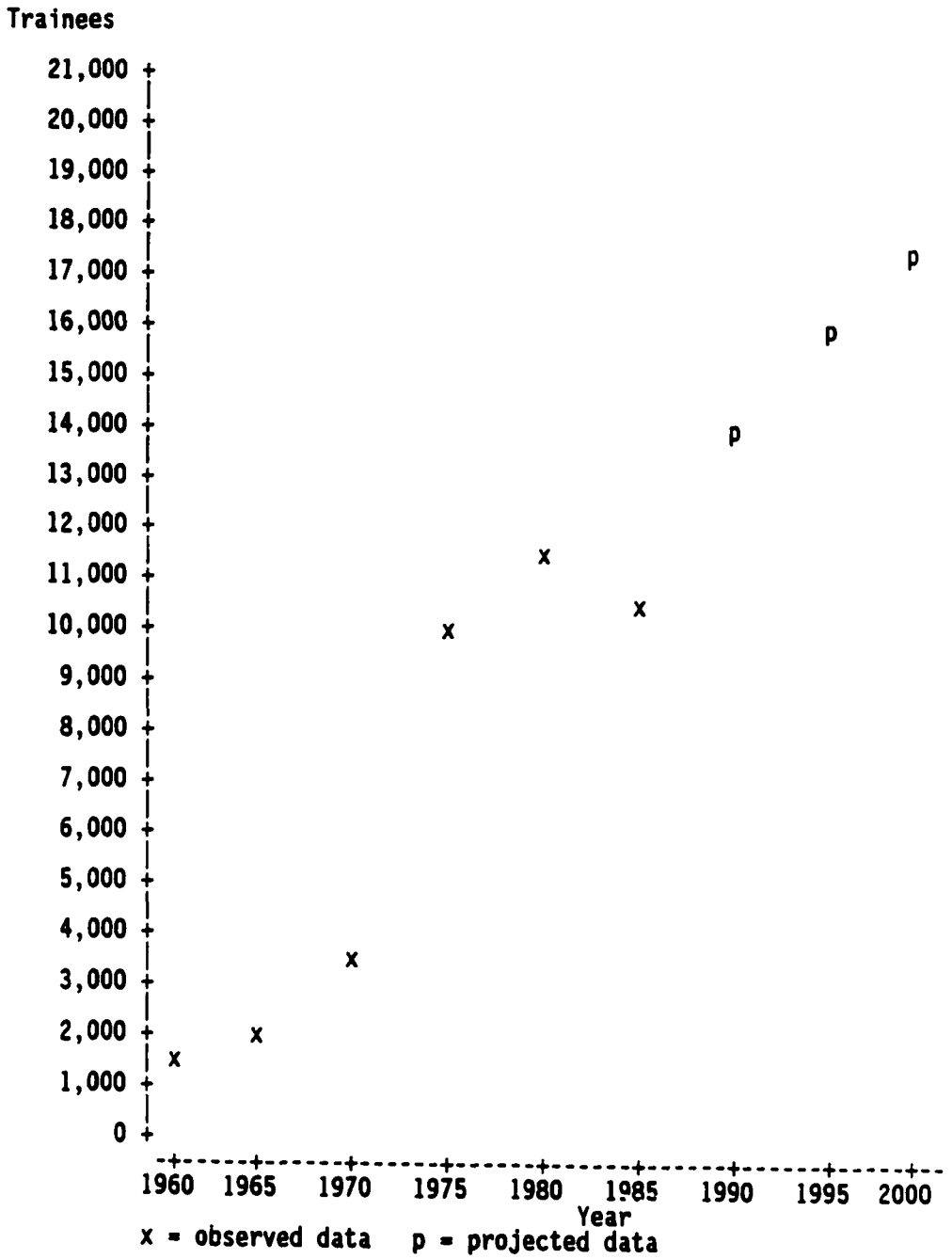

Figure 26. Teacher Projections - Tanzania
Plot of Trainees/Year

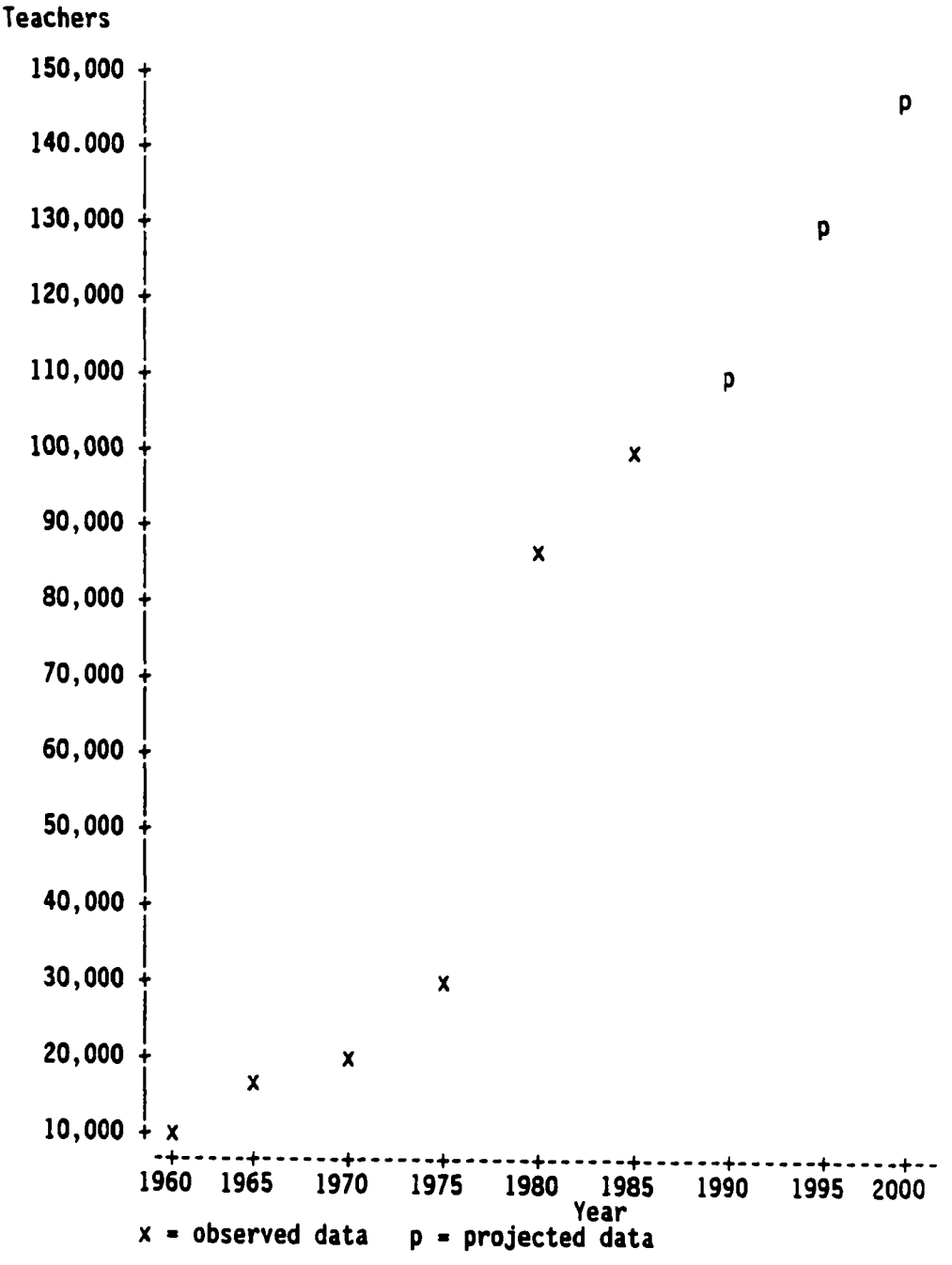

Figure 27. Teacher Projections - Tanzania
Plot of Teachers/Year

and 1985, but at a much more gradual rate. The trend is projected to increase between 1990 and 2000.

Figure 28 shows a linear relationship between population, students, and teachers for the observed and projected data. For student data in the scatterplots, there are several outliers signifying an uneven trend in the educational system. Population trends show a steady progression in population increase through the years. Teacher population plots lie on the line of regression or very close to it.

Student population increased at a faster rate than country population and the number of teachers employed. If the trend continues as such, there will be an acute shortage of teachers in Tanzania.

Data Analysis for Uganda

Table 16 presents variables for Uganda between 1960 and 1985 for observed data and between 1990 to 2000 for projected data. Between 1960 and 1985, the population in Uganda increased at a gradual, but steady, rate. Between 1960 and 1965, the rise was much higher than for the other years.

Uganda has faced several political upheavals where there have been mass murders and mass deportations (Bray & Zimmer, 1987). Refugee movements in the region created problems in keeping accurate census counts. By 1985 there were 15.5 million people, about a 131.3% increase over the 1960 figure. This represents an annual increase of 5.3%. The projected 20 million people by the year 2000 will represent approximately a 2.0% increase over the 1985 figure. The World Bank (1987) projected that there will be a 3% growth rate. Figure 29 shows a steady increase in a linear form. This increase in population will have a direct effect on student enrollments.

Enrollment in 1960 for elementary pupils was slightly over 500,000. Between 1960 and 1980, enrollment grew about 142.5% at the elementary level. This represented an annual growth rate of 7.1%.

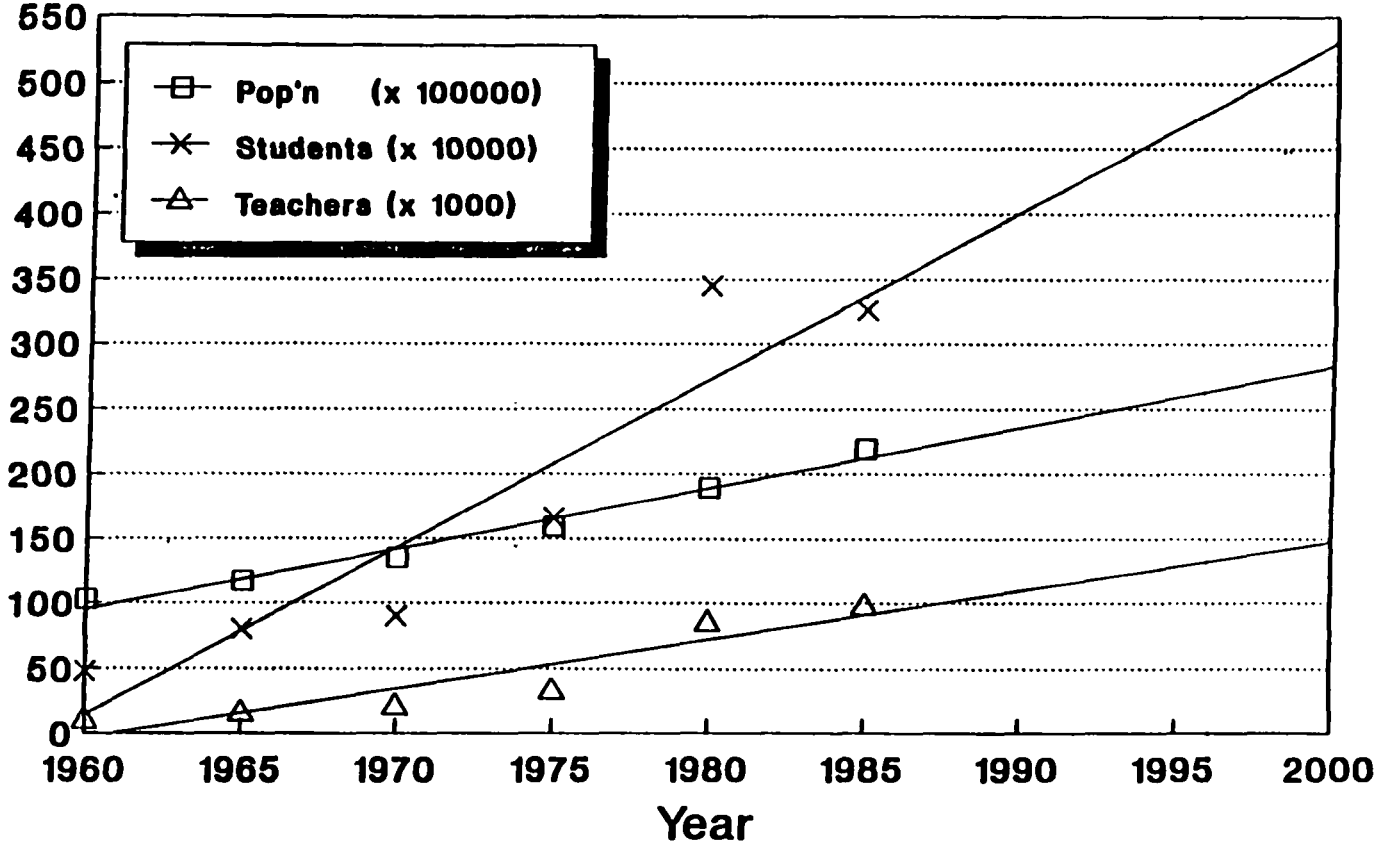

Figure 28. Population, Teachers, Students Past and Projected for Tanzania

Table 16.

Uganda

Year	Population	Elementary	Secondary	Teacher Trainees	Teachers Employed	Education Expenditures As % Of Gov't Spndg	Teacher Pupil Ratio
1960	6,677,000	532,918	38,714	2,937	17,332	18.7	1:33
1965	8,850,000	569,218	24,099	3,557	17,851	12.3	1:35
1970	9,805,000	720,127	48,221	3,967	23,906	17.8	1:34
1975	11,171,000	973,604	55,263	6,096	31,280	17.0	1:33
1980	13,106,000	1,292,377	132,051	8,157	38,423	11.3	1:37
1985	15,477,000	1,616,791	132,051	9,157	50,713	--	1:34
1990	16,661,067	1,735,071	151,491	10,348	53,517	--	1:35
1995	18,322,038	1,959,137	174,280	12,692	60,260	--	1:35
2000	19,983,000	2,183,204	197,068	13,035	67,002	--	1:36

Sources: 1. UNESCO. (1985). African Socio-economic indicators. Paris: UNESCO.
2. UNESCO. (1960-1987). Statistical Yearbook. Paris: UNESCO.
3. Europa Yearbook. (1961-1987). London: Europa Publications.

Note: -- projections not performed on variable.

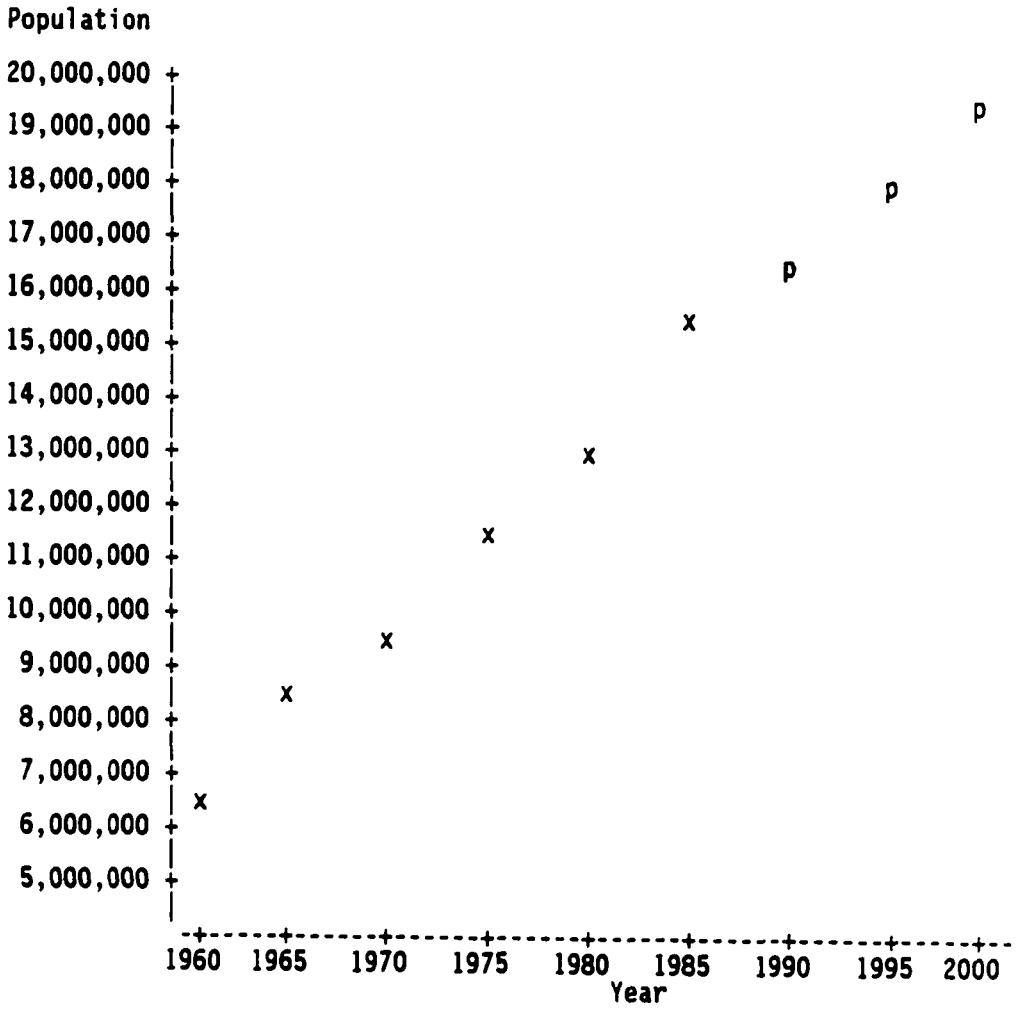

Figure 29. Teacher Projections - Uganda
Plot of Population/Year

Bray and Zimmer (1987) stated that in 1982 the estimated "...proportion of school age children attending school in 1982 was about 60 percent" (p. 1284). The sudden change between 1965 and 1970 was in response to structural changes in the education system, implemented in 1968, which extended primary school duration from six to seven years for elementary education. Figure 30 presents a graphic illustration of the observed and projected trends in the enrollment of primary schools.

Between 1960 and 1965 there was a drastic decline in the secondary student population (Figure 31). Keesing's Research Report (1972) described several political upheavals during this period which probably affected the enrollments in secondary schools. Between 1965 and 1970 there was some steady growth, but between 1975 and 1980 there was a sharp increase in secondary enrollment. This, again, can be attributed to changes in political leadership (Bray & Zimmer, 1987). There was no growth at all between 1980 and 1985. Several factors can be attributed to the inconsistency in the data. The first could be the lack of proper data collection due to unstable political conditions. The second factor may have been the inability of researchers to collect accurate data due to military activities (Chapman & Boothroyd, 1988).

Projections for the year 2000 indicate that there will be approximately 197,000 students enrolled in secondary schools. This will represent a 405% increase from the 1960 enrollment.

Figure 32 shows the trend taken by teacher training enrollments for the years 1960-85, and the projected trend to the year 2000. Between 1960 and 1985 there was a 200.8% increase in the number of trainees. Between 1985 and 2000 there is a projected increase of 42.4% in the number of trainees. This will mean an annual increase of 2.8%. At such a rate, teacher production will keep pace with the rate of growth for total student enrollment, which is projected to be 2.4%.

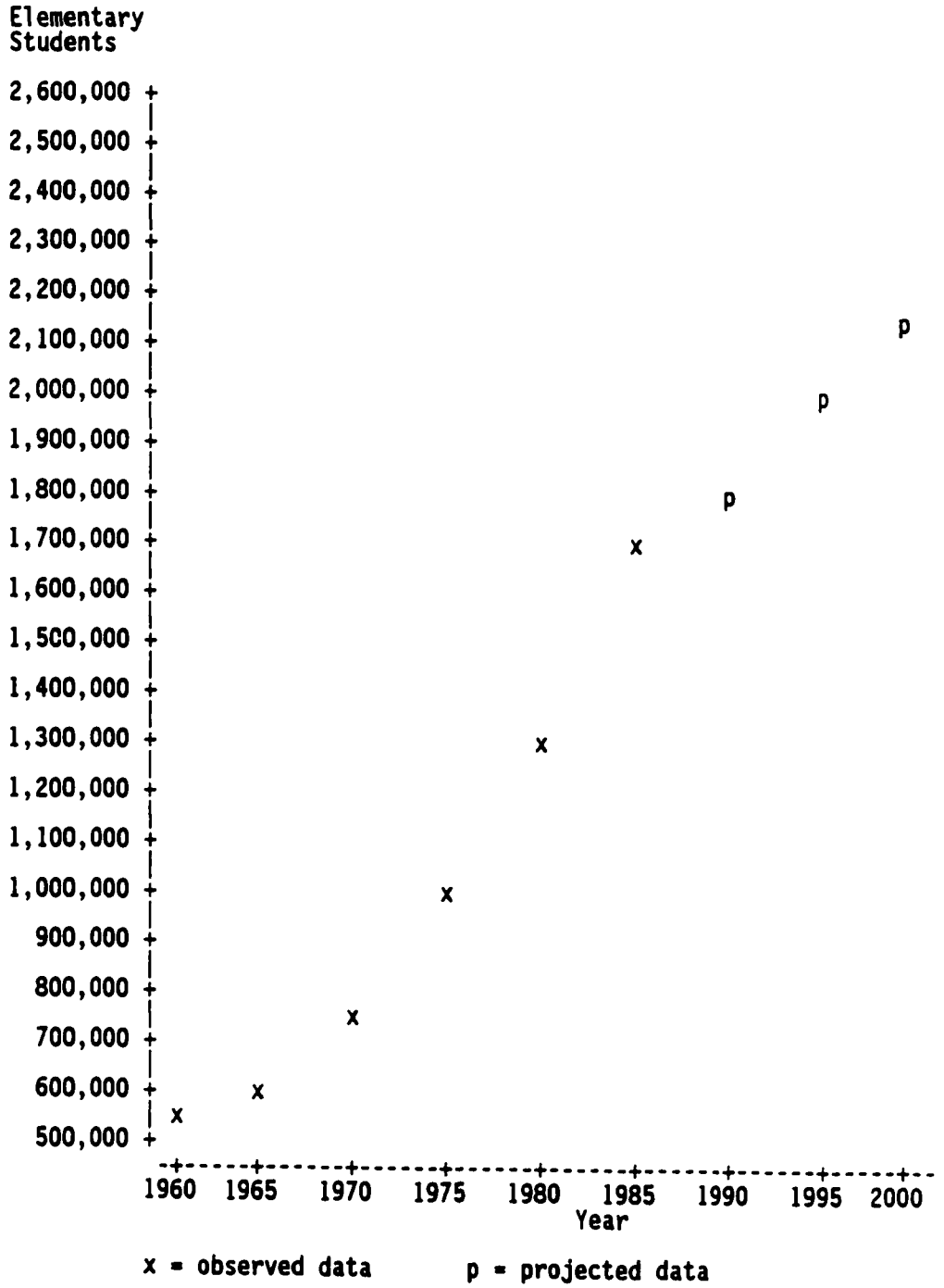

Figure 30. Teacher Projections - Uganda
Plot of Elementary Students/Year

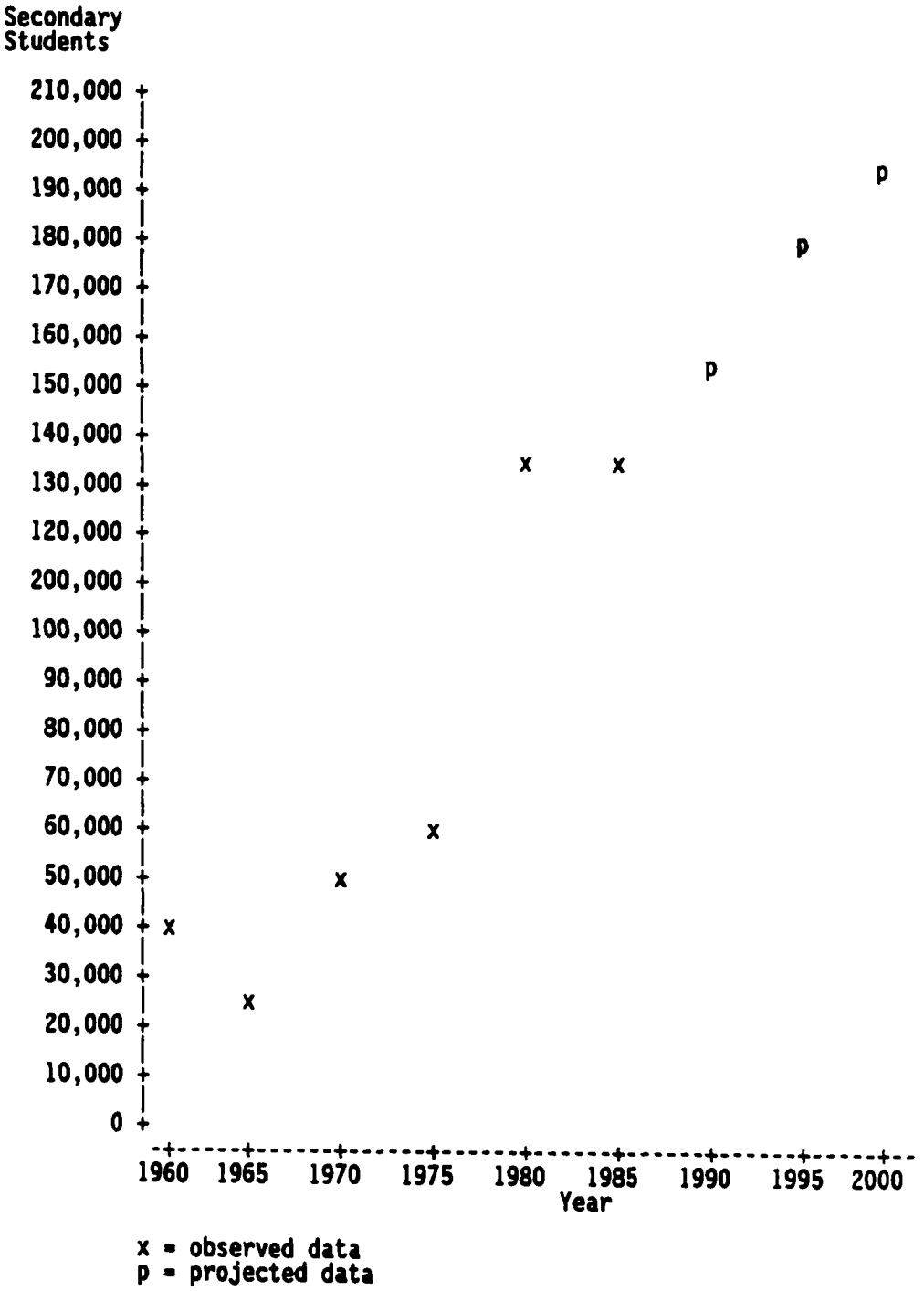

Figure 31. Teacher Projections - Uganda
Plot of Secondary Students/Year

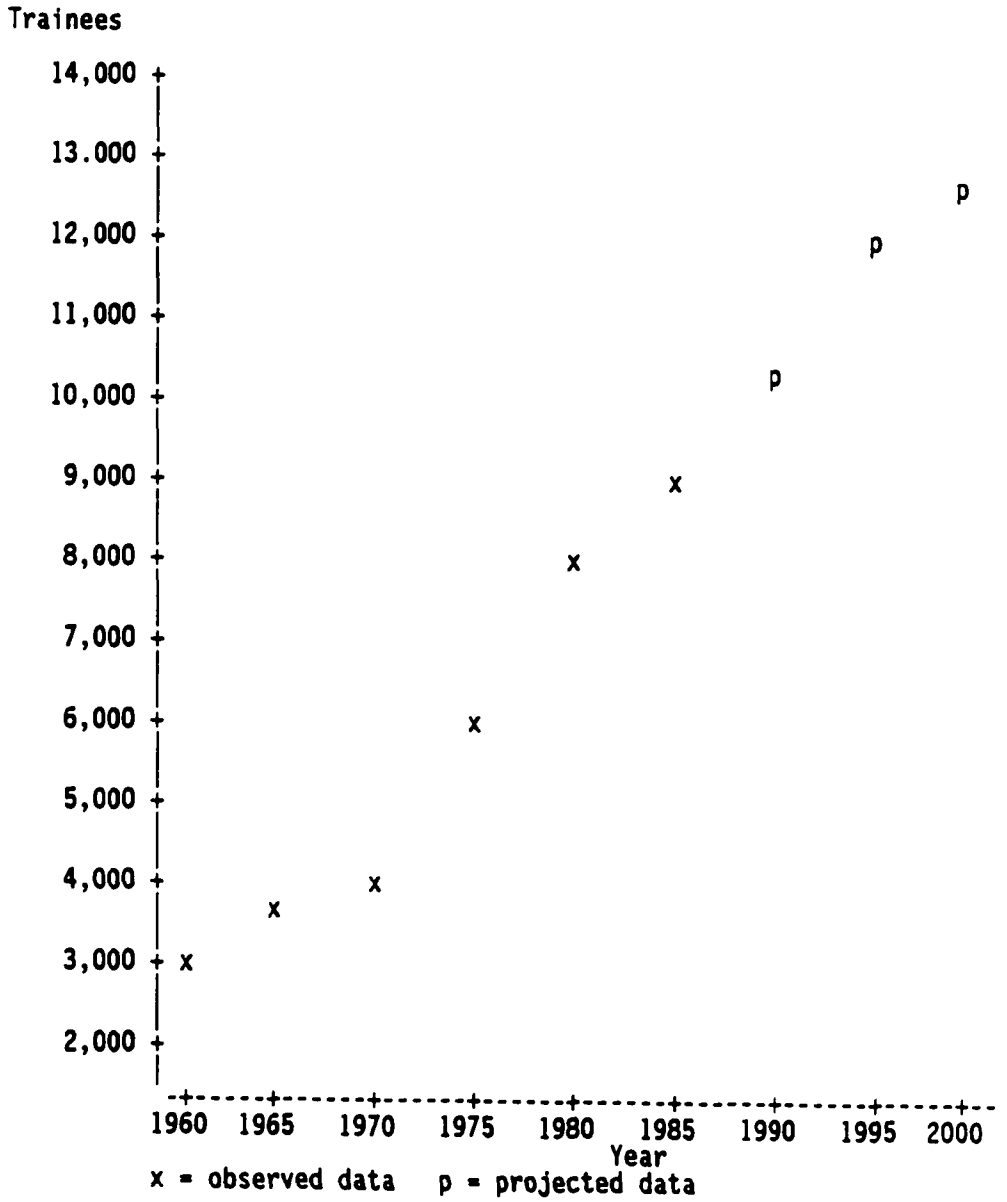

Figure 32. Teacher Projections - Uganda
Plot of Trainees/Year

Figure 33, total student enrollments at the elementary and secondary levels, shows a curvilinear trend in the increase of students. For the years between 1960 and 1965, there was very little growth followed by a steady rise between 1965 and 1985 in the total number of students. The total number of enrollments is projected to be about 2.4 million by the year 2000. At that time, the teacher/pupil ratio will be about 1:36.

The trend in growth for teacher population between 1960 and 1985 follows the same graphic pattern as the one discussed in Figure 33. Figure 34 shows the rate of teacher growth to be minimal. The data show that there were 519 more teachers in 1965 than there were in 1960 which means that there was an average annual increase of 103.8 teachers. This again can be attributed to the political situation which existed at the time, as was discussed earlier in the relation to elementary and secondary enrollments. The pupil/teacher ratio was 33:1 in 1960 and is projected to be 36:1 by the year 2000. This situation will mean that more teachers will need to be trained if the quality of education is to increase.

Figure 35 shows the linear relationships among population, teachers and students for Uganda for observed and projected data. Population data fall on the regression line. Data for students cross the line of regression for population indicating that pupil enrollments rose at a faster rate than the population. Teacher population increased at a very constant rate, and the projected numbers for the year 1990 to the year 2000 are projected to rise at the same gradual rate. It should be observed, however, that the rate of student increase is higher than the rate of teacher increase. This should signal a need for an increase in the development of teachers for the coming years.

Data Analysis for Zambia

Table 17 shows data for Zambia's seven variables. Data are

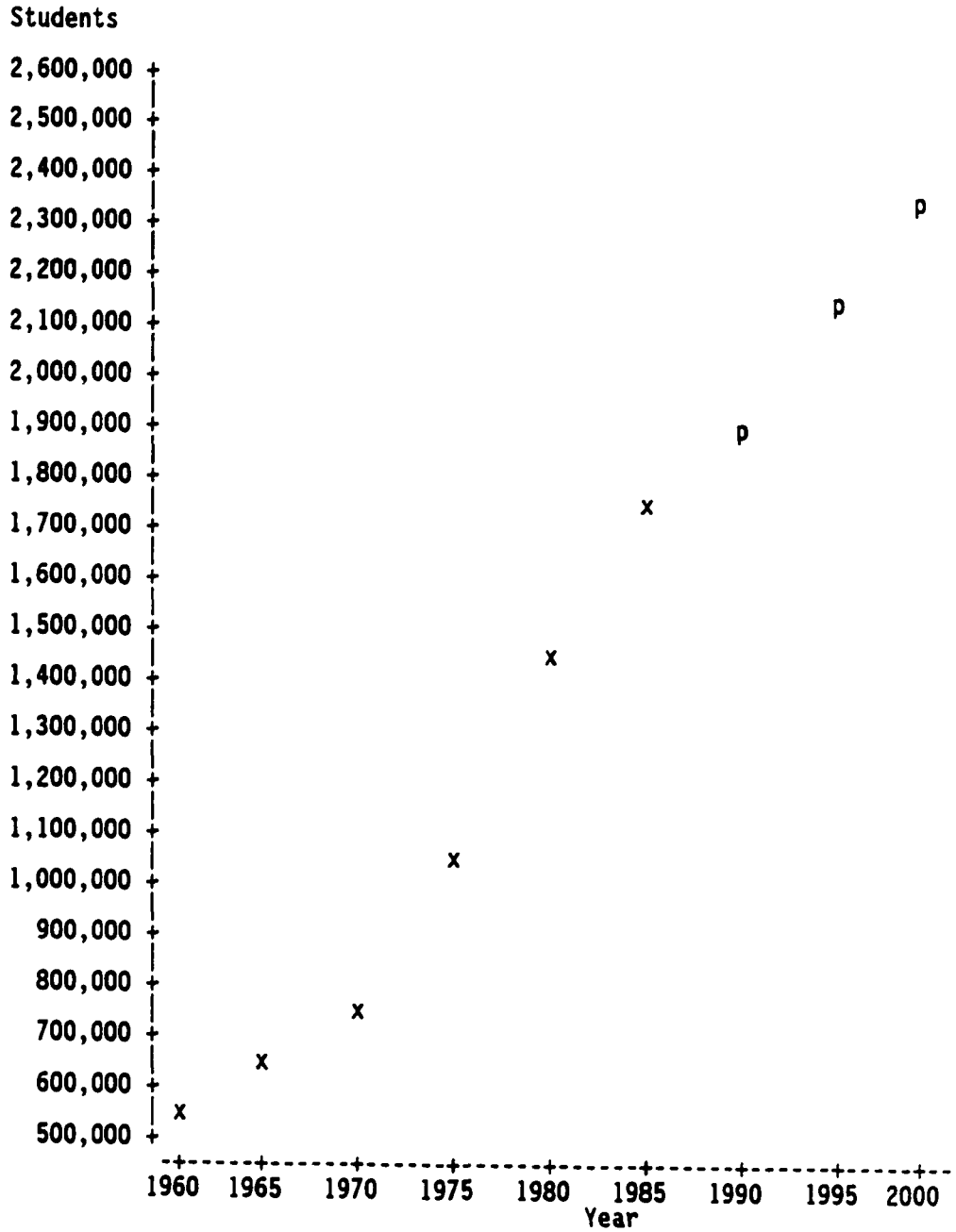

Figure 33. Teacher Projections - Uganda
Plot of Students/Year

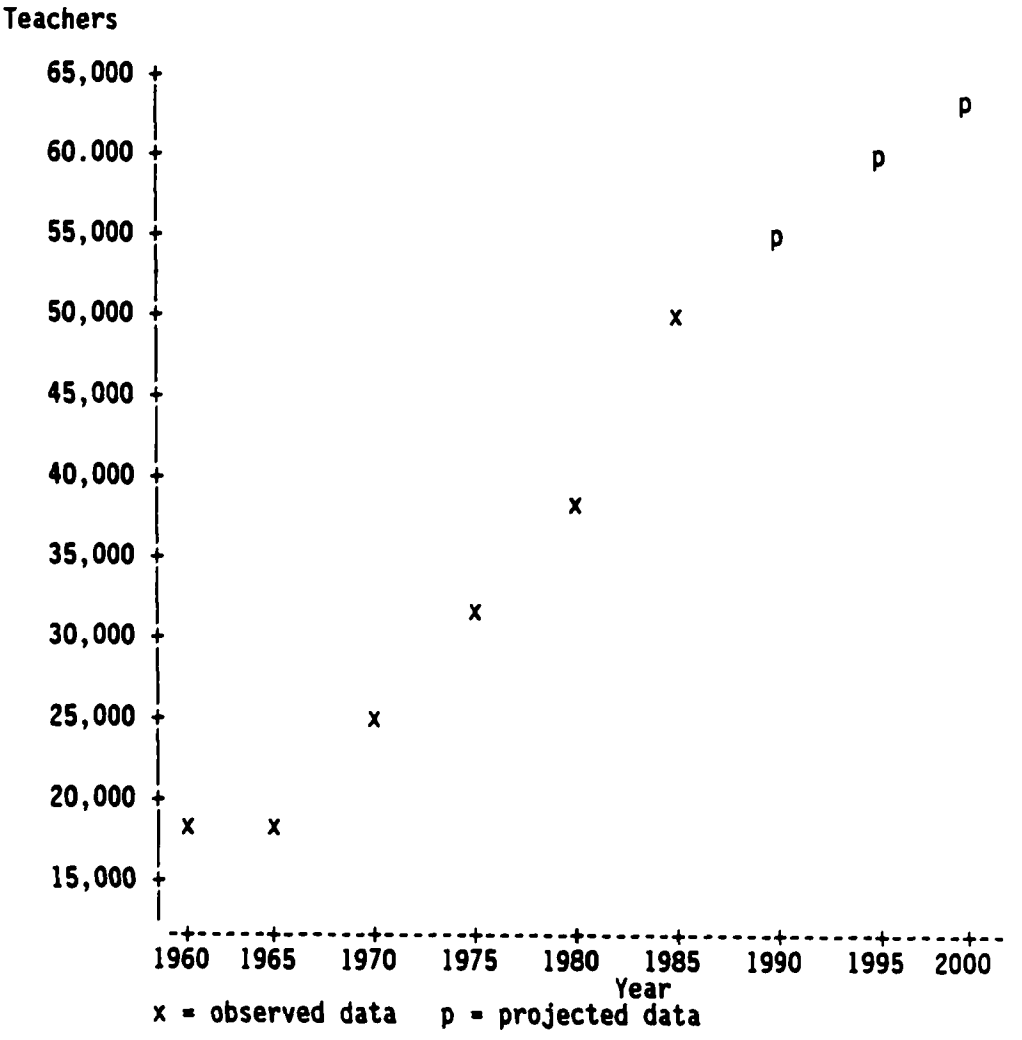

Figure 34. Teacher Projections - Uganda
Plot of Teachers/Year

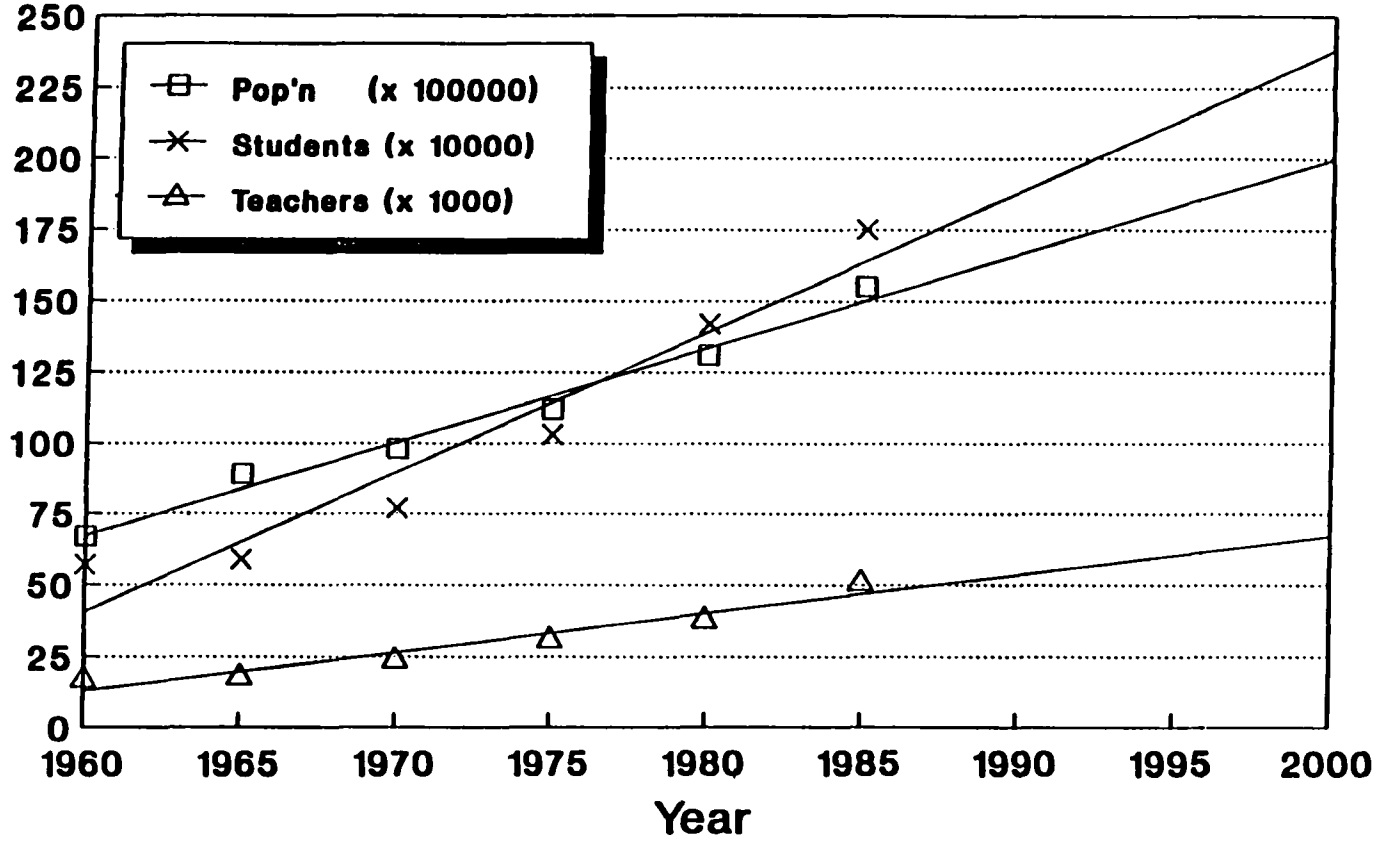

Figure 35. Population, Teachers, Students Past and Projected for Uganda

Table 17.

Zambia*

Year	Population	Elementary	Secondary	Teacher Trainees	Teachers Employed	Education Expenditures As % Of Gov't Spndg	Teacher Pupil Ratio
1960	3,210,000	287,536	5,200	1,156	7,056	12.5	1:50
1965	3,700,000	410,093	22,003	1,571	8,757	12.9	1:51
1970	4,191,000	694,670	56,394	1,934	17,317	12.6	1:47
1975	4,841,000	872,392	77,672	2,246	21,298	11.9	1:48
1980	5,648,000	1,041,936	102,019	3,742	26,277	7.6	1:49
1985	6,666,000	1,260,366	104,859	3,370	30,163	16.3 (84)	1:56
1990	7,086,733	1,454,907	137,320	10,621	35,686	--	1:45
1995	7,765,990	1,653,118	159,023	11,206	40,602	--	1:45
2000	8,445,248	1,851,330	180,727	11,791	45,519	--	1:45

Sources: 1. UNESCO. (1985). African Socio-economic indicators. Paris: UNESCO.
2. UNESCO. (1960-1987). Statistical Yearbook. Paris: UNESCO.
3. Europa Yearbook. (1961-1987). London: Europa Publications.

Note: -- projections not performed on variable.
* Known as Northern Rhodesia before 1964

projected for six variables. The only variable not projected is that of current government expenditures on education. The following section discusses each of the variables for observed and projected data.

Zambia's population in 1960 was slightly over 3.2 million. By 1985, it was over 6.7 million, a 107.7% increase. By the year 2000 it is projected to be slightly over 8.4 million, a 26.7% increase over the 1985 count.

Figure 36 illustrates the trend in population increase for observed and projected data. The United Nations (1986) stated the annual rate of change between 1980 and 1985 was 3.31% and the projected rate between 1985 and 1990 to be 3.43%. For 1990-95, the rate will be 3.49% and for 1995-2000 it will be 3.52%. If this rate continues as predicted, by the year 2000 Zambia will face a tremendous need to supply teachers for all sectors of education -- elementary and secondary.

The elementary education enrollment trend is shown in Figure 37. Between 1960 and 1985, primary enrollment increased by 338.0%; between 1985 and 2000, it is projected to increase about 46.9%, an annual increase of about 3.13%. The projected total enrollment by the year 2000 is about 1.9 million students. Figure 36 graphically illustrates the trend as specified above.

Between 1980 and 1985, enrollment for secondary students increased from 5,200 to an unprecedented 10,200. This change was probably due to changes in policy and in attitude towards education. Changes were experienced as early as 1964 (Kurian, 1987b). Educational plans developed under President Kaunda in 1964 changed the educational structure. Between 1974 and 1984 "national policies for the next decade 1974-84 heralding a series of educational reforms" (Kurian, 1984) were implemented. Seven years of universal (free) education were to be implemented from grade one to grade seven. Figure 38 shows the effect of these changes where enrollment increased drastically between 1965 and

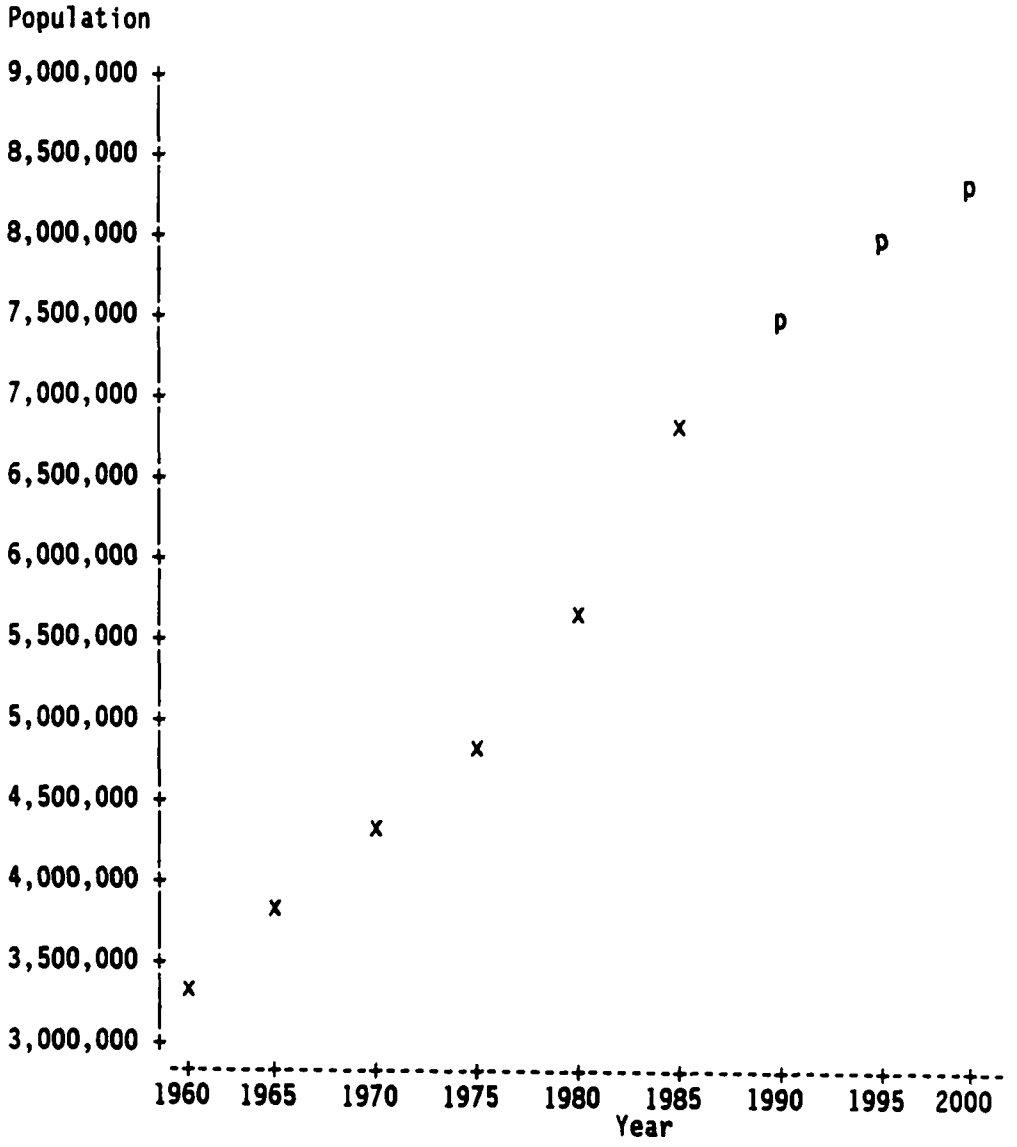

Figure 36. Teacher Projections - Zambia
Plot of Population/Year

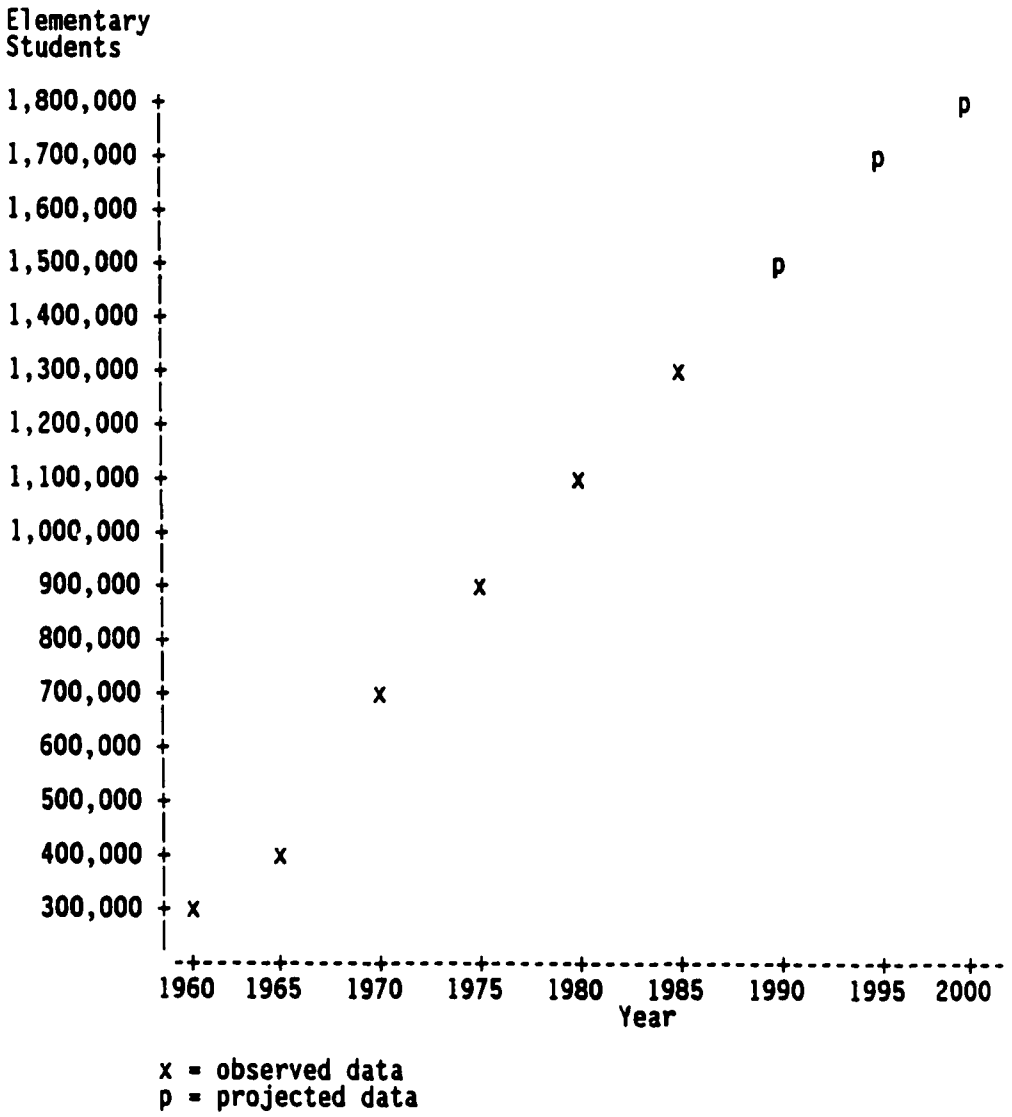

Figure 37. Teacher Projections - Zambia
Plot of Elementary Students/Year

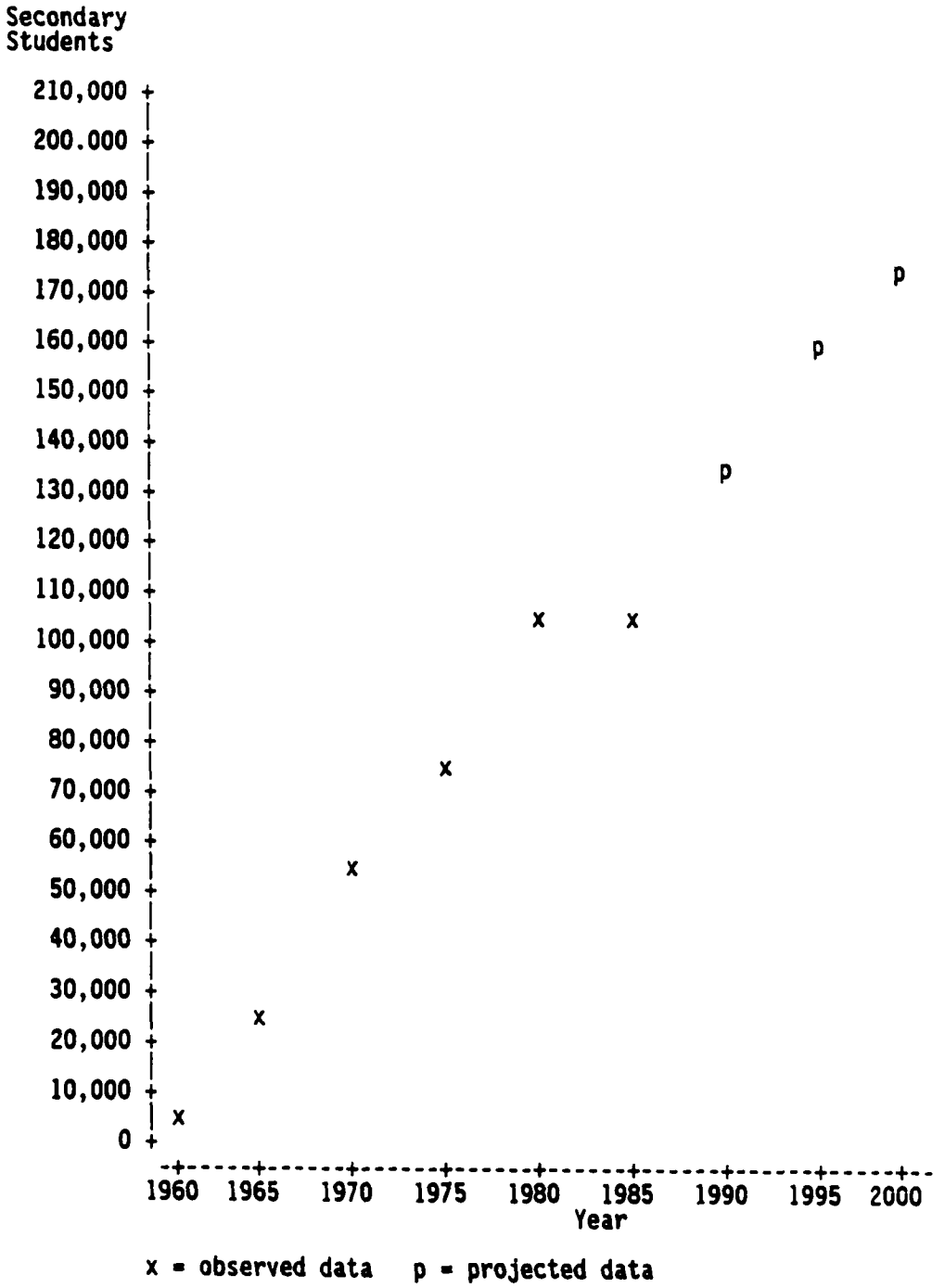

Figure 38. Teacher Projections - Zambia
Plot of Secondary Students/Year

1980. Between 1980 and 1985 there was a 2.8% increase in the number of secondary students. Although there was a decline in the rate of increase in enrollment between 1980 and 1985, the projected data show a steady increase between 1990 and 2000. Total pupil/teacher ratio for the year 2000 would be 45:1 if the trend continues as projected. This would indicate a need to train more teachers if the quality of education is to be improved.

Figure 39 shows projections for total elementary and secondary student growth for the observed and projected data. Between 1960 and 1985 total elementary and secondary enrollment grew about 366.3%. The projected growth will be 48.8% by the year 2000 unless other changes take place. This will mean an average annual growth rate of about 3.3%.

The trend in teacher training enrollment between 1960 and 1975 was a very gradual one followed by a sharp increase in the number of enrollees as shown in Figure 40. Between 1975 and 1980 there was a 66.6% increase representing an average annual increase of 13.3 %. Between 1980 and 1985 there was an average annual decline of 1.99% in enrollment. No reason was discovered during this research to justify this decline. The trend is projected to grow to over 11,800 by the year 2000. This would mean a 249.9% increase in teacher production.

Figure 41 is a plot for teachers in service in Zambia. In 1960 there were slightly over 7,000 teachers. This figure changed significantly by 1970 when there were over 17,000 teachers. This probably was in response to universal free education at the elementary level. By 1985 there were over 30,000 teachers, a 327.5% increase over the 1960 figure. The projected figure for the year 2000 is 45,519 which will give a pupil/teacher ratio of 45:1.

Figure 42 displays scatterplots for population, teachers and students. Population growth shows an even pattern for the observed data (1969-1985). For all plotted data, all points regress to the line of

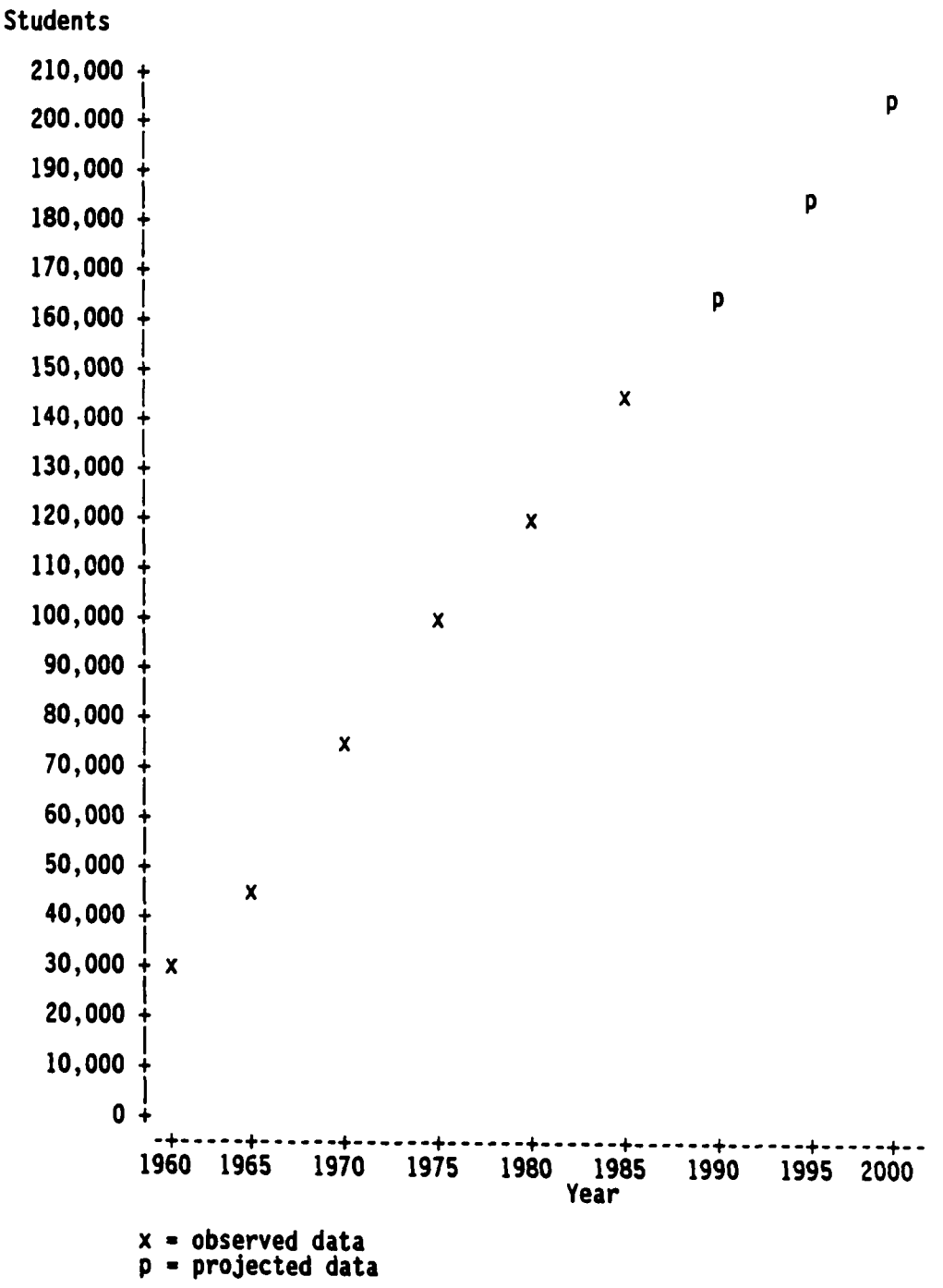

Figure 39. Teacher Projections - Zambia
Plot of Students/Year

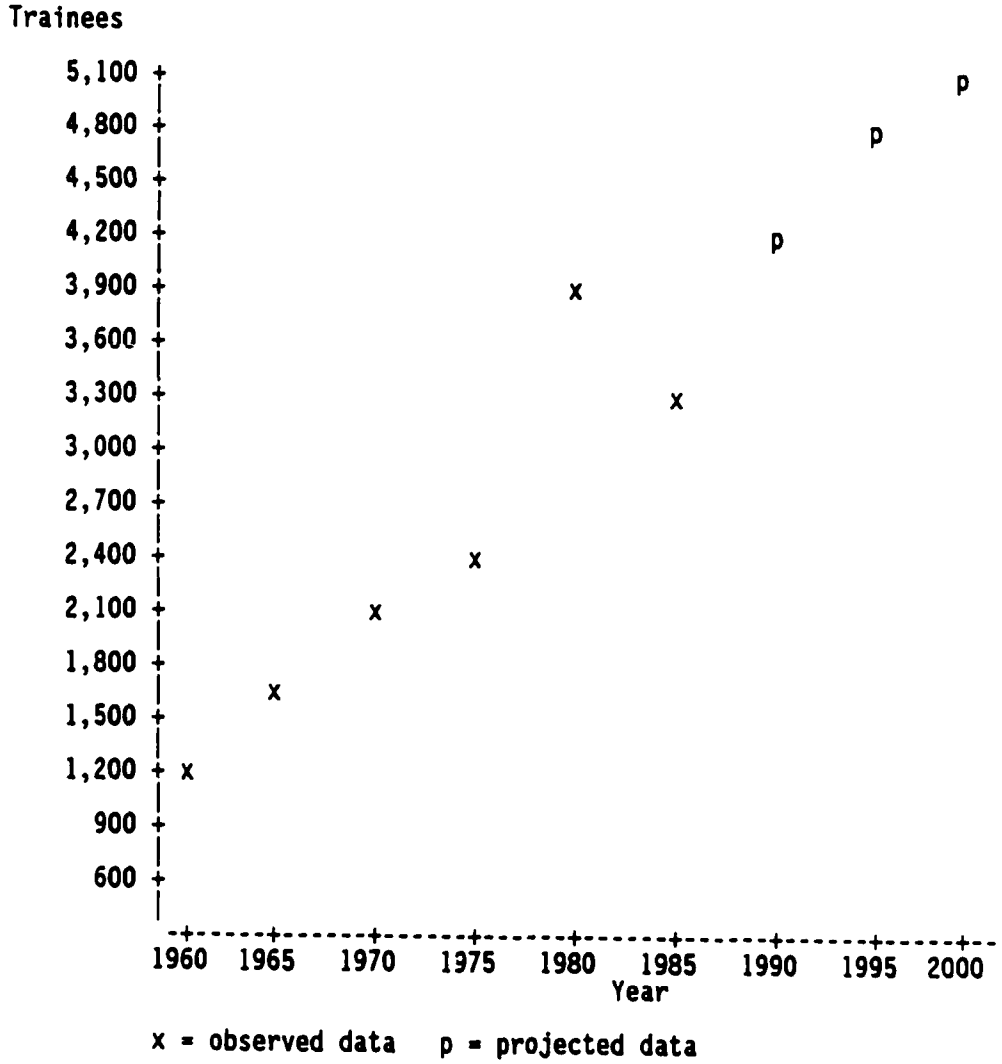

Figure 40. Teacher Projections - Zambia
Plot of Trainees/Year

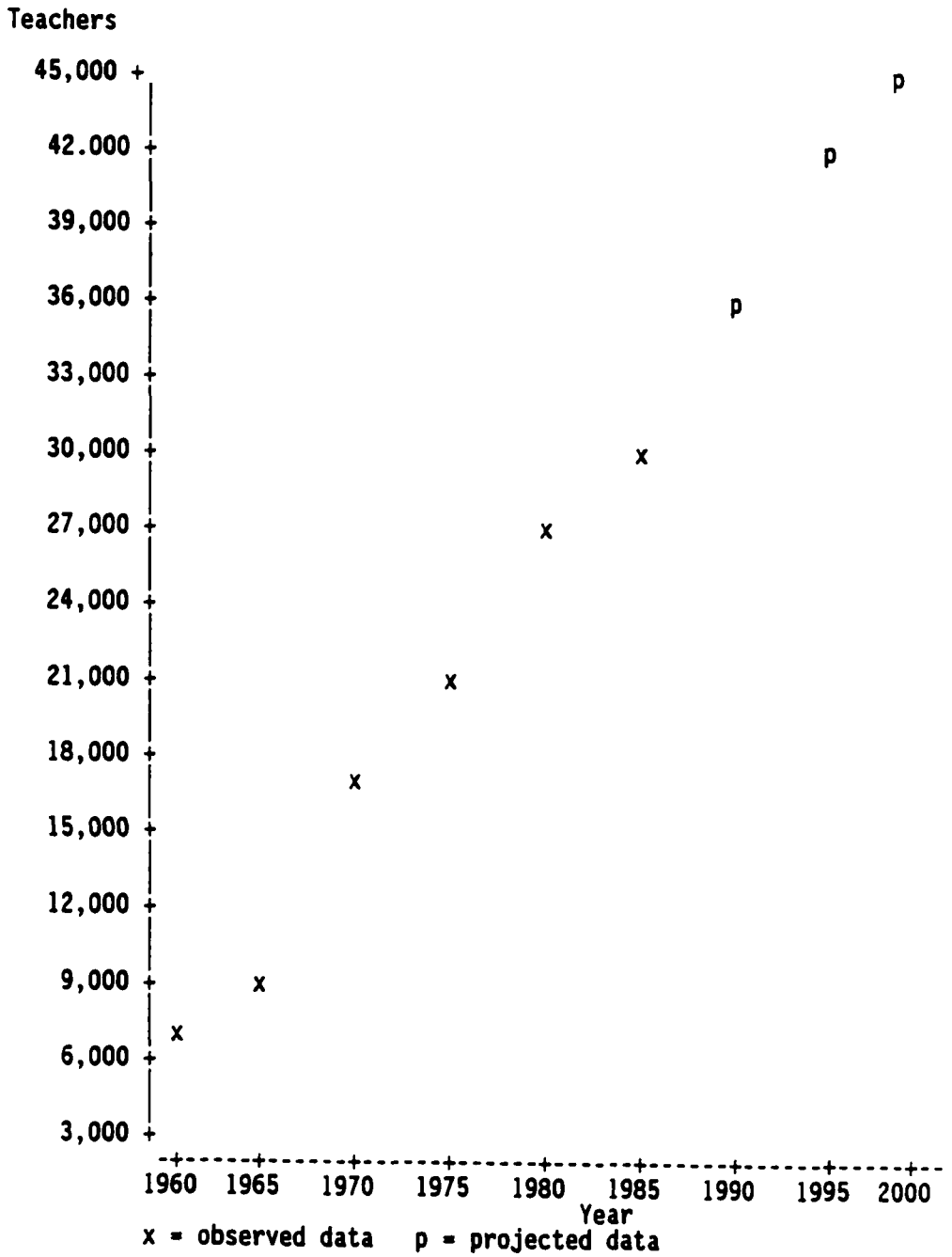

Figure 41. Teacher Projections - Zambia
Plot of Teachers/Year

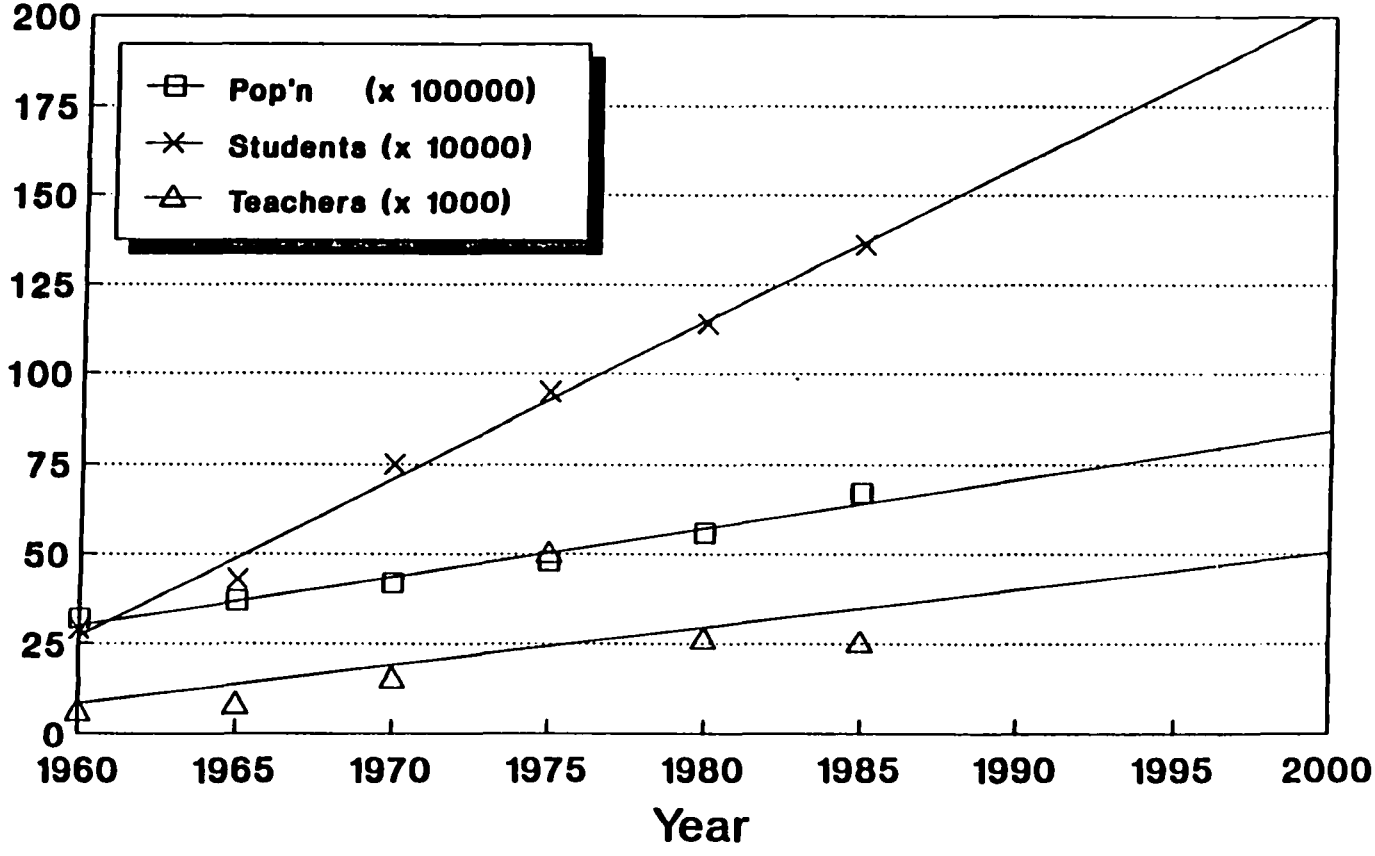

Figure 42. Population, Teachers, Students Past and Projected for Zambia

regression. This, however, is a little different from the scatterplot for teacher population. An outlier for 1975 shows a significant departure from the norm. As noted in the discussion of educational changes, this probably would affect the changes in the data for teacher population drastically.

The trend for elementary and secondary pupil data is quite different in that the increase in enrollment is not proportional to teacher supply. Although the projected rise in the number of teachers will be 50.9% over the 1985 figure, a concerted effort must be made to reduce the pupil/teacher ratio to assure quality education at the elementary and secondary schools.

Data Analysis for Zimbabwe

Zimbabwe went through several changes in the early and mid-eighties. First came independence in 1980 and then came several changes in the economic, educational, and social arenas. A statistical analysis is presented in the following discussion of some of the areas which will affect teacher quality and quantity in the future. Table 18 shows data for seven variables selected for discussion.

In 1960, there were approximately 3.8 million people in Zimbabwe. The increase in population over the next 25 years was gradual. The United Nations (1986) indicated that the population increased by 2.60% and 2.80% for periods 1975-80 and 1980-85 respectively. The same report stated that between 1985-90 the rate of growth would be 3.60%. The World Bank (1988) reported that population growth between 1980 and 2000 will be 3.4% annually. Projected data for this study indicate a population of 10.8 million by the year 2000. Figure 43 displays the trend for population for the observed and projected data. There were no major changes observed in the population pattern of Zimbabwe except that the World Bank (1988) and United Nations (1986) reported that the growth rate for population is among the highest in the world.

Table 18.

Zimbabwe*

Year	Population	Elementary	Secondary	Teacher Trainees	Teachers Employed	Education Expenditures As % Of Gov't Spndg	Teacher Pupil Ratio
1960	3,810,000	484,299	8,022	2,522	15,935	N/A	1:31
1965	4,490,000	627,806	15,146	2,819	21,308	17.3	1:30
1970	5,308,000	735,782	49,845	2,234	23,597	16.4	1:33
1975	6,219,000	862,736	70,005	3,923	29,398	13.7	1:32
1980	7,368,000	1,235,036	74,746	2,829	35,634	13.7	1:37
1985	8,174,892	2,214,963	497,766	9,504	73,382	16.0	1:37
1990	9,031,928	2,086,967	384,023	7,635	66,810	--	1:37
1995	9,928,198	2,389,880	459,671	8,681	76,411	--	1:37
2000	10,824,469	2,692,793	535,317	9.728	86,011	--	1:37

Sources: 1. UNESCO. (1985). African Socio-economic indicators. Paris: UNESCO.
2. UNESCO. (1960-1987). Statistical Yearbook. Paris: UNESCO.
3. Europa Yearbook. (1961-1987). London: Europa Publications.

Note: -- projections not performed on variable.
N/A - Data not available.
* Known as Southern Rhodesia before 1980

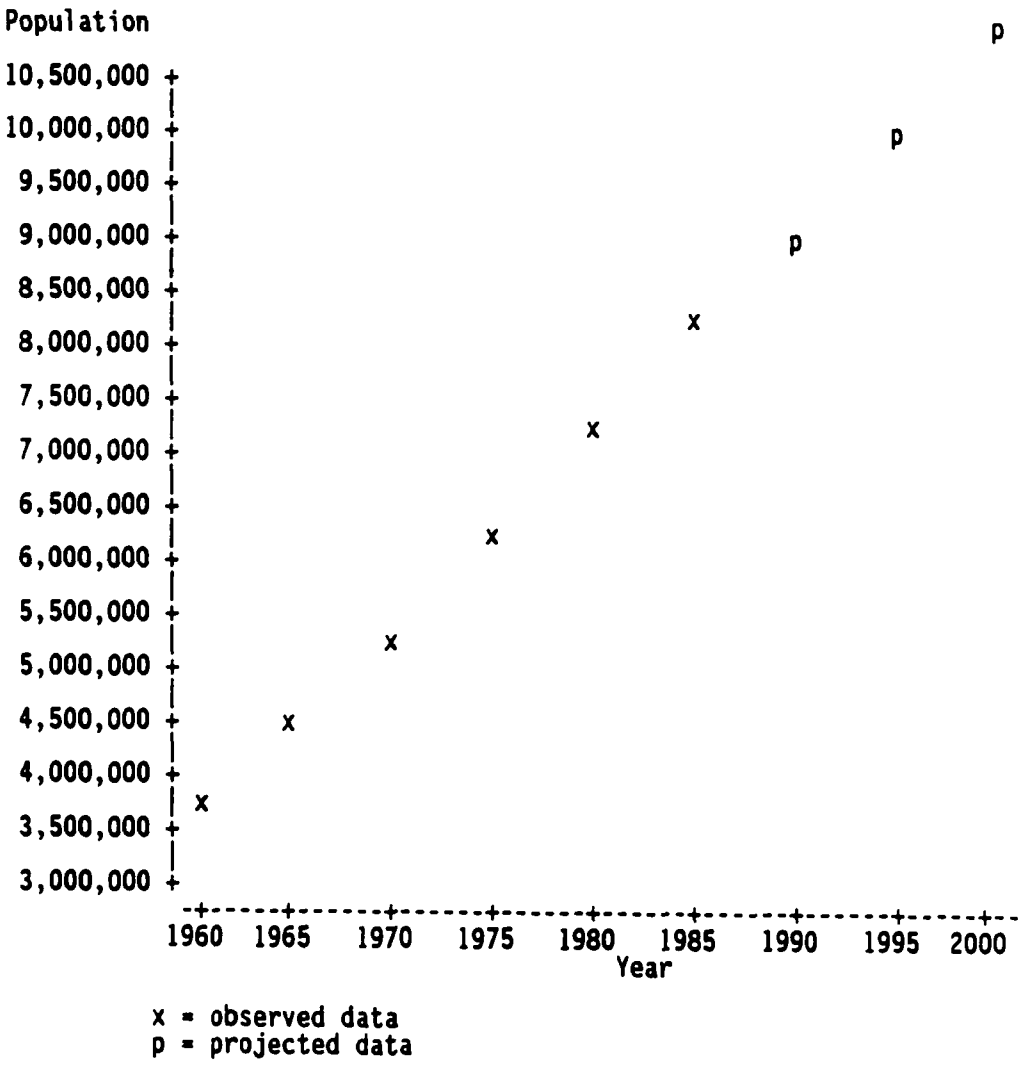

Figure 43. Teacher Projections - Zimbabwe
Plot of Population/Year

Figure 44 reveals major changes in elementary student enrollments between 1960 and 1985. The elementary pupil enrollment for 1960 was 484,300. This figure was for aided and private schools whose data were available. In the 1960s and 1970s educational data in Zimbabwe were kept separately for whites, blacks and Indians. As such, accurate accounting and reporting data for total school population was questionable. The curvilinear structure of the plot shows a gradual student increase between 1960 and 1980. There was a 43.2% increase between 1975 and 1980, but between 1980 and 1985 there was an unprecedented 79.3% increase. This increase came as a response to Zimbabwe's independence in 1980, at which time free education at the elementary level was granted (Zimbabwe Government, 1984).

The projected data show a decline from 2.2 million to about 2.1 million people in 1990. Probably this is a result of the smoothing constant which dropped the projected figure. The trend is projected to show an increase thereafter. By the year 2000 there are projected to be over 2.7 million elementary students, which would be a 22.7% increase over the 1985 enrollment.

Secondary student enrollment, as shown in Figure 45, revealed a seemingly chaotic state of affairs. Changes were as dramatic as those experienced at the elementary level. Between 1960 and 1980 there was an 831.8% increase in enrollment at the secondary level. In 1980, the year in which Zimbabwe gained independence, there was a major change in the enrollments with a 565.9% increase recorded in 1985. The end of the war in the country meant a mass influx of high-school-age students enrolling in school between 1980 and 1985 (Zimbabwe Government, 1984).

The projected data for 1990 is 384,000 which will signify a drop from the 1985 figure. The trend, however, is expected to increase for the other projected years. By the year 2000 there are expected to be over 500,000 students enrolled at the secondary level.

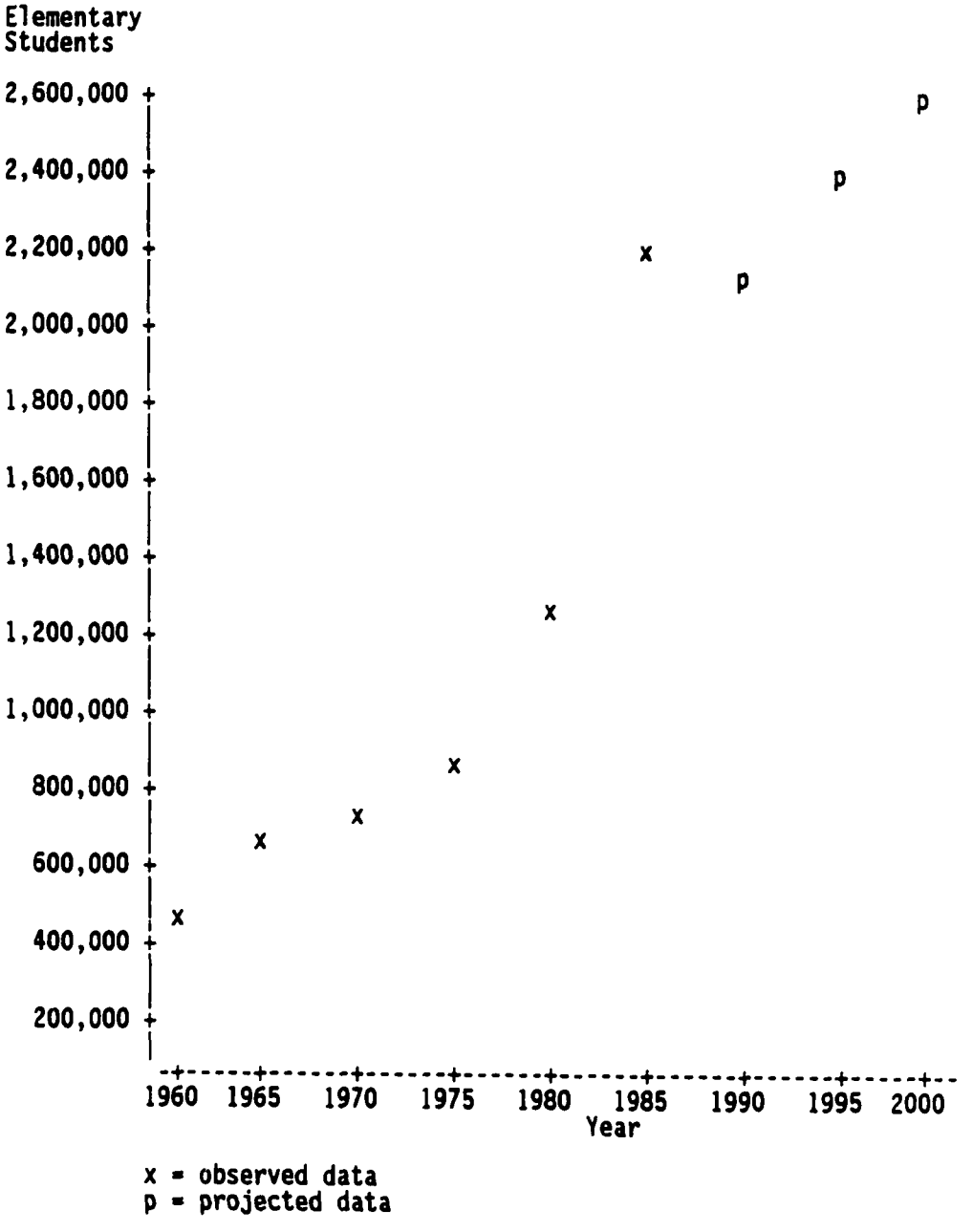

Figure 44. Teacher Projections - Zimbabwe
Plot of Elementary Students/Year

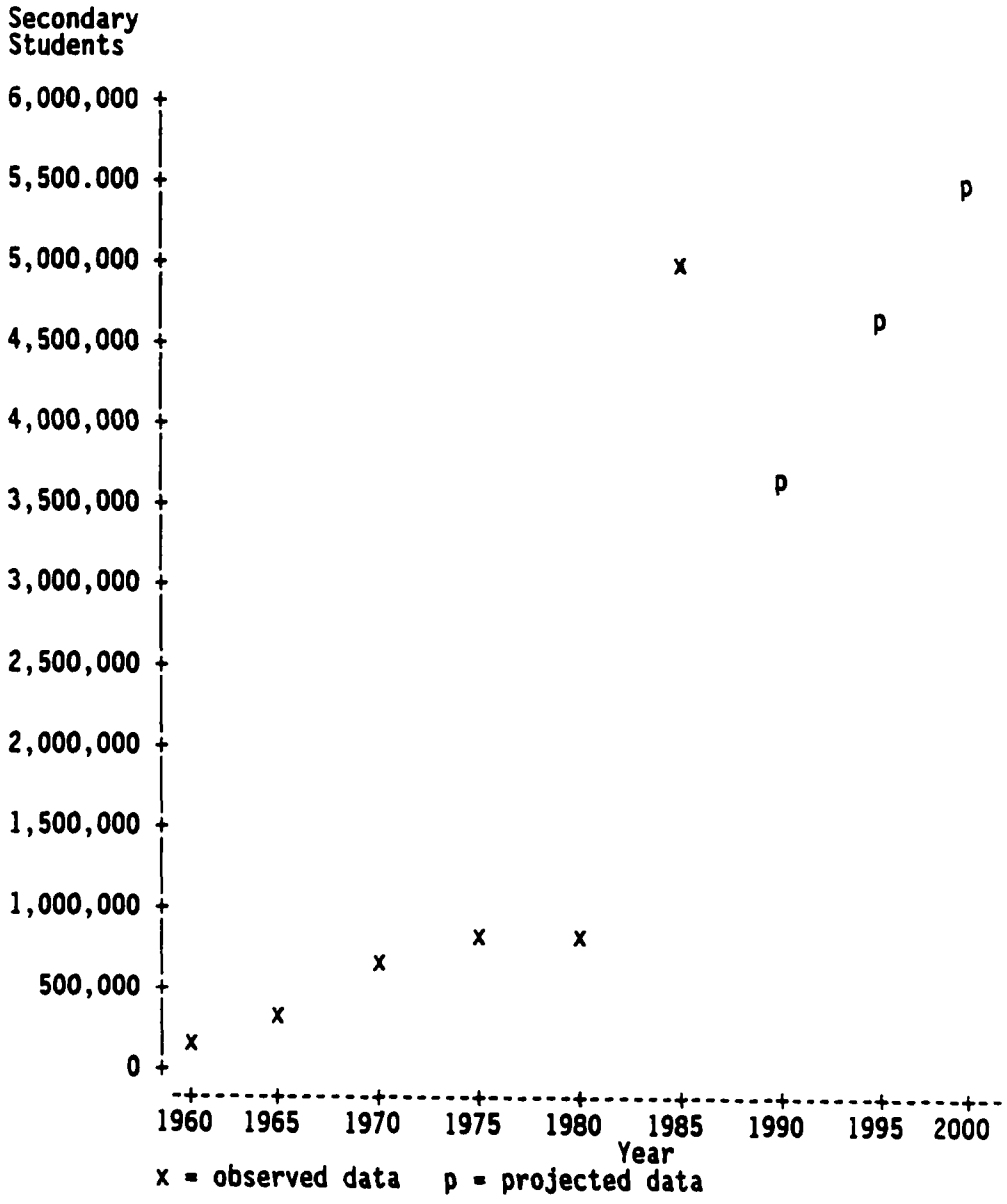

Figure 45. Teacher Projections - Zimbabwe
Plot of Secondary Students/Year

Total student enrollment for elementary and secondary schools is plotted in Figure 46. A curvilinear trend can be observed for the period 1960-1985. As was observed for both elementary and secondary enrollments in separate discussions, there were significant changes. Free education at the elementary level and less restrictive measures for educational opportunities at the secondary level meant big increases in enrollment. There is, however, a projected decline in 1990. The projected pupil/ teacher ratio is 38:1 for the year 2000.

The teacher training trend as illustrated in Figure 47 follows a very uneven pattern for the observed data betwen 1960 and 1985. Chivore (1986) conducted research on Form IV pupils' perceptions and attitudes towards the teaching profession in Zimbabwe. He concluded that 44.7% of the 577 students surveyed did not want to become teachers. He also found that only 40.0% of those who said they did want to teach preferred teaching at the secondary schools, and 15.3% wanted to teach in primary schools. Perhaps this would explain the small number of teacher trainees in Zimbabwe.

Between 1960 and 1980 there was a 12.17% increase from 2,522 trainees to 2,829 trainees. The lowest decline was in 1970 with only 2,234 trainees. This decline can be attributed to political instability which caused partial closings of church related training centers in rural and semi-rural areas (Chung, 1989). The sharp increase experienced between 1980 and 1985 was probably a response to free education at the primary level where there was a demand for more teachers. In 1985 there was a 235.9% increase over the 1980 teacher trainee enrollment. Changes in educational policies, replacement of expatriate teachers, and rejuvenated interest in increasing the number of qualified teachers in the system triggered the rise in the number of trainees (Zimbabwe Secretary for Education, 1982). Projected data show a decline for 1990 to 7635. The

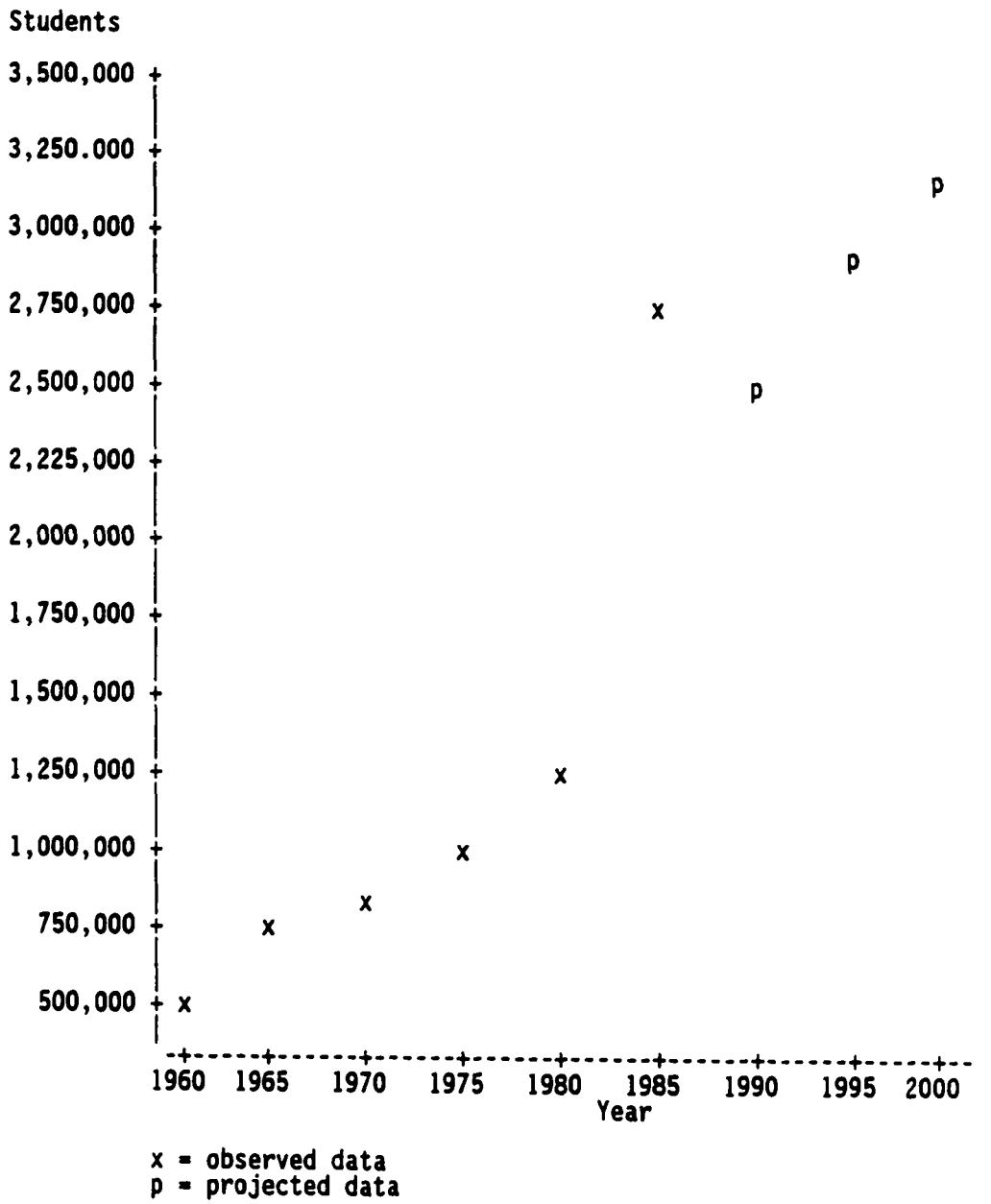

Figure 46. Teacher Projections - Zimbabwe
Plot of Students/Year

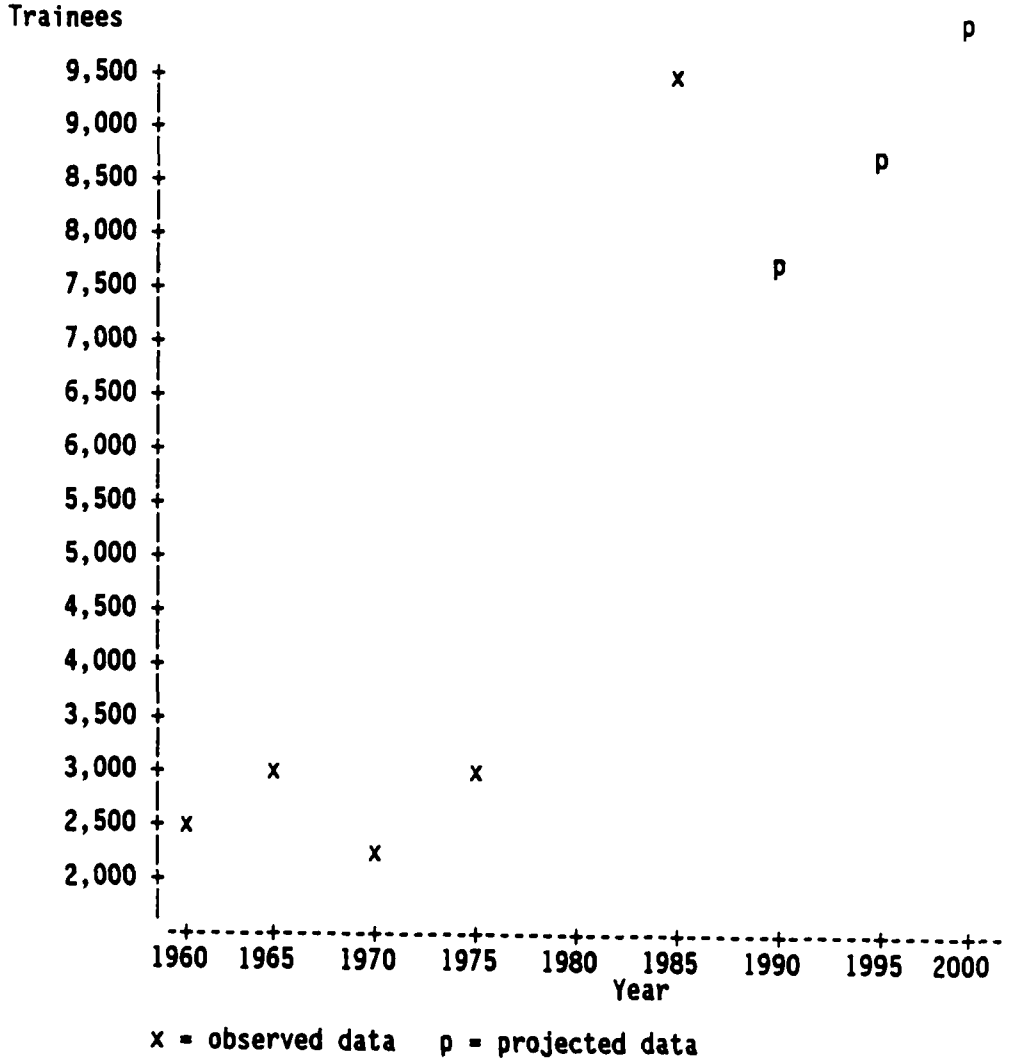

Figure 47. Teacher Projections - Zimbabwe
Plot of Trainees/Year

trend will continue to rise for 1995 and for 2000 when the projected number will reach 9,728 trainees.

Figure 48 shows the plotted trend for teacher population. There is a curvilinear trend for the period from 1960 to 1985. Total teacher population in 1960 was 15,935. There was a 33.7% increase between 1960 and 1965. Between 1965 and 1980 there was a 244.4% increase, signaling an average annual increase of 16.3%. The projected datum for 1990 is 66,810 which would be a decline from the 1985 population. Teacher population, however, is projected to increase 14.4% in 1995 to over 76,000. By the year 2000 there are projected to be 86,011 teachers, 17.2% more teachers than in 1985. Although there is a marked increase in the number of teachers, the main concern for government officials is quality; hence, the Zimbabwe Secretary for Education (1983) stated:

> The pool of qualified teaching staff quickly dried up, especially as it also had to cater for expansion in the secondary sector. Faced with the possibility of having no teachers at all, the teaching service was opened to experienced untrained teachers with a basic standard 6 (Grade 8) qualification. (p. 6)

Figure 49 is a scatterplot for population, students, and teachers on past and projected data for Zimbabwe. The population plots fall on the line of regression. The student data show an uneven pattern, and data for 1975 and 1985 lie the farthest from the line of regression. These outliers represent the extreme changes in pupil populations which were caused by the war and later the acquisition of independence in 1980 when educational policies were changed to allow more students into the system. The rate at which teachers are being produced is not commensurate with the rate of student increase. Chung (1989) stated that there were some schools which still had 1:40 teacher/pupil ratios.

Summary of Evidence in Support of Proposition I

Several elements were identified as common in all the seven countries studied. All the countries had achieved their independence

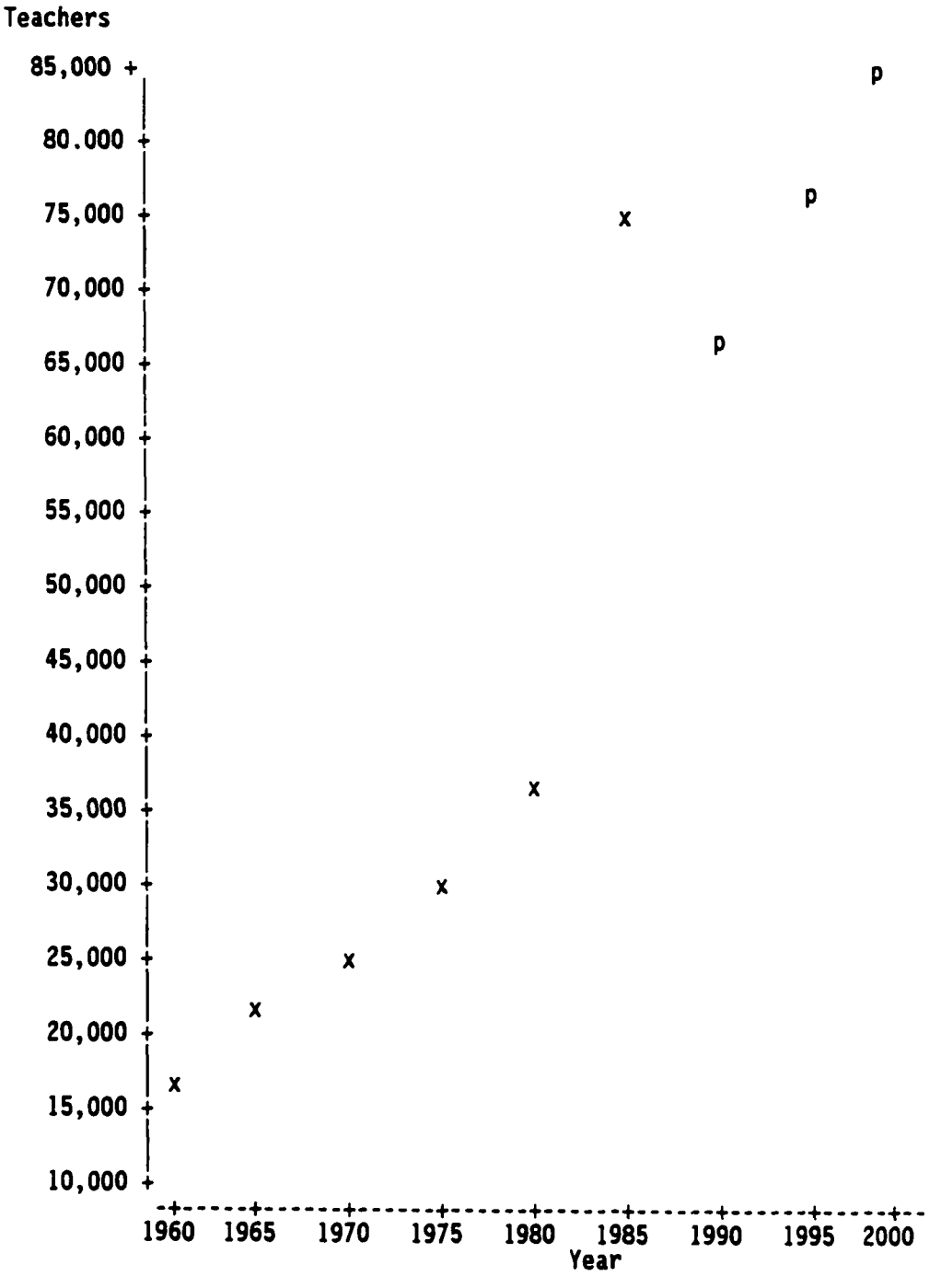

Figure 48. Teacher Projections - Zimbabwe
Plot of Teachers/Year

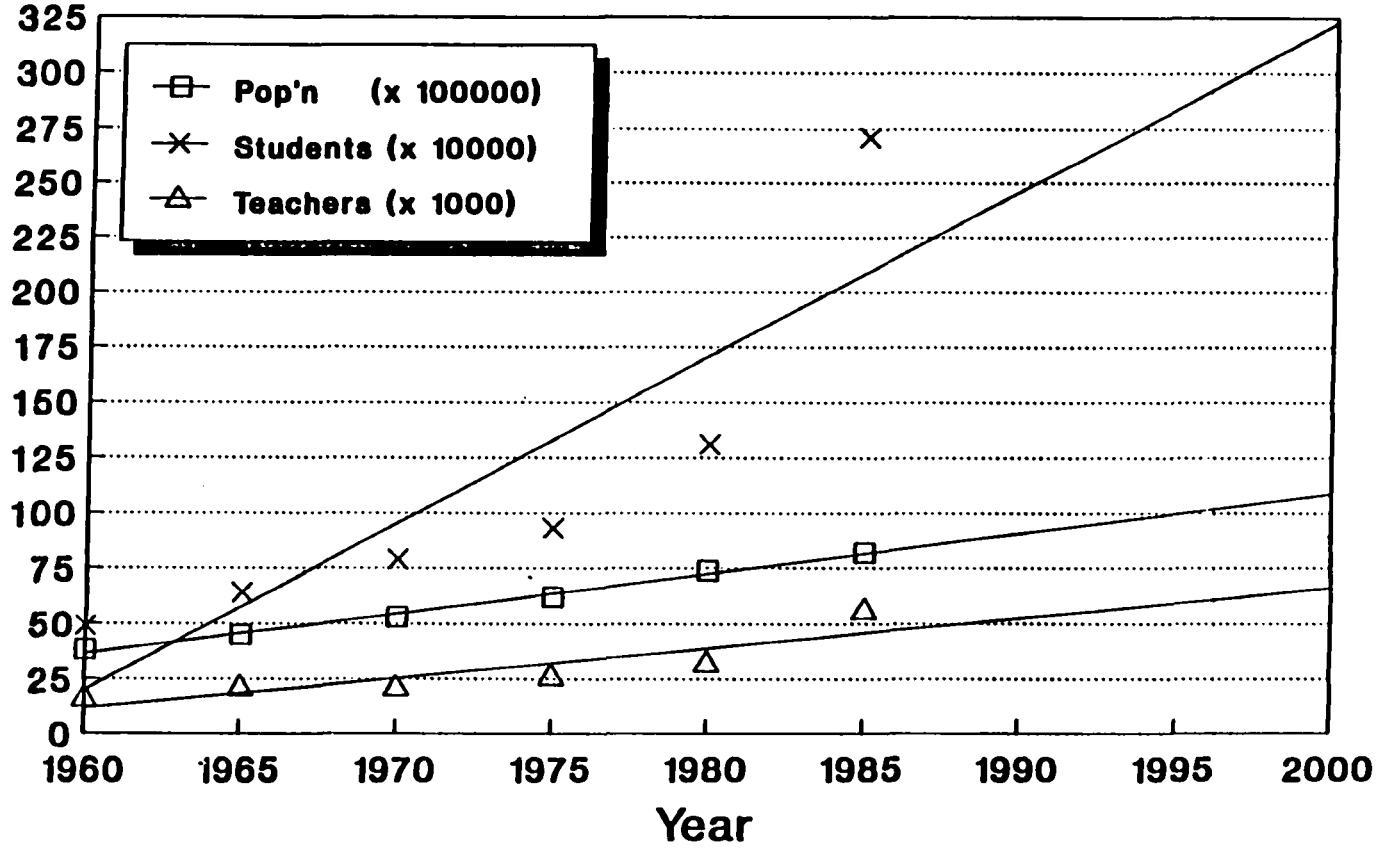

Figure 49. Population, Students, Teachers Past and Projected for Zimbabwe

from the British government. In all countries, British educational policies precluded Africans having equal educational opportunities, although missionary endeavors helped the African community by providing private schools. However, much was to be desired in terms of the quality of education and the facilities provided.

At the time of independence, African governments were faced with poorly qualified educational manpower. Through policy changes, schools were flooded with pupils, especially at the elementary level, where there were poor facilities, overcrowded classrooms, and untrained teachers.

The World Bank (1988) acknowledged in its report that "since their independence, the nations of Sub-Saharan Africa had invested heavily in education" (p. 11). The same report also stated that enrollments had recently stagnated and that the quality of education had apparently declined.

Projections showed that populations for all the variables will continue to rise. The rise in population will continue to create demands for educational improvements in terms of both quality and quantity in most cases. Demands in educational improvements will mean a need for qualified and competent teachers for elementary and secondary schools.

Summary Points

Table 19 juxtaposes teacher/pupil ratios for the years 1960 and 2000 to show differences in teacher/pupil ratios for specified dates.

Quantity of Teachers

Student numbers are gaining faster than teacher production in all countries except Kenya and Malawi. Malawi, however, will continue to have rising pupil/teacher ratios.

Quality of Teachers

Pupil/teacher ratios are flat, with three countries actually showing increases. In all countries, excluding Kenya, the pupil/teacher ratios are, at best, minimally acceptable by developed country standards and

Table 19

Analysis of Base-Year and Projected Pupil/Teacher Ratios

Country	Pupil/Teacher Ratio - 1960	Pupil/Teacher Ratio - 2000	1960 - 2000 △ P	△ S	△ T
Botswana	1:31	1:30		+	
Kenya	1:42	1:34		-	
Malawi	1:41	1:65		##	
Tanzania	1:45	1:36		++	
Uganda	1:33	1:36		++	
Zambia	1:50	1:45		++	
Zimbabwe	1:31	1:37		++	

Note: + = Moderate Pupil/Teacher Ratio Decline
- = Significant Pupil/Teacher Ratio Decline
++ = Extreme Pupil/Teacher Ratio
= Excessive Pupil/Teacher Ratio

will deteriorate as the number of students exceeds teacher production.

In all cases pupil/teacher ratios are maintained at present levels by a large number of teachers with less than one year of college, a practice unacceptable in developed countries.

Conclusions

With the possible exception of Kenya, all countries will experience pressure as student numbers exceed teacher production. Quantity is the issue.

With the possible exception of Kenya, all systems will, at best, maintain present quality with the norm being a reduction in quality.

CHAPTER III

REVIEW OF THE LITERATURE - PROPOSITION II

Introduction

The purpose of this chapter was to validate proposition two, which stated that there are potentially effective in-service activities available which the selected countries can use to improve the quality of the current teacher corps. The in-service activities were selected from a review of the literature. Activities from Asiatic, South American and African countries were reviewed. The selection of the in-service activities was based on their past success and utility.

The World Bank (1988) and Coombs (1967) noted specific problems in the less developed countries (LDCs) which would provide difficulties in the implementation of in-service training programs. The problems included (1) long distances between schools, (2) diversity in ethnic backgrounds which would cause tribal and regional differences, (3) poorly developed communication systems, (4) lack of transportation, (5) poor postal systems, (6) lack of financial resources to implement desired in-service activities, (7) poorly trained personnel to implement the activities, and (8) poor scheduling and follow-up activities.

In order for the selected countries to be able to identify, select, and implement in-service activities from other developing countries, specific infrastructure prerequisites must be met. These prerequisites included realistic policies, competent management personnel, proper planning models for in-service training of the teacher corps, and effective evaluation practices of in-service program activities so as to provide feedback.

A sound knowledge of each country's requirements for better in-service programs is essential. These requirements can be derived from specific internal indicators of performance such as (1) the economy, (2) the level of technology, and (3) the national attitude and receptivity to innovation based on social factors and needs.

This chapter discusses several issues pertaining to the selected Sub-Saharan countries' adaption of in-service activities which have been used in other developing countries. These issues are (1) policy formulation for staff development, (2) the organization and management of In-Service Education, (3) the identification of each country's requirements and indicators, (4) the presentation and analysis of each country's performance indicators, (5) the rating of those indicators, (6) the presentation of selected in-service strategies, and (7) the analysis of the identified in-service activities in relation to their utility and feasibility in each of the selected Sub-Saharan countries.

Suggestions for Planning for In-Service

Harris and Bessent (1969) identified three mistakes often made when planning and implementing in-service programs. These mistakes included (1) failure to tailor or relate in-service programs to genuine staff needs, (2) failure to identify and select appropriate activities for implementing program plans, and (3) failure to implement in-service activities with sufficient staff and other resources to assure effectiveness.

In order for the seven Sub-Saharan countries to be able to identify and select appropriate and feasible plans, assumption of in-service leadership and the placement of high priority on in-service training are essential. Perhaps the initial phase would be to identify a proper planning model and in-service strategies commonly used. Otto and Erickson (1973) presented a five-phase model for planning in-service programs. Their model for planning in-service programs included (1)

identifying needs, (2) establishing appropriate goals and objectives, (3) setting specific objectives, (4) scheduling activities, and (5) evaluating the results. These five steps are discussed below.

Phase I. Identifying Needs

The identification of needs or discrepancy analysis is an activity which identifies where each school system is and where it would like to be with relation to teacher quality and quantity. Kaufman (1972) stated that "it is critically important ... that the data for marketing these roles be as valid and representative as possible" (p. 28). Otto and Erickson (1973) stressed that the identification of specific needs was not a simple matter, and specific procedures would vary from one situation to another. They also emphasized that this phase should never be done without the active participation of teachers. Kaufman, Corrigan and Johnson (1969) noted that three equally important foci should be considered at this phase: (1) the nature of the knowledge, (2) the nature of the learner, and (3) the nature of society. They also advised that the nature of the knowledge should be considered only after the needs from the other two dimensions have been determined.

Phase 2. Establish Goals and Objectives

Of specific importance during this phase is the determination of measurable outcomes. Otto and Erickson (1973) emphasized that "worthwhile objectives are stated in behavioral, or performance, terms" (p. 11). Whereas goals are long-term, objectives are short-term and should be regarded at the institutional and individual levels (Kaufman, 1972).

Otto and Erickson (1973) broke down the process of goal establishment thus:

1. An in-service need is identified.
2. The need is translated into a goal for a complete in-service program.

3. The goal is broken down into more specific objectives.

4. Each objective serves to clarify activities that are appropriate for reaching the objective. (p. 12)

Achievement of the goals would also be contingent upon the availability of resources.

Phase 3. Select Activities

Selection of specific activities must be done in light of "resources available and characteristics of the participants as well as the selected objectives" (Otto and Erickson, 1973, p. 13). Activities such as lectures, demonstrations, buzz sessions, role playing, microteaching, etc., can only be achieved when resources are available. At this point attention should be paid to specific local conditions. Activities should be varied, interesting and definitely feasible based on the resources provided.

Phase 4. Schedule Sessions

The scheduling of in-service sessions might seem mundane after discussing needs, goals and objectives. Scheduling, however, is an important factor in achieving the desired goal(s). Specifics of scheduling involve things such as (1) negotiated contracts with experts in certain fields, (2) availability of relevant resources and equipment (3) availability of budgetary support and (4) the flexibility of participants, i.e., individuals and organizations. A wide variety of schedules were suggested by Otto and Erickson (1973). They included (1) provision of released time, (2) after-school session, (3) week-end sessions, and (4) summer sessions. Finally, they offered a word of advice: "figure out what needs to be done and how to do it, and then schedule the time that is needed" (p. 14).

Phase 5. Evaluate Results

The last phase in the process is to evaluate the program. Lewis (1983) stated "...the [planning] process is incomplete if it does not

include a systematic method for evaluating performance results...and the execution of plans" (p. 5). When evaluating, Lewis (1983) suggested identification of advantages and disadvantages of each in-service strategy. In the process of evaluation, (a) determine the impact of each strategy on the desired in-service goals, (b) establish the implications of each in-service strategy selected, (c) determine the acceptability of each in-service strategy by both participants and the community as a whole, (d) determine the costs incurred, (e) evaluate acceptability of each strategy by the staff, (f) select specific benefits gained by using each strategy, and (g) determine strengths/weaknesses of each of the strategies.

Both formative and summative evaluations are necessary because formative evaluation would help to readjust ongoing activities, and summative evaluation would provide a total picture at the end of each selected in-service activity.

In-Service Training Strategies

Bolam (1981b) defined in-service education for teachers as:

> ...those education and training activities engaged in by primary and secondary school teachers and principals, following their initial professional certification, and intended mainly or exclusively to improve their professional knowledge, skills, and attitudes in order that they can educate children more effectively. (p. 3)

In-service training activities can be grouped in approximately 13 categories, as listed below:

1. Brainstorming
2. Demonstration
3. Gaming/Simulation
4. Demonstration with practice
5. Group discussion
6. Intervisitation
7. Field Trips

8. Workshops
9. Roleplaying
10. Buzz Sessions
11. Lecture
12. Microteaching, and
13. Writing.

Implementation of in-service is done in numerous ways ranging from individual to institutional types. This section of the study provided information on some of the most acceptable and more common practices, techniques and strategies for in-service education.

1. Brainstorming: Brainstorming is an activity done in a group session in which ideas and suggestions are provided by group members. Special procedures are employed to avoid discussion, criticism or analysis. Brainstorming provides information about ideas and alternatives, influences opinions and attitudes, and induces positive attitudes towards alternative solutions. Recording of ideas for feedback is done and a follow-up is conducted on the discussion (Harris, 1989).

2. Demonstration: Demonstrations are done to stimulate or to inform and to develop participants' understanding of new techniques, procedures, materials, etc. During a demonstration, participants observe carefully planned presentations of real or simulated cases. The focus of all demonstrations should be defined, and demonstrators should be selected and informed of their task in advance. Follow-up activities should be conducted (Harris and Bessent, 1969).

3. Demonstration with Practice: Participants have an opportunity to try their hand at the activity (Harris, 1989).

4. Gaming/Simulation: An activity that combines decision-making and real-life elements of a simulation. It also includes the clearly specified rules for interaction and completion that are characteristic of games (Harris, 1989).

5. Group Discussion: The discussion on a given topic of concern is done by a relatively small group. It may or may not have any time limits, but it is advisable to have a time limit to avoid irrelevant discussions. Sharing of information, development of alternatives, developing an understanding of complex problems and situations, and arriving at a carefully considered decision are some of the objectives to be accomplished during group discussions (Harris, 1989).

6. Intervisitation: This is an activity where the participant leaves his place/location of employment and visits another location for the purpose of observing. The value of this activity is to develop and improve the participants' teaching techniques, pupil/teacher relationships, room arrangements and lesson planning. The person to be observed should be a skilled individual with specific skills to be imparted to the observer (Harris, 1989).

7. Field Trips: The field trip activity is characterized by a trip outside the school, and is designed to allow teachers or teacher groups to observe ongoing operations. Field trips can be helpful for changes in teacher attitude. They should be planned in advance. Specific objectives should be established at the outset and follow-ups should be made to assess the trip's worth (Harris, 1989).

8. Workshops: Workshops have a formal structure, emphasize practical problems, and try to get participants to do things rather than listen or talk about them. Effective workshops convert participants' experiences into learning. Assessing participant needs, specifying objectives, selecting resources, clarifying activities, allocating a budget, rehearsing the activities, etc. are part of the workshop planning process. An evaluation of the entire workshop by both participants and observers is a crucial component of the entire process (Harris & Bessent, 1969).

9. Role Playing: This strategy helps individuals to find personal

meaning within their particular work experiences through spontaneous dramatization involving one or more persons assuming roles in relation to specific problems in given situations. Role playing provides examples for discussion and stimulates interests and the acquisition of new attitudes and skills (Harris and Bessent, 1969).

10. Buzz Sessions: Buzz sessions are temporary groups which are formed by individuals to discuss specific topics. There is minimal structure to ensure interaction and individual opportunity to relate and express ideas. Verbal release of aggression, understanding, arriving at a consensus, identification of points of view, and stimulation of interest and commitment are but a few of the intended outcomes. There is usually a time limit to a buzz session under a designated leader. Notes are taken and submitted to the appropriate official(s) for decision-making (Harris, 1989).

11. Lecture: This is a prepared presentation on a specific topic of interest to the participants by one speaker. Audiences may be reached through (1) radio, (2) television or (3) written notes as in correspondence lectures usually used in distance education. Mobile units are sometimes dispatched from the central administration to go and provide lectures to targeted audiences in remote areas (UNESCO, 1979).

12. Microteaching: This strategy places emphasis on skill development for participating teachers. The teacher teaches mini-courses (lessons) to a small student group or other teachers. The activity is observed and critiqued and the teacher is given an opportunity to react. Students are allowed to provide feedback during the evaluation. The activities can be videotaped from the beginning to the end and an evaluation of the entire process (including critiquing) is made. Of special concern is teacher behavior (Bishop, 1976).

13. Writing: Writing curriculum guides, lesson plans and articles for journal publication in a supervised manner can be assumed to be a

form of in-service. Usually a presentation of the written material is done to an audience.

Organizing and Management of In-Service Education

The organization for teacher development planning in Sub-Sahara should strongly support the development of an effective affirmative force in leadership in the countries' education systems. This suggests that the Ministries of Education should play primary but not isolated roles for the development of teachers. State or country in-service agencies should adopt a broadly based endeavor concerned with local and intermediate educational problems, interests, and concerns. There are several advantages to be derived from a concerted effort directed toward the creation of in-service programs.

Morphet, Jesser, and Ludka (1972) stated the following possible advantages for using coordinated planning for education:

1. Increased attention to decentralized or client-oriented approaches develops and maintains the confidence of those for whose welfare the planning process is presumably designed.

2. The gap between planning and action can diminish significantly in that the involvement of local leadership in state planning enhances the necessary understanding of the relations between state and local needs and actions.

3. Coordinated planning should help develop more positive attitudes throughout the state concerning the need to examine the present and contemplate the future in a systematic fashion and, thus lead to a greater acceptance of change as a normal fact of life.

4. Through their encouragement of and involvement in state planning, state education agencies can enhance the partnership concept implied between the state and local education agencies in education matters. (p. 65)

Harris, Bessent, and McIntyre (1969) observed four basic sources of change to be critically analyzed when planning for change in school organizations. They were (1) environmental change, (2) structural change, (3) functional change, and (4) personnel change. Decisions to

make these changes should "take place at a number of levels in a variety of organization structures" (Hite & Howey, 1977). Hite and Howey (1977) presented seven organization types for in-service programs:

The Independent In-Service Program. The focus of this type of in-service program is to address individual teacher concerns. This type of in-service is usually teacher developed and is autonomous and accountable to the individual(s) involved. Specific prerequisites are essential before this of type program can be encouraged: availability of facilities, resources and individual interest. Several approaches to achieving this type of in-service can be used, i.e., correspondence courses, college courses, radio programs, television programs, observations and research projects.

In-service activities of this type can be managed at the building level thus maximizing teacher initiative and autonomy (Harris, 1989). However, the availability of resources such as money for incentives, schedules to free teachers for observations or to listen to programmed instruction via radio or television, and follow-up mechanisms to ensure that such activities are actually done would hinder or discourage some Sub-Saharan countries from pursuing this type of in-service program. Another major obstacle is the fact that teachers have enough income to voluntarily pursue individual professional development.

The Almost Independent In-Service Program. Here some common features are shared with the independent in-service program. Concerns are focused on the classroom situation which involves issues such as activities, skills, and student behavior. This approach may be used for situation analysis or to provide feedback to participants about their own behavior.

This type of in-service can be done at the building level after specific individual or small group needs have been identified. Orlich (1989) cited two reasons why this type of approach can be rationalized:

1. Fundamental reform comes only through the teachers who must implement any desired changes.

2. Teachers take reform seriously only when they themselves have identified their individual problems, determined their needs, and volunteered to seek help.

The Professional Organization In-Service Program. This type of program is organized and generated by professional organizations. Support from the entire school system may be possible. Professional teacher organizations for English teachers, science teachers, mathematics teachers, etc., may have power vested in them through policy structures to develop such programs. This method is probably more feasible to the countries than the two methods mentioned earlier. This program approach may involve radio and television lectures and demonstrations; workshops; and orientation activities on new curriculum, policy, and rules and regulations. Subject area teachers can be provided with experts to assist in different school settings with similar subject area needs. Remuneration can be provided through early release time or credit for teachers for professional growth point requirements.

However, group cohesiveness is essential for this approach to work efficiently. Each group would need to have a coordinator to ensure that group members receive all the required information pertaining to specific in-service activities. With proper policies and sound financial back-up, all the seven countries can use this method.

The Single Unit In-Service Program. This program is usually undertaken by a school unit to develop its own faculty or part of the faculty. Approved institutional goals may be part of the considerations to be made for developers of such a program, who are usually accountable to the local teacher in-service program administrator, principal or assistant superintendent. Howey (1981) noted several factors which promote growth in school-focused in-service. They include:

1. Clear understanding of what is successful with different pupils.

2. Frequent validation of one's personal and professional growth.

3. The frequent skills and support needed to engage in forums of systematic inquiry in the classroom.

4. Opportunities for sharing and demonstrating one's insights with others.

5. Time for introspection and reflection. (p. 17)

Many approaches can be used to enhance the effectiveness of the single unit in-service program. These include lectures, demonstrations, microteaching, radio and television programs, panel discussions, simulations, etc. Lawrence, Baker, Elzie, & Hansen (1974) stated:

1. School-based in-service programs concerned with complex behaviors tend to have greater success...than do college-based programs dealing with complex behaviors.

2. School-based programs, in which teachers participate as helpers to each other and planners of in-service activities, tend to have greater success in accomplishing their objectives than do programs that are conducted by colleges or other outside personnel without the assitance of teachers, and

3. School-based in-service programs that emphasize self-instruction by teachers have a strong record of effectiveness. (p. 8)

For all the countries selected, this approach is probably the most practical approach in terms of financial feasibility, trainer availability and scheduling convenience. To make this method a success, proper management activities have to be properly put into effect.

The Free Consortium In-Service Program. Usually by mutual agreement, three or more institutions enter a joint venture for teacher development. Formal and complex policy considerations have to be considered in relation to organization and commitment.

This method of in-service requires a designated coordinator from each of the involved institutions. At the outset, specific guidelines pertaining to clients, scheduling, involvement, locales for in-service,

resources, decision-making, scope of planning and designing of learning activities need to be clearly analyzed by all parties involved. Although this method might be cheaper in terms of money, skilled management personnel must be involved to make it work (Ryan, 1987).

The Free Partnership In-Service Program. Universities and schools are usually involved in this type of program. Non-educational agencies are also sometimes involved in the development of teacher skills. Financing, structure, and programs will vary greatly although the needs and goals of the school system will be greatly accommodated.

A willingness on the part of outside agencies to provide resources is essential. Harmonious relationships between business, government and educational agencies are essential for this type of in-service to be contemplated.

Teachers are free to avail themselves of a wide range of resources including mathematics laboratories, science materials, language kits, and courses which can be applied toward certification (Orlich, 1989). Computer centers can offer their assistance in introducing computers at different schools.

Legislative/Political In-Service Programs. Program organization and membership are prescribed by political and legislative actions. This type of in-service may be regionally based or may cover the entire educational system of a country.

Ironically, most of the in-service activities in the countries selected were found to be politically or legislatively initiated. The Ministries of Education set the pace, provided the resources, and implemented and evaluated established program activities. Perhaps most of the in-service programs were politically initiated in response to monetary donations from institutions such as UNESCO or the Agency for International Development (AID). As such, most of the in-service programs were terminated or phased out when funding ended.

Although the countries selected have benefited from international aid, they still must allocate larger portions of their local education budgets for the continuation of these in-service programs. Nelson (1976) identified the following five basic organizational structures for in-service programs which can be applied to the planning of in-service programs in Africa as:

1. The Higher Education Model,
2. The Contemporary Institute Topics Institute,
3. The Commerce Model,
4. The IHE-LEA Cooperative Model, and
5. The Systematic Approach Model. (p. 75)

Razik (1972) contended that four organizational specifications should be developed for the instruction model to clarify how the teacher training program is to be set up. He noted these specifications as:

1. Demonstration of mastery of the basic knowledge pre-requisite to the development of instructional competencies (Foundation phase).
2. Demonstration of instructional/ noninstructional and interpersonal competencies under simulated classroom conditions (laboratory phase).
3. Demonstration of instructional/ noninstructional and interpersonal competencies in an actual (supervised) classroom (practicum phase).
4. Demonstration that all the knowledge, competencies, and abilities required of the career teacher have been integrated into a unique and personally relevant teaching style (inter-phasic). (p. 37)

Due to the fact that all seven countries studied had centralized systems of education, it was logical to surmise that initiation of teacher development and in-service programs had come from the Ministries of Education (Greenland, 1983). Harris, McIntyre, Littleton and Long (1979), when referring to decentralization, stressed that "there is nothing so powerful as an idea whose time has come. But there is nothing so fragile, apparently, as a new program..." (p. 61). They further contended that:

> Even so, the rate of development and the quality of the programs that emerge will be greatly influenced by the leadership for change that administrators, supervisors, teachers, and citizens exert. Personnel administration must contribute in crucial ways to the improvement process. (p. 61)

In organizing for faculty development, Meesok, Ta Ngoc, Damiba, Aide, Hufner, Morris, Perfecto, & Setijadi (1980) observed the common process followed by most systems:

1. the upward flow of information
2. the choice of alternative courses of action, and
3. the downward flow of decisions. (p. 144)

Problems were, however, found to be inherent in a solidly upward or downward process of information flow.

UNESCO (1973) identified in one study several problems in LDCs which were attempting to plan for in-service activities. These problems were:

1. Need for planning and coordination at the national level for greater effectiveness.
2. Lack of systematic planning based on well-conceived scale of priorities, and directed to the use of existing institutional and other resources without unnecessary duplication of efforts.
3. Absence of clearly identifiable budgetary support for in-service education is essential for developing a systematic plan.
4. Inadequacy of institutional support for in-service education.
5. Lack of clear definitions in the planning process as to the contributions that the various institutions can reasonably be expected to offer.
6. Lack of "network" services at the national, regional, local and school levels for maximum coordination of efforts.
7. The wide gaps which are evident in the in-service education programs related to areas in which resource persons and resource institutions have not yet been built up on an adequate scale: education in rural areas, training for instructional leadership, and evaluation of in-service education programs and their methods. (p. 25)

The lack of proper management and planning techniques was a major problem in school organizations in developing nations. Coombs (1967) stated:

> What is at issue here is not the individual moral worth of educational administrators, their devotion to duty or their task for very high order. But do they have the professional training, competence and instruments to respond to the complex new conditions facing educational systems?... It is that they have not been recruited, or trained, or armed with the tools and techniques of modern management in order to deal effectively with the many disorders that jointly make the over-arching crisis in today's educational systems. (p. 136)

Several sources were reviewed in developing concepts relevant to the implementation of in-service programs. Kaufman (1972) and Corrigan (1969) offered an overall educational management process model which included the following steps:

1. Identification of the problem (based upon needs);
2. Determination of solution requirements and solution alternatives;
3. Selection of solution strategies from among alternatives;
4. Implementation of selected strategies to achieve the required goals;
5. Determination of performance effectiveness, and
6. Revision of above activities as required at any step in the process.

McGrath's (1972) problem-based/problem-solving (P-b/P-s) model offered a scientific approach to educational problem solving activities. In the P-b/P-s approach, the steps involved consisted of the following:

1. Searching/hearing/decisioning
2. Problem statement
3. Pool of strategies
4. Program parameters established
5. The in-service program, and
6. In-service evaluation.

A good portion of his book suggested using this approach for in-service implementation.

Lyden and Miller (1969) developed a model which included significant concepts of planning, programming, and budgeting systems (PPBS). Their model involved these steps:

1. Reexamining objectives
2. Opening new alternatives
3. Formulating the problems
4. Selecting objectives
5. Designing alternatives
6. Collecting data
7. Building models
8. Weighing cost against effectiveness, and
9. Testing for sensitivity.

Winer (1983) developed components of a multi-strategic planning process. The steps included in his model were:

1. Discovering the objectives of the organization.
2. Ranking the discovered objectives.
3. Discovering strengths, weaknesses, opportunities and threats (SWOTs) of the organization with respect to the top rank objectives.
4. Reviewing and, if necessary, revising top rank objectives.
5. Creating a long list of objectives for each top rank objective,
6. Creating more strategies and matching objectives with strategies by drawing a hierarchy of objectives, strategies by drawing a hierarchy of objectives, strategies, tactics (HOST) diagram.
7. Developing action programs for implementation (APFISS) for selected strategies, including control systems and contingency plans.
8. Beyond planning: monitoring strengths, weaknesses, opportunities, threats, and results. (p. 32)

Multi-strategic planning is a new approach which provides creativity of new ideas; derives logically from the top objectives and strengths, weaknesses, opportunities, and threats (SWOTs) of the organization, and allows planners and managers to use their time efficiently because meetings are well defined and kept on track.

Mirabile (1986) stated:

> The success of your career development program depends on how well it dovetails with corporate culture, goals and objectives. Using action research in program design can ensure needed integration. (p. 40)

Nadler (1981) outlined several planning approaches which can be used in education systems. The basic three objectives of Planning and Design (P&D) are:

1. To maximize the effectiveness of a recommended solution
2. To maximize the likelihood of its implementation
3. To maximize the effectiveness of resources used in the P&D effort.

Although variations exist in the research strategy in terms of interactions, decision-making processes, etc., the basics of the conventional P&D approach are as follows: (1) define the problems, (2) formulate the problem, (3) explore alternatives, (4) select the solution, (5) detail the solution, (6) implement the solution, and (7) evaluate the solution.

<u>The Need for Policies on Staff Development</u>

The compelling need to systematically structure in-service activities in Sub-Saharan countries is an issue which needs immediate attention from the ministries of education. The first and foremost need is to "...strengthen capacity in the policy area..." (Moock, 1984, p. 225).

In another observation, Fuller (1986) agreed with Baum and Tolbert (1985) who observed:

> Teacher training programs and in-service training programs are poorly designed and equipped. Ways

> to deal with these shortcomings include expanding training facilities, strengthening in-service training, improve the quality of training programs, and providing teachers with resources and incentives that will help them to improve the quality of their instruction. (p. 138)

Problems of (1) lack of resources, (2) ineffective teacher education programs, (3) lack of qualified teachers, and (4) poor budgeting for in-service training programs can be ratified by "the design of effective policies and development strategies..."(Carceles, 1979, p. 165). Klitgaard (1986) also stated that policy considerations for in-service teacher development will "...create incentives of several kinds" (p. 45). He suggested that specific policy provisions at the national, regional, and local levels should be developed with specific reference to the scope and duration of, and the activities needed for specific development programs.

The Center for Educational Research and Innovation (1978) presented specific questions and issues that must be addressed when designing in-service programs such as:

1. What kind of legal framework is necessary and feasible for a teacher in-service program?
2. How much release time and funding for in-service should a teacher be entitled to in, say a 40 year career?
3. Should in-service be given priority over pre-service education training?
4. Should funds be specifically earmarked for in-service?
5. What are the implications of the accountability movement for in-service?
6. How can political support and funding be obtained for release based in-service when teachers receive much longer vacations than average workers?
7. What are a teacher's professional obligations in related to in-service training? (p. 47)

In order to systematically respond to policy planning questions above, King (1969) noted:

> Even a simplified model indicates that an educational system has to respond to four different types of demand: (1) the demand of the individual for his personal potential and for preparation for a career, (2) the demand of the economy, which as part of national investment, requires a future manpower with highly developed skills relevant to economic needs, (3) the demand...for more education as desirable in itself, (4) the demand inherent in social change, extension of equality of opportunity, the function of stabilizing, breaking down or replacing existing social strata in accordance with politically determined goals. (p. 5)

To enhance in-service policy formulation, Cantrol (1965) suggested that it was essential to observe such parameters as human potentials, participants' perceptions about their job and organization, and about themselves, values, norms, and rewards. He further pointed out that policies should be periodically reviewed to ensure their effectiveness in terms of organizational goals and individual member satisfaction.

Policy-Formulation Parameters to Enhance In-Service Education Programs in Sub-Saharan Africa

When formulating policies for in-service programs several parameters should be taken into consideration. Human potentials, perceptions about the school, values, norms, and rewards are essential components of a healthy school system. Since policies are there to guide human behavior, they should be reviewed periodically to ensure their effectiveness in terms of organizational goals and teacher satisfaction.

Potentialities. Cantrol (1965) speculated that individuals who were unaware of their possibilities for action and unaware of their needs and problems tended to acquiesce to circumstances. These people showed little or no involvement in school and district activities to improve schools and their performance. However, once these people were made aware of new possibilities, they became better teachers and community participants. They became psychologically flexible and pursued new courses of action. They generated goal-related perceptions and adopted new values.

Perceptions. Perceptions are functions of an individual's (1)

situational field or settings, (2) previous societal, cultural, and environmental conditioning, and (3) unique sensory and response capacities, capabilities, training, and experiences. "An individual's process of perception includes the selection, organization, appraisal, and interpretation of specific stimuli in a situation. Values, goals, needs, desires, interests, and experiences play an important part during such a process" (Miller, 1970, p. 28).

Miller also stressed that an individual can use strong positive and negative biases to insure the amplification of selected perceptions in one situation and insulation from undesirable stimulation in another.

Values. Concerning values, Theodorson and Theodorson (1969) stated that:

> Values provide the generalized standards of behavior that are expressed in more specific, concrete form in social normals. Because of the generalized nature of values, it is possible for individuals who share the same values to disagree on specific norms embodying the values....Because of the strong emotional feelings attached to values and because they serve as standards for judging concrete rules, goals, or actions, they are often regarded as absolute although the formation and comprehension of values evolve in the normal process of social interaction. (pp. 455-456)

In-service activities are to be regarded as an attempt to change human/organizational behavior. Miller (1970) studied the influence of human values in altering individual behavior, and concluded that:

1. They principally determine what he regards as right, good, worthy, beautiful, ethical, and so forth....
2. They also provide the standards and norms by which he guides his day-to-day behavior....
3. They chiefly determine his attitudes towards the causes and issues (political, economic, social, and industrial) with which he comes into contact daily.
4. They exert a powerful influence on the kinds and types of persons with whom he can be personally compatible and the kinds of social activities in which he can engage.

5. They largely determine which ideas, principles, and concepts he can accept, assimilate, remember, and transmit without distortion.

6. They provide him with an unlimited number and variety of moral principles which can be employed to rationalize and justify any action he has taken or is contemplating. (p. 78)

Human values must be considered of paramount importance if any form of reward is to be provided to teachers who participate in in-service activities. Improved policy implementation would contribute to more stable and rational behavior in the midst of social differences.

Norms. Norms are defined as "...rules or standards of behavior... which serve in controlling group actions, thoughts, and emotions" (Holmans, 1950, p. 123). Holmans further defined a norm as:

> ...an idea in the minds of the members of a group, an idea that can be put in the form of a statement specifying what the other members of the group should, or ought to do, or are expected to do, under given circumstances. (p. 123)

Norms should be considered in policy formulation so as to help sanction teacher behavior. Sanctioned behavior or belief, as construed by Katz and Kahn (1978), is defined by three criteria:

1. There must be beliefs about appropriate and required behavior for group members as group members.

2. There must be objectives or statistical commonality of such beliefs; not every member of the group must hold the same idea, but a majority of active members should be in agreement.

3. There must be an awareness by individuals that there is a group support for a given belief. (p. 52)

Although norms are informal rules governing what group members are supposed to do, they are not to be construed as actual behavior. They are imperatives or "shoulds" and are not limited in their application. An organization should consider its group members' needs and induce a strong willingness to stay in the group (Zaleznik & Moment, 1964).

Rewards. Zaleznik and Moment (1964) maintained that in order for a

group to maintain its capacity to function coherently, there must be a system of rewards and punishment:

> When members conform to the norms and are rewarded, they presumably will be motivated to continue to conform. On the other hand, where deviations from the norms engender punishments that succeed in restoring behavior to an approximation of the norm, control exercised by the group is enhanced....And there can be no more devastating breakdown in social control than that which follows the infliction of punishments that are too severe or the continuation of punishment when deviation no longer exists. (p. 111)

Theodorson and Theodorson (1969) stressed that an effective reward system depends upon the way in which any society or group sanctions conformity:

> Such a system involves not only the rewarding of honors and disadvantages, but also the withholding of negative sanctions. Reward systems do not necessarily represent the influence of the group as a whole, but may be primarily operated for those who hold power and authority...on the basis of their claim to represent and express the will or best interests of the group or society. (p. 350)

Identifying and providing for the stated parameters entails good system planning practices and the desire to satisfy group members of an organization.

In Bottom's (1975) opinion, in-service education should enable educators to acquire the competencies needed to implement educational activities directed toward specific student needs, improve their own or expected goals of professional development, and meet their own goals of personal growth.

Bolam (1978), in a discussion of In-Service Education for Teachers (INSET), revealed five components which would enhance the formulation of policy when he cited the Swedish National Board of Education which distinguished five types of in-service education:

> INSET 1: The one whose content is coordinated with basic training. These are components of basic training which demand amplification via INSET after the teachers have acquired a certain measure of professional experience.

> INSET 2: This is of locally determined content. Within the individual school of municipality, groups, or individuals, whether they belong to the school management, the teaching staff or other personnel category, observe INSET requirements which may often be peculiar to their school or school system.
>
> INSET 3: This in-service program is of centrally and regionally determined content. Central and regional authorities are capable of the continuous surveillance of in-service requirements, e.g., in connection with their work on school evaluation, curricular development and research and development activities.
>
> INSET 4: The content of this type of in-service program is determined by educational reforms or by thoroughgoing curricular revisions. Reforms or changes of this kind often necessitate special individual needs.
>
> INSET 5: This is an in-service type program whose content is determined by specific individual needs. p. 16)

Due to the broad definition of the term "in-service training," some basic but fundamental problems are inherent in any type of program geared at staff development.

Yovanovich (1987), in a study on continued professional development of teachers, concluded:

> 1. Continued professional development for teachers must be varied in nature....
> 2. Professional organizations must be recognized as a key element.
> 3. Teachers and administrators must work together in a coalition.
> 4. On-going long term commitments are the foundations for effective continued professional development for teachers. (p. 2551-1A)

Costs For In-Service

As with any other national project, designing and implementing teacher in-service programs requires resources. Cost in terms of time and money were found to be a major problem in the selected countries due to a lack of financial resources and of qualified personnel to provide required services (UNESCO, 1985).

Greenland (1983) stated that:

> A number of INSET activities surveyed in this report benefited from foreign aid in one form or another, and although the total value of aid may be known to the recipient government, it is difficult for the latter to calculate the cost of, for example, replacing expatriates by local personnel. (p. 121)

In most countries studied, INSET activities were either terminated or disrupted by the following factors which reflected the financial aspect of in-service activity: (1) low salaries for tutors at the institutes; (2) lack of adequate housing for traveling tutors; (3) poor facilities, (4) long travel distances for teachers from rural areas; and (5) funding for most in-service activities by external agencies. Item four created problems in making long-range plans because of the uncertainty of the duration of funding (Greenland, 1983, p. 13).

In his concluding remarks on teacher in-service activities in 13 African countries, Greenland (1983) stated:

> Indeed, the research team agreed from the outset that INSET for initial certification, for up-grading, for new roles and for curriculum renewal are such different species that any worthwhile generalizations must be confined to each species, if not to identifiable varieties within each species....The extent to which these issues are eventually clarified in the countries represented by the research team depends logically on the resolution of a much greater issue, namely the relative importance to be accorded to teacher training as a variable in the process of educational development.... The scale of the teacher force to be re-trained, the conservatism of existing training structures, and the teacher's own perception of their career needs are constraints powerful enough to daunt the most adventurous innovator...the best way forward is to encourage policy-makers to formulate priorities in these terms but at the same time provide detailed examples of good INSET practice which the enthusiast can quickly adapt and adopt. (p. 125)

A good starting point to develop effective in-service programs would be to develop a practical educational philosophy and rationale for in-service programs. Establishment and coordination of policies at the national, regional, and local levels should be done in a participatory manner. Leaders of the selected countries should also study effective

systematic planning procedures for teacher development that have been used in developed and other developing nations.

Relevancy of Policies and Management Issues to Sub-Saharan Countries

Specific country problems were identified during the review of the literature related to in-service program development. The problems which contributed to poor quality teacher corps were primarily due to lack of the following: (1) well defined policies to promote and encourage in-service participation, (2) personnel with management skills to ensure programs were properly planned, coordinated, implemented and evaluated, (3) continuity due to lack of incentives and interest, (4) adequate equipment to properly implement designed programs, and (5) uniformity and agreement as to what the best approaches were to meet the needs.

The problem of teacher distribution was also a major problem due to poor policies and bad management. The World Bank (1988) report stated only 24% of Botswanians, 18% of Kenyans, 12% of Malawians, 14% of Tanzanians, 7% of Ugandans, 48% of Zambians, and 27% of Zimbabweans were urban dwellers. This puts the majority of school age pupils, and thus most of the teacher corps, into rural settings. As a result of their geographic distributions, the majority of teachers were unable to receive adequate in-service training. Specific policies can be designed to address those infrastructure requirements for in-service programs in the Sub-Saharan countries.

Published Requirements for Better In-Service Programs

A summary of requirements by country for teacher in-service programs is provided below. These requirements were arrived at by identifying from the literature specific areas of concern in each country. In order to establish effective in-service programs, each of the countries needs to address these issues realistically and then plan for those selected in-service activities.

Requirements for Botswana

1. Develop sound policies which encourage in-service participation especially at the local level (Botswana Ministry of Education, 1986).

2. Allocate a good portion of the education budget for in-service training programs (Botswana Ministry of Education, 1986; Eshiwani, 1988).

3. Hire and train local management personnel who are familiar with local needs (Cameron et al., 1983; Kurian, 1985; Lockhart, 1988).

4. Encourage local businesses to produce materials and equipment for workshops and hands-on activities (Botswana Ministry of Education, 1986).

5. Equitably distribute the available resources among urban and rural schools (Botswana Ministry of Education 1986; Greenland, 1983).

6. Provide incentives to encourage teacher participation (Botswana Ministry of Education, 1986; Hull, 1987).

7. Encourage local communities and businesses to contribute to in-service activities (Botswana Ministry of Education, 1986; Lockhart, 1988).

Requirements for Kenya

1. Develop better policies geared toward the development of in-service programs (Kenya Ministry of Education, 1988; Safuna, 1988).

2. Allocate funds for in-service activities on a continuous basis (Cameron et al., 1983).

3. Decentralize decision-making concerning in-service activities (Kenya Ministry of Education, 1989).

4. Identify and target specific groups rather than encourage everyone to attend suggested activities (Kenya Ministry of Education, 1989).

5. Equitably distribute resources among rural and urban teachers for in-service activities (Kenya Ministry of Education, 1989).

6. Encourage local businesses to produce instructional equipment and materials (Kenya Ministry of Education, 1989; Safuna, 1988).

7. Provide enough activities for specialized personnel (Kenya Ministry of Education, 1989).

Requirements for Malawi

1. Before any sound budgetary considerations can be made for in-service programs, revamp the total economic picture (Ministry of Education and Culture, 1985).

2. Increase teacher salaries in order to retain good teachers in service (Ministry of Education and Culture, 1985; Malewezi, 1988).

3. Change policy in order to find feasible solutions concerning teacher development (World Bank, 1988; Malewezi, 1988).

4. Hire and train competent management personnel in the education sector (Ministry of Education and Culture, 1985).

5. Increase funding for materials and equipment production (Ministry of Education and Culture, 1985; Cummings, 1987).

6. Equitably distribute the available resources between rural, private and urban schools (Ministry of Education and Culture, 1985).

7. Provide incentives to encourage teacher participation in in-service programs (Ministry of Education and Culture, 1985).

8. Encourage local businesses and community leaders to get involved in in-service activities (Ministry of Education and Culture, 1985).

9. Identify and tailor specific in-service activities to specified teacher groups (Mininstry of Education and Culture, 1985).

10. Decentralize in-service activities (Ministry of Education and Culture, 1985).

Requirements for Tanzania

1. Redesign policies to accommodate a wide variety of in-service approaches (Husen & Postlethwaite, 1985; Tanzania Ministry of Education, 1988).

2. Plan some in-service programs in the context of knowledge and skills required for rural development (Husen & Postlethwaite, 1985).

3. Incorporate the Ujaama concept of "cooperative development projects" in in-service projects for practical subjects (Husen & Postlethwaite, 1985).

4. Encourage local production of materials and equipment for in-service education (Tanzania Ministry of Education, 1988).

5. Encourage business and community participation in in-service programs (Tanzania Ministry of Education, 1988; Clermont & Maimbolwa, 1985).

6. Decentralize in-service activities to provide local autonomy to local schools (Husen & Postlethwaite, 1985).

7. Increase government funding for in-service programs (UNESCO, 1979).

8. Provide a variety of reward systems for in-service participants (Husen & Postlethwaite, 1985).

9. Provide services on a regional basis in order to concentrate efforts and manpower distribution (Tanzania Ministry of Education, 1988).

Requirements for Uganda

1. Develop country economic outlook (Husen & Postlethwaite, 1985).

2. Allocate a good portion of the education budget for in-service activities (UNESCO, 1969).

3. Design programs to accommodate regional differences in language instruction (Odaet, 1982).

4. Encourage local and business leaders to participate in in-service programs by providing facilities and equipment (UNESCO, 1969).

5. Redevelop policy structures to accommodate a variety of in-service practices (World Bank, 1988).

6. Redesign teacher salary schedules to attract more competent and qualified teachers (UNESCO, 1969).

7. Hire and train competent management personnel in the education sector (Husen & Postlethwaite, 1985).

8. Equitably distribute the available resources and equipment between rural and urban school settings (Husen & Postlethwaite, 1985).

9. Decentralize the decision-making process (UNESCO, 1969).

10. Provide lucrative incentives for teacher participation in in-service programs (UNESCO, 1969).

Requirements for Zambia

1. Develop country economic outlook (Cameron et al., 1983).

2. Allocate a good portion of the education budget for in-service activities (Cameron et al., 1983; Mwanakatwe, 1974).

3. Encourage community and business leaders to participate in in-service programs by providing materials, facilities and equipment (Cameron et al., 1983; Kaluba, 1986).

4. Hire and train competent personnel to manage and plan for in-service activities (Cameron et al., 1983; Mwanakatwe, 1974).

5. Decentralize the decision-making process on the nature of in-service activities (Draisma, 1987; World Bank, 1988).

6. Equitably distribute the available resources between rural and urban school systems (Draisma, 1987; Mwanakatwe, 1974).

7. Redevelop policy structures to provide a variety of in-service approaches (Lungu, 1985; World Bank, 1988).

8. Provide more lucrative incentives to encourage teacher participation (Cameron et al., 1983).

9. Encourage local production of materials and equipment (Cameron et al., 1983).

Requirements for Zimbabwe

1. Decentralize policies to provide for local autonomy in determining the kinds of in-service activities desired (World Bank, 1988; Simmons & Alexander, 1980).

2. Encourage local production of materials and equipment for

in-service activities (Ministry of Primary and Secondary Education and Ministry of Higher Education, 1988; World Bank, 1988).

3. Encourage business and local leaders to participate in in-service actitivies (Schiefelbein & Simmons, 1981; Ministry of Primary and Secondary Education and Ministry of Higher Education, 1988).

4. Allocate a good portion of the education budget for in-service programs (Ministry of Primary and Secondary Education and Ministry of Higher Education, 1988; Government of Zimbabwe, 1985).

5. Equitably distribute the available resources between urban and rural schools (Jaji, 1988; Zimbabwe Government, 1981).

6. Provide a variety of incentives to encourage teacher participation (Ministry of Primary and Secondary Education and Ministry of Higher Education, 1988).

7. Identify and target specific groups to be retrained in specific areas such as special education or practical subject areas (Ministry of Primary and Secondary Education and Ministry of Higher Education, 1988; Government of Zimbabwe, 1985).

A summary matrix of country requirements which must be met in order to implement in-service programs and achieve adequate results is presented in Table 20. A systematic selection of feasible and economic in-service strategies can greatly reduce wastage of resources. Lack of continuity in implemented programs can be reduced through constant monitoring of teacher practices and leadership behavior. Local control of in-service activities and decision-making pertaining to rewards, schedules, and distribution of materials and equipment can greatly enhance any government's efforts to deal with remote and hard-to-reach school sites.

Although infrastructure variables such as poor transportation systems, lack of efficient communication systems, climatic conditions, lack of electricity in remote school systems, poor teacher morale, and

Table 20.

Summary Matrix of Country Requirements Suggested from the Literature

Requirements	Botswana	Kenya	Malawi	Tanzania	Uganda	Zambia	Zimbabwe
Improve Policy Provision	x	x	x	x	x	x	x
Allocate Budget for In-Service	x	x	--	x	x	x	x
Improve School Management Personnel	x	--	x	--	x	x	--
Involve Business and Community	x	x	x	x	x	x	x
Equitable Distribution of Resources	x	x	x	--	x	x	x
Provide Incentives	x	--	x	x	x	x	x
Encourage Production of In-Service Material	x	--	--	x	--	--	--
Decentralize Decision-Making	--	x	x	x	x	x	x

Note: (a) x = those requirements identified from the cited sources.
(b) -- = cited sources did not identify these requirements
(c) Most of the countries would need to meet all requirements above although the cited sources did not so indicate.

Table 20. (Continued)

Requirements	Botswana	Kenya	Malawi	Tanzania	Uganda	Zambia	Zimbabwe
Target Specific Groups	--	x	x	x	x	--	x
Vary In-Service Activities	--	x	--	--	--	--	--
Improve Country Economy	--	--	x	--	x	x	--
Improve Teacher Salaries	--	--	x	--	x	--	--
Increase Funding for Materials/ Equipment Production	--	--	x	x	--	x	--
Incorporate Ujaama Concept	--	--	--	--	--	--	--
Target Specific Content Areas	--	--	--	x	--	--	--

Note: (a) x = those requirements identified from the cited sources.
(b) -- = cited sources did not identify these requirements
(c) Most of the countries would need to meet all requirements above although the cited sources did not so indicate.

other problems tend to disrupt efforts to establish in-service programs, competent leaders should be able to identify and implement in-service strategies conducive to their own environment based on the available resources. Indicators for each of the selected countries' potential to implement in-service programs were selected and are discussed below.

Evidence in Support of Proposition II

Data Collection

Albert (1987) defined indicators as "registers used to predict the course of the economy on the basis of the performance of certain economic processes" (p. 228). In order to assess each country's potential to adapt and implement in-service practices from other developing countries, several indicators of performance were identified and selected for analysis.

Data on economic, social, and technical indicators were identified from The World Bank, Europa Yearbook, and United Nations documents. The data would provide some degree of measure of performance by each country and help to determine each country's ability to implement an in-serivce program.

A concerted effort was made to limit the selection of data to international sources because these sources use data collection techniques which conform to methodologies of the United Nations agencies.

Full comparability cannot be insured and care must be taken when comparing and interpreting these indicator data. The World Bank (1987) noted specific problems to be encountered when working with data from developing countries and stated:

> The statistical systems in many developing countries are weak, and this affects the availability and reliability of the data. Readers are urged to take these limitations into account in interpreting the indicators, particularly when making comparisons across economies. (p. 2)

The selected indicators were grouped into three categories, (1) economic indicators, (2) social indicators, and (3) technical indicators.

The economic indicators selected include: (a) the public expenditure on education showing average annual growths for the years 1970-1980 and 1980-1983; (b) teacher salaries for elementary and secondary school teachers for 1983 as a percentage of per capita income; (c) the external debt of the education sector as a percentage of total country debt for 1980 and 1984; (d) the national average rates of inflation for the periods 1965-1973 and 1973-1984; and (e) the recurrent per pupil expenditure for elementary and secondary education as a percentage of the Gross National Product.

Averages for the seven countries were calculated for each of the variables. The primary source for these data was the World Bank (1988) Report on Education in Sub-Saharan Africa. It should be noted that data which were not available for the selected years were substituted with data from another year by the World Bank.

Five variables were selected for social indicators. Again, the primary source consulted for this data was the World Bank Report (1988) on education in Sub-Saharan Africa. The first indicator was the population density per square kilometer. Data chosen for this indicator were for observed (1980-85) and projected (2000-2025) data for each of the countries. The annual rates of population change for 1980-83 and 1985-1990 were also provided. Urban population as a percentage of total country population for 1965 and 1984 was selected for the seven countries. Tribal languages were chosen as an indicator of homogeneity or diversity in each of the countries. The more languages there were, the more diversity there was assumed to be. The last variable in this category was the gross enrollment ratio of students. Enrollment ratios for elementary and secondary students were collected for 1980 and 1983. Averages were computed for the seven countries for each of the indicator variables.

Technical indicators were chosen as measures of efficiency. These indicators would determine the technical aspects of implementing in-service programs (Albert, 1987). Ten variables were selected for technical indicators. Data for population and country size were provided for comparison purposes, not as technical data. Technical indicators included radio receivers, televisions, book publishers, daily newspaper circulation, number of periodical titles published, telephones, railway lines, roads, automobiles (including commercial vehicles), and electricity consumed in megawatts for each of the seven countries. The selection of methods/means for the delivery systems of the in-service programs would be contingent upon the quantity and quality of these technical indicators.

Indicator Rating

Indicators were rated for country potential by a panel familiar with Sub-Saharan Africa. This panel was composed of a group of 15 University of Alabama at Birmingham (UAB) students. An attempt was made to contact a total of 30 students -- the total of all Sub-Saharan African students at UAB. Twenty-two were contacted, with 7 declining to participate. Ten of the participants were in graduate school and 5 were undergraduates. Three of the students were studying engineering, 7 were studying business, 1 was studying education and 4 were studying computer science. Their geographical distribution was as follows: 5 were from Kenya, 2 were from Uganda, 1 was from Zimbabwe, 1 was from Sudan, and 6 were from Nigeria. Those students selected were born and raised in Africa, and attended elementary and secondary schools in Africa. Their knowledge of Africa was assumed to be essential for rating the indicators.

Rating Methodology

First, the panel was provided with the indicator data for each country to study individually. Then an explanation of the rating system used by Kurian (1984) was provided. Kurian (1984) rated over 100

countries world-wide according to performance in selected indicators. The ratings were then ranked into four categories: top ten, high medium, low medium, and bottom ten. For each of the indicators, a country's performance was rated as being in the top ten, high medium, low medium, or bottom ten. Points were awarded, ie., top ten, a 4; high medium, a 3; low medium, a 2; and bottom ten, a 1. Thus, for every indicator selected, points were awarded indicating that country's potential to use that indicator as a method/means when implementing in-service programs. It should be noted that whereas a score of 4 is an advantage under radio services, it is a disadvantage as a measure of ethnic diversity. This would mean that there are numerous different groups and subgroups in that country which would create cultural differences (Kurian, 1984). Such diversity could create barriers to the efficient implementation of in-service programs.

Significance of the Indicators of Performance

Economic Indicators (Table 21)

Public Expenditure on Education

Economic indicators are very important when planning to introduce and implement an in-service training program. The average annual growth rate of public expenditure on education is important because it gives the planner a sense of direction as to whether government appropriations for education will allow for new programs to be implemented, especially when there are many expenses to be incurred.

Teacher Salary

The trend of teacher salaries needs to be considered as an important indicator because some types of activities such as college courses and seminars might involve teachers paying their own expenses for items such as lodging, transportation, and registration. When teachers' salaries are very low and do not show any signs of increasing significantly, plans might have to be made to pay such expenses at the Ministry or district

Table 21.

Economic Indicators for Selected Countries

Country	Public Expenditure On Education Average Annual Growth Rate		Teacher Salaries As Multiple of Income Per Capita		External Debt of Education Sector as % of Total Country Debt		Average Annual Rate of Inflation		Recurrent Per Pupil Expenditure as % of GNP Per Capita			
			Elementary	Secondary					Elementary		Secondary	
	1970-80	1980-83	1983	1983	1980	1984	1965-73	1973-84	1980	1983	1980	1983
Botswana	20.9	0.6	3.1	5.4	5.3	8.0	4.4	9.8	14	12	64	62
Kenya	11.2	- 7.8	3.6	3.9	1.0	1.7	2.3	10.8	13	12	37	22
Malawi	2.5	- 5.1	3.5	12.4	3.4	7.7	4.5	9.4	8	6	131	124
Tanzania	8.2	- 2.4	2.8	28.6	1.5	1.8	3.2	11.5*	12*	12	15	343
Uganda	17.7	31.4	1.3	11.3	3.5	3.3	5.6	64.5	4	4	46	69
Zambia	0.8	13.5	6.3	10.5	1.8	1.9	5.8	10.5	10	15*	60	101*
Zimbabwe	9.9	9.2	5.6	10.0	0.0	0.0	1.1	11.4	24	17	128	42
Average	5.1	5.6	3.7	11.7	2.4	3.4	3.8	18.3	12.1	11.1	86	131

Source: World Bank. (1988). Education in Sub-Saharan Africa: Policies for adjustment, revitalization and expansion. Washington, DC: World Bank. (p. 142).

Note: *for years other than those indicated.

level. Teachers' salaries were found to be substandard when compared with those for developed countries.

External Debt of Education Sector

If the education sector is heavily indebted, there is a strong probability that there will be very few innovations made. Due to lack of revenue and thus a lack of incentive pay for trainees and trainers, implementing an in-service program might prove to be fruitless. As observed in the 1980 and 1984 data, debts for the educational sector as a percentage of total country debt rose in all the selected countries except for Zimbabwe. This indicates that it would be difficult to generate sufficient revenue to introduce new programs in some of the countries.

Average Annual Rate of Inflation

The data collected in Table 21 show that inflation rose in all of the selected countries. Uganda experienced the largest increase from 5.6% to 64.5% during the period 1980-1984. When considering the implementation of an in-service program, one must assess the impact of inflation on whether the system can afford required resources and equipment. Some of the equipment might have to be bought from other countries which would require that greater foreign exchange reserves be used due to the devaluation of local currency.

Recurrent per pupil expenditure

Recurrent per pupil expenditures as a percentage of Gross National Product per capita fell for both elementary and secondary levels in Botswana, Kenya, Malawi, and Zimbabwe between 1980-83. When there is a decline in the appropriations per pupil, there is a probability of a decline in the quality of education. When there is a decline in the quality of education, a variety of less expensive in-service approaches might have to be tried to efficiently develop teachers.

Inflation rate

Inflation in all the countries rose, with the highest rate for 1973-84 being in Uganda with 64.5%. Regional averages for inflation more than doubled for all of the selected countries. Inflation indicators are very important for they signal total economic trends. Educational planners would need to determine the affordability of new programs and equipment before selecting the in-service strategies.

The list of economic indicators is not exhaustive in nature, but was intended to provide some basic information on the complexity of the problem of teacher shortages in developing countries and the interplay of the selected indicators in the whole process. The interrelatedness of these economic indicators is of paramount importance to the educational planner because focusing wholly on one indicator might mean totally neglecting another.

Social Indicators (Table 22)

Five variables were selected in this category; they included (1) the population density for each country, (2) the annual rate of population change, (3) the urban population as a percentage of total population, (4) the number of languages spoken in each of the countries, and (5) the gross enrollment ratios for elementary and secondary students. These five indicators are not exhaustive in nature, but are meant to provide the reader with basic social indicators which may influence the implementation of an in-service program. Statistics for social indicators were selected from The World Bank (1988) report.

Population Density

Population density was selected because it affects the ease with which persons can be reached. In areas where population is sparse, communication can be very difficult, especially in the absence of telephones, televisions, reliable transportation and daily newspaper circulation. Botswana had the least population density between 1980-85

Table 22.

Social Indicators

	Population Density Per Km^2		Annual Rate of Population Change		Urban Population as % of Total Population		Languages Spoken		Gross Enrollment Elementary		Gross Enrollment Secondary	
Country	1980-85	2000-25	1980-83	1985-90	1965	1984	Total	Principal	1980	1983	1980	1983
Botswana	2	7	3.82	3.70	4	24	3	2	91	96	19	21
Kenya	35	142	4.12	4.20	9	18	50	7	104	100	18	19
Malawi	59	196	3.09	3.32	5	12	15*	4	61	58	4	4
Tanzania	24	89	3.52	3.65	6	14	120	3	93	87	3	3
Uganda	67	222	3.33	3.49	5	7	30*	7	58*	57	7	8*
Zambia	9	32	3.31	3.43	24	48	73	8	98	100	17	17
Zimbabwe	22	84	3.50	3.61	14	27	20	3	88	131	8	39
Average	31.1	110.3	3.53	3.63	9.7	21.4	44.2	4.9	96.1	101	22.3	27.7

Source: World Bank (1988).

Note: * For years other than the dates specified.

and is projected to have only seven people per square kilometer between the years 2000 and 2025. Uganda had the highest population density of 67 persons per square kilometer between 1980-85 and is projected to grow to 222 persons per square kilometer by the year 2025. By the year 2025, the population densities for all countries will have doubled or tripled in most cases. With increased population, there will be a need to increase the number of teachers and school facilities.

Population rate of change

The range for the average annual rate of change for populations in the selected countries was between 3.09% and 4.12%. By world standards, these figures were high (World Bank, 1988). The projected rates of change will affect education and the number of teachers that will be needed. Kenya's rate of change between 1985-90 was projected to be 4.20%, up from 4.12% between 1980-85. This was the highest rate for the selected countries. Malawi's average growth rate was projected to be the lowest with a rate of 3.32%. The regional average growth rate for the selected countries was 3.36%. Educational planners would have to plan for future expansion so as to provide quality education.

Urban population

Data for urban population as a percentage of total country population were selected for 1965 and 1984. Between 1965 and 1985, urban population more than doubled in all of the selected countries. This drastic change can be attributed to several factors:

1. Migration from rural to urban areas to seek employment, especially after the countries' independence.

2. Migration to urban areas to seek refuge from guerilla activities in the countryside due to political instability (United Nations, 1986).

These shifts in population are important for in-service planning because some methodologies require a large group of teachers for effectiveness.

Languages/homogeneity

The diversity of a group can be measured by the total number of languages or dialects spoken by members of that group. As an indicator of homogeneity it was found that there were several languages spoken in each of the selected countries. Tanzania had a total of 120 spoken languages with three principal official languages. Kenya and Uganda each had seven official languages. Zambia had eight, Malawi four, while Tanzania and Zimbabwe had three each. Kurian (1984) provided percentages of homogeneity. Homogeneity is described as "having the same kind or similar in nature" (Webster's Dictionary, 1967). Kurian showed that Botswana had 49% homogencity of languages, Kenya had 17%, Malawi had 38%, Tanzania had 7%, Uganda had 10%, and Zambia had 18%; no percentage was provided for Zimbabwe.

This indicator is important for in-service planning because of several factors:

1. Tribal factors can determine the acceptance or rejection of a program presenter.

2. Developing written material in different languages can prove to be costly.

3. Different perceptions about development in different groups can determine the success or failure of a program, and

4. Favoritism on the part of regional planners can play an important role as to where the best facilities, resources, and equipment are provided (Kurian, 1984).

Gross enrollment - elementary/secondary

Gross enrollment ratios for elementary and secondary pupils are very important indicators of the quality of education provided. For the selected countries, the gross enrollment ratios were for 1980 and 1983. For Botswana, the ratios for both levels rose from 91% to 96% and from 19% to 21% for elementary and secondary pupils respectively. Kenya's

elementary enrollment ratio dropped in 1983 from 104% to 100% while the secondary level ratio rose one percent from 18% to 19%. Malawi's elementary ratios fell from 61% to 58%, while the secondary one remained constant at 4%. Tanzania's ratio declined from 93% to 87% for elementary pupils and remained constant at 3% for secondary pupils. Uganda's ratio for elementary pupil enrollment declined from 58% to 57% while the secondary enrollment increased slightly from 7% to 8%. Zambia's elementary pupil ratio increased from 98% to 100% while the secondary ratio remained constant at 17%. Zimbabwe experienced the highest increase for both elementary and secondary enrollment ratios, from 88% to 131% and 8% to 39% for elementary and secondary pupils respectively.

These gross enrollment ratios are significant for planning teacher trainee recruitment. They are also important when making decisions as to whether to train more teachers or provide in-service activities to those already in service.

Technical Indicators (Table 23)

In order to implement a variety of in-service activities, the whole system must be analyzed to determine what means are available to make each approach feasible. When considering whether to implement distance education programs, the technical capability of a country is of paramount importance. The indicators identified here represent a few of the technical indicators in Table 23. Availability of these indicators provides maximum effectiveness in the implementation of in-serivce activities.

Radio Receivers

Radio receivers are an important indicator of performance when planning to implement in-service education at the national level. Some of the countries already have educational radio programs (Kurian, 1987). Distance education for adults and special programs for elementary schools in languages, science and history have been broadcast over the radio

Table 23.

Technical Indicators (1985)

Indicator	Botswana	Kenya	Malawi	Tanzania	Uganda	Zambia	Zimbabwe
Radio Recvrs.	150,000 ('88)	3.4 m.	1.1 m.	2.0 m.	340,000	528,000	480,000
Televisions	370,000	250,000	--	13,000	100,000	100,000	130,000
Publishers	5	16	4	8	5	14	26
Daily News Circulation	30,000	307,000	13,500	150,000	71,300	105,000	214,106
Periodicals	9	42	7	34	5	27	61
Telephones	19,109 ('85)	248,110	40,142	104,000	54,439	77,185	245,242
Railroads (km)	705	2,733	798	2,600	1,286	2,164	3,934
Roads (km)	13,500	52,055	12,215	81,895	28,332	37,359	85,784
Autos	28,745 ('83)	268,434	36,417	103,082	23,600	124,635	330,000
Electricity (Megawatts)	154	544	160	439	163	1,728	1,539
Country Size	222,711	224,081	15,747	364,900	93,104	290,586	150,873
Population	1,169,000	21,163,000	7,982,607	23,217,000	12,630,076	6,730,000	8,640,000

Source: 1. United Nations. (1988). The World in Figures. NY: United Nations.
2. Europa Yearbook. (1986-1988). Vols. 1 & 2.
Note: m = millions; km = kilometers

waves in most developing countries. The more receivers there are, the more people can be reached. The problem, however, is the affordability of radios specifically for in-service purposes.

Television Receivers

As for television use in schools, much has to be done with the majority of the countries in order to fully use television services. One country selected for this study (Malawi) was reported to have no television services at all (Kurian, 1987). For the other selected countries, there were very few televisions, and those available probably reached primarily urban dwellers. One major obstacle for not having television in rural areas is the lack of electricity. Lack of electricity would make it impractical to plan television programs for in-service activities unless they are targeted towards the urban teachers who will in turn have to help train rural teachers. Availability of televisions would enhance planning for distance education whereby a larger audience might be reached.

Book Publishers

The number of publishers was considered very important because it determines the availability of leisure and academic reading material. Should special in-service projects be implemented, access to published materials has to be readily guaranteed. Malawi, Botswana, and Uganda were found to have few publishers. Kenya, Zambia and Zimbabwe had the most with 16, 14, and 26 each, including government publishers.

Newspaper Circulation

Newspapers are very important because they provide a medium for providing information to the public. For in-service purposes, newspapers can be used for announcements, schedules or even hands-on activities for subject-area teacher workshops. If there are not enough newspapers being circulated, program effectiveness can be minimal.

Periodical Circulation

Periodicals provide professionals with an opportunity to publish and circulate ideas in the selected countries. Periodicals were found to be available in English and vernacular languages. The numbers of available title publications were provided for this study (See Table 24). The magnitude of periodical circulations and the frequency of circulation are very important. Regular reading of journals helps teachers keep abreast of national, regional, and worldwide changes, and this knowledge can be used for instructional purposes.

Telephones

The number of telephones as an indicator was deemed important because telephones provide easy communication for quick decision-making. Most of the telephones in these countries are probably available in the urban areas where businesses and schools are concentrated. This leaves in-service provision for rural areas with fewer options.

Transportation/Railways

Roads and railways are very important indicators due to the need for traveling to and from in-service centers. For some countries, there were also waterways available, but such a means of transportation for in-service purposes was considered sluggish and might prove to be costly in terms of time and money. Airways were also available, but were not considered feasible because of the cost factor. The options left were railway and road services. Kurian (1984) ranked several countries' railway systems. The countries' total land areas were divided by the available railway systems which provided a ratio of land mass/railway lines. Thus, a lower ratio would mean better railway services. Malawi was ranked 62 which was the highest of the selected countries, followed by Zimbabwe at 66. Ranked last was Botswana at 112. The railway system in Botswana was owned by National Railways of Zimbabwe. In January of 1987, Botswana and Zimbabwe agreed to consign all railway services within

Botswana to the national government (Europa Yearbook, 1989). For most of the selected countries, adequate railway transportation was available for cargo and passengers. Traveling and cargo shipment of in-service goods and equipment could be done via railway services.

Transportation/Road Systems

Zimbabwe had the largest road network with over 85,000 kilometers of paved and gravel roads. Malawi had the least with slightly over 12,000 kilometers. Botswana had 13,500 kilometers of roadways. The two major reasons for these low numbers of roadways in Malawi and Botswana would be Lake Malawi in Malawi and the desertland in Botswana. Kenya, Tanzania, Uganda, Zambia, and Zimbabwe also have adequate road networks (Kurian, 1987). Good road systems would provide in-service trainers and trainees easy access to training centers.

Transportation/Vehicles

Passenger and commercial vehicles data were included. Commercial vehicles were included because shipment of resources and equipment on a timely basis is of paramount importance in any project. In order for an in-service program to be successful both commercial and passenger vehicles have to be readily available. In this regard, Uganda was reported to have the least ratio of automobiles per thousand persons. Kurian (1984) provided ratios of vehicles per thousand persons. He reported the following country ratios; Botswana, 19.27:1000; Kenya, 6.49:1000; Malawi, 2.30:1000; Tanzania, 2.28:1000; Uganda, 0.78:1000; and Zimbabwe, 29.14:1000. Clearly, Zimbabwe had a much better advantage in this regard because mobile programs can be implemented for in-service training. Uganda was observed to have the lowest ratio of automobiles per one thousand persons, followed by Malawi and Tanzania.

Energy Consumption

Consumption of electricity was selected as an indicator because in-service activities involving high technology would require the use of

electricity. Data in megawatts for electricity consumption came from the United Nations (1988). Zambia had the highest annual consumption of 1728 megawatts, followed by Zimbabwe with 1539. Datum for Botswana showed 154 megawatts. Kenya had 544 megawatts; Malawi, 160 megawatts, Tanzania, 439 megawatts; and Uganda, 163 megawatts. This indicator showed that high technology cannot be fully implemented in most rural schools where electricity still is not available. This would leave the majority of teachers underdeveloped in the area of educational technology involving the use of electricity.

Analysis of the Ratings by Country

Country ratings by the panel of African students are presented in the columnar table (Table 24). This table was provided to the panel for rating each variable. Each indicator had to be weighed against several factors including (1) country size, (2) country population, and (3) current Gross National Product. Each indicator was rated using a four-point system. A 4 indicated very high potential, a 3 indicated high, a 2 indicated low, and a 1 indicated very low. Individual ratings for each variable were averaged in computing the score for that variable. For areas where there was rating confusion, the actual data were provided in the rating table. Economic indicators provided the most confusion. As such, three of the variable data were provided in the rating table for public expenditure on education, teacher salaries, and debt of the education sector as a percentage of total country external debt for 1984.

Botswana

Botswana rated very high in (a) the population rate of change, (b) urban population rate of change, and (c) the debt of the education sector as a percentage of total external debt. It rated high in its gross enrollment ratio for elementary students. Low ratings were observed for (a) per pupil expenditure, (b) radio receivers, (c) televisions, (d) periodicals, (e) telephones, (f) railroads, (g) roads, (h) automobiles,

Table 24.

Indicator Ratings by Country

Indicators	Botswana	Kenya	Malawi	Tanzania	Uganda	Zambia	Zimbabwe
ECONOMIC							
Public Exp.	0.6%	- 7.8%	- 5.1%	- 2.4%	31.4%	13.5%	9.2%
Teacher Salaries	3.1/5.4	3.6/3.9	3.5/12.4	2.8/28.6	1.3/11.3	6.3/10.5	5.6/10.0
Debt of Education	8.0%	1.7%	7.7%	1.8%	3.3%	1.9%	0.0
Inflation	1	2	2	3	4	2	2
Per Pupil Exp.	2	1	2	4	2	3	2
SOCIAL							
Population Density	1	4	4	2	4	1	2
Population Rate of Change	4	4	4	4	4	4	4
Urban Population	4	3	2	2	1	4	4
Languages/Diversity	1	4	1	4	2	4	1
TECHNICAL							
Radios	2	4	3	3	2	2	2
Televisions	3	3	-0-	2	3	3	3
Publishers	1	3	1	3	1	2	4
Newspaper Daily Circulation	1	3	1	2	1	3	4

Source: Ratings provided by a panel of African students using Kurian's New Book of World Rankings, (1984).

Note: 1 = Very Low; 2 = Low; 3 = High; 4 = Very High

Table 24. (Continued)

Indicators	Botswana	Kenya	Malawi	Tanzania	Uganda	Zambia	Zimbabwe
TECHNICAL							
Periodicals	2	3	1	2	1	2	4
Telephones	2	2	2	2	2	2	3
Railroads	2	2	2	3	2	2	3
Roads	2	2	2	3	2	2	3
Autos	2	2	2	2	2	2	3
Electricity Use	2	2	1	1	2	3	3
Gross Elementary Enrollment	3	3	2	3	2	2	3
Gross Secondary Enrollment	2	2	1	1	1	2	2

Source: Ratings provided by a panel of African students using Kurian's New Book of World Rankings, (1984).

Note: 1 = Very Low; 2 = Low; 3 = High; 4 = Very High

(i) electricity consumption, and (j) gross enrollment ratio for secondary students. Very low ratings were observed for (a) inflation, (b) population density, (c) cultural diversity, (d) publishing capability, (e) daily newspaper circulation, and (f) teacher salaries.

There was a positive average annual growth in public expenditures on education during the 1980-83 period. When compared with the other countries, teacher salaries were average for both elementary and secondary levels.

Kenya

Kenya rated very high in (a) its debt of the education sector, (b) population density, (c) population rate of change, (d) diversity due to language difference, and (e) availability of radio receivers. It ranked high in (a) urban population, (b) television receivers available, (c) publishing capability, (d) newspaper circulation, and (e) periodical title circulation in the country. It ranked low in (a) inflation, (b) telephone availability, (c) railway service potential, (d) road service potential, (e) automobiles available, and (f) megawatts of electricity available.

There was a negative average annual growth in public expenditures on education during 1980-83 per annum. Kenya had the highest negative growth rate of all the countries selected. Teacher salaries as a percentage of per capita income were average when compared to other Sub-Saharan African countries, although the salaries for secondary teachers was the lowest of all the selected countries.

Gross enrollment ratios for elementary students rated high and secondary students rated low as percentages of the respective school-age groups. Kenya's debt of the education sector rated as one of the lowest for the Sub-Saharan region.

Malawi

Malawi rated very high in (a) its debt of the education sector, (b)

population density, and (c) rate of population change. It ranked high in radio receivers available, and ranked low in (a) inflation, (b) per pupil expenditure, (c) urban population, (d) telephones available, (e) railroad tracks, (f) roads available, (g) automobiles available, and (h) growth of elementary enrollment. Public expenditure on education, diversity in ethnic groups, publishing capability, daily newspaper circulation, periodical circulation, electricity consumption, and gross secondary enrollment rated very low. It should be noted that there are no televisions in Malawi.

Public expenditure on education as a percentage of GNP experienced negative annual growth for 1980-83. Teacher salaries for both elementary and secondary education were average when compared to other African countries. Of all the countries selected, Malawi had one of the highest debts for the education sector.

Tanzania

Tanzania rated very high in (a) per pupil expenditure, (b) population rate of change, and (c) diversity of different ethnic groups. The debt of the education sector and secondary teacher salaries as a percentage of per capita income were also very high when compared to the other selected countries. Inflation, radio receivers, publishing capabilities, railway tracks, and gross elementary enrollment ratio were rated high. Low rankings were in (a) population density, (b) urban population, (c) televisions available, (d) daily newspaper circulation, (e) periodicals available, (f) telephones, (g) road services, and (h) automobiles available.

Public expenditure on education experienced a negative growth for 1980-83, one of the lowest among the selected countries. As an indicator, teacher salaries as a percentage of per capita income was one of the lowest among the selected countries. Electricity consumption and gross enrollment ratio for secondary level were rated very low.

Uganda

Uganda rated very high in the average rate of change for public expenditures on education for the 1980-83 period. Disparities between elementary and secondary teacher salaries as a percent of per capita income are large. The ratio for secondary teachers is by far higher than that of elementary teachers.

The debt of the education sector was, however, among the higher figures for the region. For all the selected countries, Uganda had the highest inflation rating. Population density, inflation, and population rate of change were the indicators which rated a 4 each.

Uganda was rated 3 for its television services. The rating indicated that Uganda had a good television system although it seemed to be concentrated in urban areas. Several indicators were rated 2 in nine different areas, all of which were crucial indicators. The lowest ratings were in urban population, publishing, daily newspaper circulation, periodicals circulated, and gross enrollment for secondary students. These ratings indicated that Uganda's capability to utilize approaches involving high technology and costs for in-service would be minimal.

Zambia

Zambia's ratings were very high in four areas: (a) the education sector debt, (b) population rate of change, (c) urban population as a percentage of country population, and (d) diversity in national tribes or ethnic groupings. All of these will have a negative impact on in-service program development unless the right approaches are selected. Ratings of a 3 were observed in four areas: (a) per pupil expenditure in education, (b) television, (c) daily newspaper circulation, and (d) electricity consumption in megawatts. All of these indicators are very important and are good resources for in-service program implementation. Ratings of a 2 were given in ten areas: inflation, radio receivers available,

publishing capability, periodical circulation, telephone availability, railroad trackage, road systems, automobiles, elementary and secondary gross enrollment ratios. The lowest rating was in population density, which would create problems in utilizing some of the in-service approaches. Public expenditure and teacher salaries were higher than those for most of the selected countries of this study.

Zimbabwe

Zimbabwe was rated very high in five of the indicators selected. Population rate of change, urban population, daily newspaper circulation, publishing capability, and periodical circulation were ranked very high when compared to the other selected Sub-Saharan African countries. Public expenditure on education for 1980-83 was higher than several of the other selected countries. Teacher salaries as a percentage of per capita income were 5.6% and 10.0% for elementary and secondary teachers respectively. There was, however, no debt for the education sector for the specified years.

Seven indicators were rated a 3: televisions, telephones, railroads, roads, automobiles available, electricity consumption, and gross elementary enrollment ratio. Ratings of a 2 were given in five areas: inflation, per pupil expenditure, population density, radios, and gross secondary enrollments.

The fact that the Languages indicator was rated a 1 shows that there is more homogeneity than in several of the selected countries which were rated a 3 or 4 for homogeneity. Although there are several dialects, only three languages are considered official for instruction and business purposes.

Summary for Indicators and Ratings

A systematic analysis of the country's ratings was very important because implementation of an in-service program entails use of resources to be derived and supplied from various sectors of the country.

Extreme caution should be taken when interpreting indicator ratings, however. These ratings were not judgmental, but were made to provide a description of the quality of performance for each of the countries in the selected areas. Whereas a very low rating of a 1 indicated an advantage in a certain area, the same rating would have indicated a disadvantage in another. The same applies to ratings of a 4.

For the most part, the selected Sub-Saharan countries did not rate very highly in the majority of areas, which meant that very careful selection of feasible in-service practices should be done by individuals at the local, regional, or national level. Before implementing in-service programs, adjustments in some economic areas would have to be made by most of the countries in this study in order to guarantee that established in-service activities will not be regarded as a temporary panacea, but as ongoing activities. An analysis of in-service strategies in conjunction with each country's indicators would provide basic, but not conclusive, information pertaining to each country's ability to effectively apply those strategies.

First, general in-service strategies and then specific in-service practices from other developing countries are discussed below.

In-Service Programs from Other Developing Nations

The following section summarizes some of the in-service activities identified during the search of the literature. These activities were published by individuals, organizations or countries. Some of the strategies used in these programs were identified in a previous section of this study.

Before selecting in-service activities from other developing countries, knowledge and understanding of these strategies for in-service activities were necessary because they would provide an awareness of the requirements of each of the strategies. The next step was to select

in-service activities that were used and had some degree of success in other developing countries.

Review of Major In-Service Programs

Bangladesh In-Service Program

The results of this program were reported by a study group (1979) under the aegis of UNESCO. The study group consisted of specialists from Asia and Oceania.

The Bangladesh Education Extension and Research Institute was concerned only with in-service education. Its main concern was to provide educational personnel-inspectors, subject teachers for primary and secondary schools, college professors, and headmasters (principals) with in-service training. The specific functions for the Institute were as follows:

1. To help secondary school teachers obtain up-to-date knowledge of teaching methods and increase their efficiency in teaching their respective subjects.
2. To help headmasters and headmistresses as far as possible to deal with problems arising out of introduction of diversified courses - like advanced science, commerce, agriculture, home economics and industrial arts.
3. To assist in the general improvement of the curricular programs of the pilot secondary schools.
4. To arrange seminars and conferences for inspectors, education officers and other top ranking officials of the Education Department.
5. To disseminate knowledge about different aspects of education through the publication of journals, booklets and the like. (UNESCO, 1979, p. 8)

Strategies to achieve these functions included: (1) short courses ranging from one to ten weeks; (2) one-year courses in the vocational subject areas; and (3) seminars and conferences for the heads of educational institutions and other educational officers. Short courses were used to train teachers in specific subject areas such as English, Bengali, arts and crafts, etc. Short workshops were also provided in

Audio-Visual Education and Sciences. One year courses were offered in agriculture, commercial subjects and industrial arts. Also, arrangements were made for field trips to various organizations and other schools to help specific participants.

Evaluations were made before, during and after each course through questionnaires and interviews. Evaluations which had already been done showed that "teachers feel much more confident than before in dealing with students and with referent curricular subjects" (p. 10). Trainees however showed concern over lack of sympathy from authorities, lack of time to fully implement their newly acquired skills and knowledge, and a shortage of teaching aids in schools. For reward purposes, certificates, promotions, and money were recommended, but were not being considered as the only reward system. Three suggestions were made in order for success to be achieved: (1) provision of more teaching aids, (2) frequent, unannounced visitations by inspectors and specialists, and (3) change of attitude of teachers towards the teaching profession.

Indian In-Service Program

This study was sponsored by UNESCO (1979) to study the development of materials for in-service training of teachers in Asia and Oceania.

In-service teachers' education in India was organized by the National Council of Educational Research and Training (NCERT). In-service activities were organized in response to the felt needs in the field of education in order to make possible the implementation of innovations. The constituent units of NCERT were (1) The National Institute of Education (NIE), (2) The Centre for Educational Technology (CET), the four Regional Colleges of Education (RCES), and 17 officers of the Field Advisers.

With a new pattern of education introduced at the secondary level called the 10+2 pattern, it was felt that there existed a need to "help teachers to understand the new curriculum, to update knowledge of their

subject, and to acquaint them with new methods of teaching and of continuous evaluation of the performance and achievement of children" (p. 11). Teacher chose from materials prepared for eight subjects for their courses at the ninth and tenth levels (or IX and X classes).

The courses were done in six months through correspondence. Upon completion of the correspondence courses, teachers were called in groups for two weeks of contact program instruction. For those interested in work experience, another two weeks were allowed. The "correspondence-cum-contract" course for primary teachers was based on the same pattern as the secondary teacher course. The "correspondence-cum-contract B.Ed" course was intended to clear the backlog of untrained teachers. Instruction was carried out in regular classes during two summer vacations, and through correspondence in the intervening nine months.

Short course programs were conducted (a) through in-service training of primary school teachers in science using multi-media packages and (b) in television and radio programs in support of in-service training.

The Department of Science Education prepared new textbooks and teachers' guides as well as economical teaching kits. However, elementary teachers were not considered ready to use or implement the changes. In spite of the efforts that were made, science teaching at the elementary level was reported to be a major weakness.

The training program had to be completed during a 12-day vacation period during which time the school television programs were suspended. A multi-media program was developed with the following objectives:

(a) To familiarize the teachers with the pedagogy associated with the science education programs;

(b) To upgrade the teachers' knowledge and understanding of the content of the primary school science syllabus;

(c) To familiarize the teachers with the textbooks and teachers' guides prepared by NCERT for grades 3 to 5 and adopted or adapted by the states;

(d) To familiarize the teachers with the primary science kit prepared by the NCERT; and

(e) To show how things could be improvised even when a full kit is not available. (UNESCO, 1979, p. 12)

The program covered three aspects; pedagogy, motivation, and enrichment. The television and radio programs in support of in-service training were divided into two parts -- the television component, and the radio component. The television program component was a 22 1/2 minute program designed mainly to illustrate pedagogy. The lesson was based on specific content which could also serve the purpose of upgrading the teachers' knowledge of subject matter. An introductory talk by the teacher monitor preceded the telecast and was followed by general discussion on the program.

The radio programs were divided into two types: (1) six programs for enrichment which were based either on a specific topic from the telecast or on the day's activities, and which attempted to related the topic to everyday life activities; and (2) six motivational programs consisting of pre-recorded discussions on the day's work or of interviews with teachers who had participated in previous activities.

Specific problems emerged, as in the Bangladesh model. Lack of incentives, lack of resources for publication of materials, and logistical scheduling problems were among the problems cited. However, the teachers rated these programs and their experiences well above average.

Indonesian In-Service Program

The Indonesian in-service programs were under the aegis of the Ministry of Education. UNESCO (1979) cited that "There are differing interests between the institutions preparing teachers and other personnel and those employing them" (p. 15). Consequently, teacher training institutions were regarded as irrelevant. Curricular reforms manifested by significant activities begun in 1972 included:

(1) Experimentation through pilot programs projected for development schools in search of a system which was more efficient, flexible and relevant to national or country developments.

(2) Primary and secondary school curriculum standardization which implied changes in school objectives, restructuring of educational or instructional programs, revision of subject matter and contents, reconstruction of new teaching materials, innovation in teaching learning strategies, renovation in delivery system and teaching methods, reconsideration of evaluation systems, development of guidance, and reorganization of school administrative mechanisms.

(3) Science development and educational innovation and technology, which implied new/additional teacher roles and other educational personnel and the need for an updating of their capabilities.

(4) The requirements of academic and personal competencies for teaching, which cannot be provided during pre-service training.

(5) Requirement for personnel promotion which implied additional or complementary knowledge skills and attitudes, and

(6) The large number of underqualified teachers due to "crash" teacher training programs designed to overcome the teacher shortage in the schools.

Specific objectives were formulated as follows:

1. To adjust the trained teachers and other personnel to their actual roles and ranks;

2. To update their capabilities to keep them abreast of national changes;

3. To promote and upgrade their positions; and

4. To retrain underqualified teachers.

The targeted clientele for the program were preschool and primary teachers, lower and upper secondary teachers, university teachers,

supervisors, headmasters (principals), central administration staff, counselors, librarians, and other support personnel.

In-service training areas included:

1. Education reforms in general,
2. Curricula reforms including the understanding of new curricula,
3. Educational innovation and technology,
4. Subject matter content especially for science, mathematics, social studies, the Bahasa Indonesian language, and Health Education,
5. Teaching methods,
6. Evaluation,
7. Guidance and counseling,
8. School and class administration and management, and
9. Practice teaching.

Specific clientele (individual or organizational) were considered in these offerings.

In considering specific training objectives for client level, subject matter, and training approaches and strategies, there were various types of instructional materials used including newsletters and leaflets, articles in professional bulletins and magazines, discussion papers, narrative papers and simple textbooks and modules and other self-contained materials.

Evaluation was done through carrying out pre- and in-service participation to assess the participants' achievements and through general observation of attitudes. Problems were encountered in assessing attitudes and the effectiveness of materials used for the short training periods.

Nepal In-Service Program

UNESCO (1979) stated that due to enlarged school enrollments, population explosion, and free access to primary school, Nepal found herself with only 40% of her primary level teachers qualified in the

1978-79 school year. With this backdrop, in-service education was to be the answer to the need for upgrading the quality of teachers. UNESCO (1979) discovered that pre-service programs suffered from a lack of adequately trained educators. Most of the primary teacher educators were either underqualified or inadequately trained.

So, the objectives of the in-service programs designed were:

1. to educate untrained teachers already in the job; and

2. to train them first and foremost for teaching.

In order to achieve the two objectives cited above, specific strategies were formulated:

1. Extension training - Retrained secondary school teachers through evening classes.

2. Straight Program - Designed for science and mathematics teachers for lower secondary schools.

3. On-the-spot training - Allowed primary teachers to train in the rural areas without leaving their jobs. Teachers were not allowed to leave their jobs because of the unavailability of substitutes. One advantage cited with this program was that training came with actual practice or actually employed learned skills and knowledge immediately.

4. Training of Primary teachers of remote areas - Two approaches were adapted to train teachers with School Leaving Certificates (SLC). One was the Distance Teaching Program (on-the-job type training), and the other was the Remote Area Teacher Upgrading Program.

Specific problems were, however, encountered with these programs. They included:

1. Scheduling,

2. Lack of continuous feedback mechanisms to study the programs' effectiveness,

3. Lack of adequate facilities -- most of the primary teacher training programs had very few facilities,

4. Lack of adequate funding -- items such as salaries, traveling and other areas of expansion proved futile to the implementation of otherwise noble plans, and

5. Lack of transportation and communication facilities in remote and rural areas.

The Philippine In-Service Program

UNESCO (1979) stated that as early as 1960 the Philippine Ministry of Education and Culture had embarked on an accelerated and continuing plan of in-service education. Decentralization was adapted in the 1970s and each of the 13 regional offices was charged with the responsibility of conducting in-service training for teachers.

Regional objectives were structured so as (1) to up-grade teachers' knowledge of curricula content and methodology, (2) to keep teachers abreast of developments in education and changes in policies affecting program thrusts, (3) to train teachers for roles demanded by new roles, and (4) to raise teachers' qualifications through either formal degree or non-degree courses.

Strategies and approaches to achieve these objectives included:

1. Seminars and workshops in varying time durations for different groups of educational personnel.

2. Summer institutes for teachers.

3. Formal coursework in colleges, universities and other training institutions for degree or non-degree programs.

4. Non-formal education schemes.

5. Dissemination of knowledge through self-learning materials.

Seminars were divided by level -- national, regional and local. Also seminars for specialized clientele were formulated especially for supervisors and other managerial staff. This program was a 5-week live-in seminar workshop conducted at Baguio Vocational Normal School, Teachers' Camp, Baguio City. It was designed to develop the managerial

leadership abilities of supervisors. Seminars which ranged from one or two to five or six days were also designed depending on individual or organizational needs.

Summer institutes were conducted by the Regional Science Teaching Centers (RSTC) with funding from the National School Development Board. These institutes were designed to upgrade elementary and secondary teachers of science and mathematics.

Formal degree courses and non-degree courses at the graduate level were offered in practically all teacher education institutions. Teachers and other educational personnel enrolled in courses either as part-time or full-time students. Courses were scheduled on Saturdays or evenings to accommodate teachers and public school administrators. For those who preferred summer courses, course requirements could usually be met in five or six summer terms.

Non-formal in-service schemes were not conducted in formal school settings or classrooms. Examples of non-formal schemes included (1) distance study, (2) University of the Air, (3) out reach, and (4) extension activities of government agencies and teacher education institutions. The Distance Study Plan was intended to inform teachers and the general public on the thrust of national development goals such as health, nutrition, environmental education, population education, etc. The program offered teachers the opportunity to upgrade their professional qualifications through monitoring of lessons aired over radio or through cassette tapes and printed materials available in resource centers. The program linked with institutions which granted graduate credit for the work done by the teacher participant.

Since the government required its employees to serve 15 days in rural areas every year, most faculty members preferred to spend their time conducting seminars and workshops informally for rural teachers.

Self-learning materials and packages were also devised and encouraged for use by teachers. Decentralized learning resource centers were set up around the country. There centers were intended to help teachers attain professional self-renewal through special materials and educational media.

Problems Encountered. UNESCO (1979) listed several problems encountered in this particular program. One problem dealt with inadequate coordination of in-service approaches, thereby resulting in duplication of effort, overlapping content, and piecemeal measures. The other problem dealt with inadequate evaluation during and after training.

Only a few program plans included specific follow-up measures. Poor coordination in the selection of in-service participants, especially those training for new roles, led to the overtraining and undertraining of participants. Personnel trained for new roles were not always placed in positions which made use of their new training. There was not much emphasis on attitude change after in-service teachers left; participants tended to have more knowledge but to have the same attitudes they had before training.

Financial constraints of transportation, lodging expenses, etc. prohibited some from fully participating in in-service activities. Lack of funding also explained the inadequacy of resource and learning materials for in-service courses.

The Malaysian Project Mobile in-service Training Program for Agricultural Science

UNESCO (1979) noted that prior to the institutionalization of this program, certain situations had prevailed concerning the training of agriculture teachers. UNESCO stated that:

1. In-service training for agriculture science teachers had been limited to groups of participants who needed to complete stages of courses that spanned over two years. This resulted in fewer participants than anticipated.

2. The types of courses offered required participants to come to centers during holidays and stay there for two or more weeks. Because of this and other factors such as boarding expenses, travel, etc., fewer participants were encouraged; and

3. The curriculum of training programs did not meet the actual needs of participants but rather those of organizers who seemed to be remote and devoid of an understanding of the real situations "out there."

The Mobile Unit was set up in 1974 as a pilot project and utilized already available resources. The main objectives of the program were:

1. To establish mobile in-service units that would provide alternatives to train teachers to overcome some of the weaknesses experienced.

2. To establish direct contact with teachers of agriculture sciences, to understand and assist them in solving their problems, and to assess their requirements for training, and

3. To indirectly boost the teaching of agricultural sciences especially with regard to the administration of the subject in the schools and the provision of adequate resources for teachers.

The mobile unit was set up in the Department of Agricultural Science at Tahoe College. The staff and support personnel were utilized. The Ministry of Education provided the funds.

Specific steps to begin the project were undertaken. These steps included:

1. The preparation of a working paper to be approved by the Central Curriculum Committee of the Ministry and for the approval of budget allocation.

2. Several planning and working sessions were held to decide on the details of the programs and to prepare content materials for the courses. It was decided to visit each center twice in 1974.

3. A survey was made to determine the number and details of teachers teaching agricultural science in the state. This was done by sending survey forms to all schools offering the subject. From

the returns it was decided to set up centers in five districts and a list of participants for each center was prepared.

4. When all the materials for the course were ready a mock session involving all the staff of the Agricultural Science Department was carried out and criticisms and suggestions were made regarding each person's presentation. This served as indirect pre-test for the materials, since it was not possible to conduct and actual one.

5. A school in each district affected was selected for the centre and the headmaster and senior agricultural science teacher were contacted to solicit their co-operation.

6. A preliminary visit by one of the organizers was made to each center school to arrange for the program, borrowing of facilities and to arrange meals for the participants and lecturers. The curriculum for the first round of the course was based on observed needs of the participants obtained from actual observations of the staff and information received from students on teaching practice. (UNESCO, p. 48)

The first round of implementation involved upgrading of administration, budgeting, and the acquisition of materials, equipment, and other facilities. For subsequent courses, the curriculum was based on suggested courses of action and specific individual area requests made by participants.

For the actual conduct of the courses -- three lectures -- one driver and one attendant were involved. They traveled by car and by a landrover which carried equipment and materials. Materials used were those already available at the college as well as those newly developed. Photocopies were made and distributed for use in various centers.

Evaluation was done at the end of each training course. Each participant filled out a course evaluation form in which he/she expressed his/her reactions to the programs. Applicants were also encouraged to indicate areas where they felt changes were needed.

Strengths of the Approach. Several strengths in this approach to in-service were identified as follows:

1. There was better contact between instructors and trainees.

2. Participants did not have to leave their worksites thereby reducing expenses.

3. There was a greater opportunity for discussion of specific site and logistical problems.

4. Expenditure for travel and subsistence of persons was kept to a minimum.

5. Centers used provided tutors with an ample workplace. Suggestions from participants to improve their own schools were evaluated on site.

6. Mobile units gained experience as they moved from place to place and were in a position to provide objective comparisons.

7. The less formal approach, having less instruction and more demonstration, proved to be more effective. This approach was employed in areas such as budgeting, acquisition of materials and other supplies, fieldwork planning and programming, and layout of buildings.

Above all, this program was considered to be effective and quite valuable for implementation in other areas.

The Nigerian Mobile Teaching Training Program

This program was designed to train teachers and upgrade their professional competency. The northern region of Nigeria was the targeted geographical area for development. The project was reported as part of the Primary Education Improvement Project (PEIP) (Kolawole, 1980). The initial phase of the project was launched in 1971 with the hope that such training would supplement teacher production. UNESCO and UNICEF helped in the material and financial aspects of the program. The Institute of Education at Ahmadu Bello University supervised the program. The PEIP program was to produce Mobile Teacher Trainers (MTTs). Central to the MTT concept was the idea that master teachers train classroom teachers on the job.

The MTTs were Ministry of Education employees. Their success or failure was highly contingent on the cooperation received from the

Ministry. The project schools were under local control. Duties of the MTTs were:

1. To provide close supervision, give professional help, supply materials and explain difficulties to local teachers;

2. To run short courses for project teachers for orientation purposes;

3. To train new MTTs and to assist in the expansion phase of the project (Kolawole, 1980).

MTTs who were recruited had to have skills in (a) providing different activities for teachers, (b) classroom organization and grouping, (c) primary science, (d) discussions, and (e) construction of instructional material. A book was prepared as a guideline for primary teacher activities. All primary class activities were suggested to enhance instructional approaches, media construction, equipment operation and pupil evaluation.

Specific problems, however, were encountered including (a) the slow flow of materials from production sites to consumers, (b) some subjects being given more attention than others, (c) a lack of paper and ink, (d) frequent breakdown of machines, and (e) shortage of staff. The lack of program continuity was attributed to the following:

1. Poor compensatory schemes for both participants and trainers;

2. Teacher transfers which interrupted their participation in the program;

3. Lack of PEIP coordinators;

4. Lack of physical facilities which discouraged participants from continuing in the program, and

5. Thefts of equipment due to a shortage of storage facilities.

Evaluation techniques consisted of questionnaries, observations, and teachers' verbal feedback. Formative and summative evaluations were performed.

The most positive aspects as reported by participants included:

1. Children were happier and learned more easily.
2. There was greater emphasis upon individual progress.
3. More practical than traditional methods were employed.
4. Teacher/supervisor relationships improved.
5. The quality of materials and methods was higher.
6. National Common Entrance Examination results showed higher scores. (Kolawole, 1980, p. 237)

In general, in spite of all the problems mentioned above, the project was evaluated as a success (Brown, 1975; Kolawole, 1978).

Zimbabwe Integrated Teacher Education Course (ZINTEC)

Sibanda (1983) studied the ZINTEC program. The following summarize his report of the program activities. The ZINTEC program was a strategy introduced after Zimbabwe's independence in 1980 to raise the number of qualified teachers in the school systems. Every term a cohort of 900 teachers was allowed to begin the four-year training program. The first and last 16 weeks of the program were designed to have the participants attending a residential course. During the three and one-half year intervening period, trainees were visited in their schools by a team of mobile tutors. Trainees were required to complete correspondence assignments and attend short tutorial courses during every second vacation.

At the outset in 1981, the Ministry of Education identified 14,413 untrained teachers. Funding for the program was provided partly by the Zimbabwe Government, and by UNICEF. In summary, ZINTEC was a combination of residential vacation courses and distance education.

ZINTEC Structure. The following outlines the structure of the Zimbabwe Integrated Teacher Education Course.

1. Term 1 - 16 weeks of residential courses at a training college.
2. Terms 2 and 3 - Two terms of supervised teaching with in-service correspondence work. Three week vacation course (residential).
3. Terms 4 and 5 - Two terms supervised teaching with in-service correspondence work. Three week vacation course (residential).
4. Terms 6 and 7 - Two terms supervised teaching with in-service correspondence work. Three week vacation course (residential).
5. Terms 8 and 9 - Two terms supervised teaching with in-service correspondence work. Three week vacation course (residential).
6. Term 10 - One term supervised teaching with in-service correspondence work.
7. Term 11 - 16 week final residential course at the Regional Teacher College and final examinations (Sibanda, 1983).

Objectives for ZINTEC were:

1. To overcome the existing shortage of teachers in the country,
2. To provide the teacher with a sense of service to society,
3. To instill a sense of identity in the teacher,
4. To develop the trainee's sense of learning and teaching,
5. To develop rational thinking in the student and staff.

Teachers were required to:

1. Acquire relevant classroom survival skills,
2. Involve themselves in community projects,
3. Accept Ministry appointments and transfers, and
4. Work as a government employee.

The administration of ZINTEC was a national effort with a national center located in Harare. There were five regional administrative locations in the five provinces. There were also teacher training colleges which provided staff and dormitory facilities. The national center was responsible for the production and distribution of correspondence materials and the evaluation of the project. Regional

centers were responsible for the selection, placement, and transporation of trainees to and from their appointed teaching sites.

Criteria for student (trainee) selection included (a) willingness to work in and withstand hard conditions, (b) at least one term of teaching experience prior to admission to the program, (c) five "O" levels (high school diploma) or Grade II certificate, and (d) at least 20 years old or above.

Trainees who participated were paid Z$97 approximately per month plus free tuition, board and lodging, food and books. The $97 stipend was provided because trainees spent a great amount of time actually teaching.

Specific problems were outlined which had been experienced during the first year. They included:

1. Some students started withdrawing from conventional teacher colleges in favor of ZINTEC.

2. Lecturers were inexperienced in training teachers.

3. Shortages of books were very critical during the first year.

4. The first intake consisted of a mixed group of trainees. some of whom had returned from the war and had a different perspective of the initial goals. Regardless of the problems, the Ministry felt that the whole venture was a success and well managed.

ZINTEC was comprised of a professional writing staff responsible for distance learning materials. Regular radio programs were also established and were prerecorded on cassettes for distance teaching in rural areas.

During a trainee's residential training, arts and crafts, music, and homecrafts were taught alongside the more theoretical subjects such as math, science, social studies and religious education. When trainees went into the field, only theoretical subjects were pursued through distance education strategies. Individual projects were also encouraged.

During week ten, a trainee was required to identify a subject for study and to be assessed in that subject.

Teacher Advisory Centers - Kenya

Ayot (1983) reported on the status of teacher advisory centers in Kenya and analyzed the degree to which they had succeeded. They were established as an answer to meeting the need for teachers due to increased enrollments created by the introduction of free primary education. Twenty advisory centers were established in 1970, and by 1981 there were 43 Teacher Advisory Centers throughout Kenya.

External aid was provided by UNICEF in the form of equipment, tools, and audio-visual aid equipment. There were problems of storage facilities for equipment and in scheduling of District Primary School Inspectors who did not have enough time to assume extra duties. Another problem was the unavailability of tutors to work at the different centers. There were also no clear policies establishing Teacher Advisory Center tutors.

The main purposes of the Center were:

1. Updating teachers in the use of necessary equipment,
2. Providing new teachers with support in areas of need,
3. Serving as a clearinghouse for new curriculum information to be disseminated throughout the school systems,
4. Providing research opportunities and an exchange of ideas among teachers,
5. Providing the Kenya Institute of Education with curriculum materials based on local research and findings from each Teacher Advisory Center,
6. Serving as a resource center by providing teachers with moral and material support. (Photocopy facilities were available at the centers for use by district teachers),

7. Serving as a receiving center for materials and resources from Ministry to district teachers,

8. Contacting teachers' colleges on a regular basis.

Achievement and Constraints. Several problems were encountered during the implementation of the Kenyan teacher advisory centers. Eleven constraints are listed below.

1. Location of the centers presented some basic problems in some areas because facilities were in temporary housing.

2. There were extreme shortages of workshop space in most of the centers.

3. Although there was equipment, specific shortages in books, cameras, radios, tape recorders, slide projectors, overhead projectors, film strips, tapes, duplicating equipment, and many other types of equipment were reported. Of the total number of centers, only four have been reported to have adequate equipment. Twenty-seven centers were reported not to have film-strip projectors, which "most tutors believe to be absolutely necessary" (Ayot, 1983, p. 159).

4. There were shortages of competent and qualified staff in most of the centers.

5. Distances between schools and centers adversely affected teacher attendance for workshops, etc.

6. The underequipped centers were minimally used.

7. Center tutors spent most of their time visiting the Ministry of Education and local chiefs, rather than guiding teachers.

8. Centers offered workshops and courses lasting only a day or half a day mostly in mathematics, English, or science.

9. There was very little financial assistance offered to the centers by the Ministry of Education and Kenya Institute of Education. Ayot (1983) stated that this was due to the lack of clear policy for providing monies to the centers.

10. Transportation was very difficult for most of the travelers to and from the centers. There were centers which did not have any form of transportation at all.

11. Administratively, there was a clear lack of an effective chain of command. A survey showed that 22 centers claimed they were responsible to the District Primary School Inspectors, seven were accountable to District Education Officers, two claimed to be under the Assistant and Primary School Inspectors, and two did not even know to whom they were responsible.

A summative evaluation showed that most of the centers fell short of the original goals for a variety of reasons ranging from inadequate financing to logistical problems due to lack of clear policies.

The Domasi In-Service Center in Malawi

Mwale (1983) cited a rise in elementary school enrollments that necessitated the creation of the center. UNICEF agreed to provide grants for the training of unqualified teachers between 1977 and 1982.

Courses at the center ranged from weekend courses for officers to six-week courses for minimally qualified and unqualified primary teachers. Teachers who took courses through the Malawi Correspondence College went to Domasi for upgrading courses. Orientation courses and refresher courses for new subjects were also provided.

Specific activities are listed below:

1. Officers' weekend education courses
2. Orientation of teachers to new curricula
3. Refresher courses in subject areas of instruction
4. Materials production workshops for science and mathematics
5. Refresher courses on different aspects of teacher problems
6. Administrator training in administration and supervision

Selection of participants varied from recruitment on a competitive basis to recommendations made by inspectors for those teachers whose

performance was below standard. The restrictions in participation were due to shortages of space and personnel for dealing with larger groups at any one time.

Approaches used in the in-service activities included lectures, discussions, demonstrations, field visits, guided practical writing, seminars and simulations.

Duration for in-service activities lasted as follows:

1. Upgrading - six weeks
2. Orientation courses - two to five days
3. Administrator orientation - two days to five days
4. Briefing sessions for District officers - one week
5. General refresher courses - two to five days

Inducements. In order to motivate the participants, the following inducements were provided.

1. Food and lodging at government expense
2. Newly appointed offers were rewarded through salary increases
3. Guarantee of permanent employment for sub-qualified teachers

It was stated that no specific or obvious inducements were provided except for the ones stated above.

The Inspectorate Section of the Ministry of Education was the responsible authority for all decisions affecting the INSET activities. Inspectors were responsible for providing the Ministry headquarters with reports.

There was, however, no evaluation instrument available; there were no personnel to fully perform program performance. The only form of feedback was through inspectors' reports of teacher performance after in-service participation.

Government and UNICEF sponsored all of the activities for in-service training. As far back as 1981 efforts were underway to solicit economic

aid from the European Economic Community (Mwale, 1983). Results of such efforts were not readily available to be included in this study.

Evaluation of In-Service Practices

Evaluations were made for each in-service practice to establish the obvious financial, technical, and social requirements of each program. The ten selected in-service activities from other developing countries were evaluated using the following methodology. The characteristics were used to match the in-service practices with each of the Sub-Saharan countries. A set of criteria was established to analyze each of the identified in-service practices (Harris, 1989). The criteria are presented below.

In-Service Program Evaluation Criteria

1. Were any specific foci identified for the in-service program?
2. Were there sponsors identified? If so, was the sponsor the Ministry of Education, the local school, an institution, an international organization, or any other organized group such as a teacher organization?
3. Were specific approaches such as demonstrations or workshops used?
4. Who was the targeted audience for the in-service program activities?
5. Were there specific resources required, and if so, what kinds?
6. Were there any types of incentives provided, and if so, what kinds?
7. What and how was the evaluation performed, and what were the results?
8. Were there any specific problems experienced during the implementation? If so, what were the problematic areas?

Rating of the In-Service Programs

The panel of UAB African students (who made the country evaluation) also evaluated the in-service program reports to determine each program's feasibility in the Sub-Saharan countries. A rating scale was established to determine the in-service characteristics for each of the in-service programs. These characteristics would be matched with the country's

economic, social, and technical indicators for each of the African countries to determine where the in-service practices would be most feasible.

Table 25 displays the countries where the in-service activities were used, the in-service characteristics, and the ratings for each of the in-service characteristics. A rating of a 4 meant that emphasis was placed upon that item during program implementation. A 3 meant that there was medium priority placed on that particular item. A rating of 2 meant that little emphasis was placed on that item. A rating of a 1 meant that some mention of that item was made in the literature, but no emphasis was given. Ratings were then averaged to produce a single rating for each in-service program with each of the evaluation criterion. Thus, the rating was: a 4 - high; a 3 - medium; a 2 - low; and a 1 - poor.

Categories Rated

There were eight categories with specific items to be rated:

1. Focus - The first category for analysis targeted institutional goals/objectives to be achieved such as development of teachers, the instructional processes, increasing teachers' knowledge of academic concepts, helping individual teachers' professional growth, developing teachers' technical skills, developing curriculum of instruction, and helping teachers' classroom management ability, etc.
2. Sponsor - The next category for analysis was the sponsor of the in-service activities. Four groups of potential sponsors were identified: The Ministry of Education, the school itself, institutions such as universities or agencies created by the government, and international agencies.
3. Approach - Twenty delivery methods were identified as potential approaches to the implementation of in-service activities. Traditional

Table 25.

Evaluation of In-Service Characteristics

Category	Bangladesh	India	Indonesia	Kenya	Malawi
Focus					
Goal Specific	4	4	4	4	4
Instructional Process					4
Concept Focus		3			
Individual Growth		3	3	3	
Technical Skill Devlelopment	4	4	4	3	
Curriculum Development	4	4	4	3	4
Instructional/Classroom Management	4		4		
Other	4		4		
Sponsor					
Ministry	4	3	4	3	3
School				3	
Institution	4	4		3	
International Agency	3			4	4
Other					
Approach					
Demonstration				3	4
Workshops	4	3		3	
Seminars	4		3		4
Lectures		4	3	3	4
Radio Services		3			
Television Broadcasting		3			
Automobile Services					

Note: 4 = high; 3 = medium; 2 = low; 1 = poor

Table 25. (Continued)

Category	Bangladesh	India	Indonesia	Kenya	Malawi
Corresondence Services		3			
Field Trips	4				4
College Courses					
Discussions	3		4		4
Writing/Research		4	4	3	4
General Refresher					
New Roles					
Orientation of New Teachers					
Brainstorming					
Short Courses	4	4			4
Long Courses	4				
Creative Strategies					4
Microteaching					4
Target					
Individual Teacher	4		4	3	4
Groups	4	4	4	2	
Administrators	4	4	4	2	4
Others			4		
Resources					
Personnel	3	3	2	2	2
Schedules	2	2	2	2	2
Monetary	3			2	
Facilities	3	4		2	2
Equipment/Materials	3	4	4	4	2

Note: 4 = high; 3 = medium; 2 = low; 1 = poor

Table 25. (Continued)

Category	Bangladesh	India	Indonesia	Kenya	Malawi
Incentives					
Stipends Paid	3	2			
Promotion	3		4		4
Release Time					3
Lodging/Travel					3
Certification of Recognition	3				
Other		4	4		4
Evaluation					
Very Good	4				4
Good		3	3		3
Average				2	
Poor					
Problems*					
Policy		2		3	
Logistics		3		3	3
Personnel	3	3	2	3	3
Materials/Equipment	3	3	2		
Facilities	1	1		2	3
Schedules	3		1		
Implementation		3			
Monetary				3	

Note: 4 = high; 3 = medium; 2 = low; 1 = poor

*The higher the rating, the more complex the problem.

Table 25. (Continued)

Category					
Focus					
Goal Specific	4	4	4	4	4
Instructional Process					4
Concept Focus				4	4
Individual Growth		4		4	
Technical Skill Devlpt	4		4		
Curriculum Development					
Instructional/Classroom Management		4	4	3	4
Other				3	3
Sponsor					
Ministry	4		4	4	4
School					3
Institution	4		4		4
International Agency			4		4
Other					
Approach					
Demonstration	4				
Workshops			3	4	4
Seminars				4	4
Lectures		4			4
Radio Services		4		4	4
Television Broadcasting					
Automobile Services	4		4	3	

Note: 4 = high; 3 = medium; 2 = low; 1 = poor

Table 25. (Continued)

Corresondence Services		4			4
Field Trips	4				
College Courses				4	
Discussions	4		4		
Writing/Research			4		4
General Refresher					
New Roles					
Orientation of New Teachers					
Brainstorming					
Short Courses			4	4	4
Long Courses				4	4
Creative Strategies					
Microteaching					
Target					
Individual Teacher	4	4	4	3	3
Groups	4	4	4	3	3
Administrators	4		4	4	4
Others		4		4	
Resources					
Personnel			2	4	3
Schedules		4		4	4
Monetary			2		3
Facilities	4	2	2		4
Equipment/Materials	4		2		3

Note: 4 = high; 3 = medium; 2 = low; 1 = poor

Table 25. (Continued)

Category	Malaysia	Nepal	Nigeria	Phillipines	Zimbabwe
Incentives					
Stipends Paid		2	2		4
Promotion					3
Release Time		2			3
Lodging/Travel		2			4
Certification of Recognition				3	
Other					
Evaluation					
Very Good					
Good			3		3
Average		2			
Poor					
Problems*					
Policy			2		
Logistics		2	2	3	2
Personnel				3	3
Materials/Equipment		2	2	3	2
Facilities		3	2	3	1
Schedules		4			
Implementation		2	2	3	1
Monetary		3	2	3	1

Note: 4 = high; 3 = medium; 2 = low; 1 = poor

*The higher the rating, the more complex the problem.

approaches were identified from the literature and were incorporated into this study.

4. Target - The category for target groups indicated whether the in-service activity was oriented towards individuals, groups, administrators or any other educational personnel.

5. Resources - The resource category included personnel, schedules, money, facilities, and equipment and materials.

6. Incentives - The category for incentives identified money expended, promotions, release time allowed, payments for lodging and travel, certification of recognition, or any other forms of incentives which might have been appropriate for the system.

7. Evaluation - The evaluation category identified four areas as to whether the in-service approach was evaluated as very good, good, average, or poor.

8. Problems - The problem category included items such as policies, logistics, personnel, materials/equipment, facilities, implementation, and monetary efficiencies.

Observations About the In-Service Program Ratings

According to the literature reviewed, the foci or goals/objectives of the in-service programs were well identified. Specific groups in each of the programs were targeted for in-service training and enough support was received from governments, institutions, and international organizations.

Methods for conducting in-service training were well identified and specific materials and equipment necessary for in-service activities were identified and selected.

Evaluations were performed by individual in-service participants, supervisors, and Ministry officials. However, specific problems were found to be common among all the in-service activities. They included lack of good policies, logistical inconveniences, lack of warehouses for

storing equipment, unavailable transportation, inadequate supplies/ materials and equipment, and poor scheduling. Findings in this area support the views expressed in the literature. Some countries had more problematic areas than others. Perhaps this is indicative of poor management and lack of adequate budgets in those countries where there were problems in their in-service programs.

Feasibility Analysis for In-Service Program Adoption in the Sub-Saharan Countries

Procedures

In order to rate the feasibility for each of the selected Sub-Saharan countries' potential to adopt the in-service practices selected from ten other developing nations, an attempt was made to contact the original panel who had rated the economic, social and technical indicators. Nine of the original panel members were willing to participate in this rating.

Each of the panel members was provided the Indicator Ratings by Country (Table 24) and the Evaluation of In-Service Characteristics (Table 25). The panel participants were also provided with comparative data on population, the gross national product, the average annual growth of the domestic product, and the per capita income for the selected Sub-Saharan countries and the other developing countries where the in-service models were originally implemented (Table 26).

The country's potential was rated either a high (3), medium (2), or a low (1). A high rating indicated the country had the potential to meet the requirement; a medium rating indicated the country might encounter difficulties in meeting that requirement; and a low rating portended the country's inability to meet the requirement (Table 27).

Observations

Based on the feasibility ratings, Botswana had the highest potential to succeed in adopting the ten identified in-service practices. Kenya had high ratings for the in-service approaches from Bangladesh, India,

Table 26.

Comparative Data for In-Service Program Adoption

Country	Population (1987)	GNP (1987)	Average Annual Growth GDP	Per Capita Income
Bangladesh	102,563,000	U$ 17,408 m.	2.5% (87-88)	$ 169
Botswana	1,169,000	U$ 1,175 m.	11.9% (80-86)	$ 1,175
India	796,600,000*	U$ 241,305 m.	1.5% (87-88)	$ 303
Indonesia	170,534,000	U$ 76,766 m.	3.4% (80-86)	$ 449
Kenya	21,163,000*	U$ 7,500 m.	2.9% (80-87)	$ 357
Malawi	7,982,607	U$ 1,223 m.	2.4% (80-86)	$ 153
Malaysia	16,921,000*	U$ 29,556 m.	4.8% (80-86)	$ 1,739
Nepal	17,632,960	U$ 2,836 m.	7.1% (87-88)	$ 167
Nigeria	101,992,000	U$ 39,533 m.	- 5.0% (80-87)	$ 388
Phillipines	58,721,307*	U$ 34,638 m.	5.9% (65-80)	$ 587
Tanzania	23,217,000	U$ 5,202 m.	- 1.8% (80-87)	$ 226
Uganda	12,630,076*	U$ 4,086 m.	- 2.4% (80-87)	$ 314
Zambia	7,531,119	U$ 1,696 m.	- 4.4% (80-87)	$ 212
Zimbabwe	8,640,000	U$ 5,265 m.	2.2% (80-87)	$ 585

Source The Europa Yearbook. (1989). Vols I and II. London: Europaopa Publications, Ltd.

* Indicates population for years others than specified.

Table 27

Comparison of In-service Requirements with Selected Sub-Saharan Countries' Potential to Implement In-Service Programs

In-Service Program	In-Service Program Requirements	SELECTED SUB-SAHARAN COUNTRIES' POTENTIAL						
		Botswana	Kenya	Malawi	Tanzania	Uganda	Zambia	Zimbabwe
Bangladesh								
	Economic Indicator - H	H	H	L	M	H	M	H
	Social Indicator - M	H	H	H	L	H	L	H
	Technical Indicator - H	H	H	L	M	L	H	H
Indian								
	Economic Indicator - M	H	H	L	M	M	L	H
	Social Indicator - H	H	H	M	L	L	M	H
	Technical Indicator - M	H	H	L	M	M	M	H
Indonesian								
	Economic Indicator - H	H	M	L	M	M	M	H
	Social Indicator - H	H	M	L	M	M	M	H
	Technical Indicator - M	H	M	L	M	M	L	H

Note: H = High (3)
M = Medium (2)
L = Low (1)

Table 27. (Continued)

In-Service Program	In-Service Program Requirements	SELECTED SUB-SAHARAN COUNTRIES' POTENTIAL						
		Botswana	Kenya	Malawi	Tanzania	Uganda	Zambia	Zimbabwe
Kenya								
	Economic Indicator - H	H	H	L	L	L	L	H
	Social Indicator - H	H	M	M	M	L	M	H
	Technical Indicator - H	H	M	L	L	M	L	H
Malawi								
	Economic Indicator - M	H	H	L	L	H	M	H
	Social Indicator - H	H	L	M	L	M	M	H
	Technical Indicator - M	H	H	L	H	H	H	H
Malaysia								
	Economic Indicator - H	H	M	L	L	L	L	M
	Social Indicator - H	H	L	H	L	L	M	H
	Technical Indicator - H	M	M	L	M	L	L	M

Note: H = High (3)
M = Medium (2)
L = Low (1)

Table 27. (Continued)

In-Service Program	In-Service Program Requirements	SELECTED SUB-SAHARAN COUNTRIES' POTENTIAL						
		Botswana	Kenya	Malawi	Tanzania	Uganda	Zambia	Zimbabwe
Nepal								
	Economic Indicator - M	H	H	M	H	H	H	H
	Social Indicator - H	H	H	H	M	M	M	H
	Technical Indicator - M	H	H	M	H	H	H	H
Nigeria								
	Economic Indicator - H	H	H	L	M	H	M	H
	Social Indicator - H	H	H	H	M	M	M	H
	Technical Indicator - H	H	M	L	M	M	M	H
Phillipines								
	Economic Indicator - H	H	M	L	M	M	M	H
	Social Indicator - H	H	M	M	L	L	H	H
	Technical Indicator - M	M	H	L	M	M	M	H
Zimbabwe								
	Economic Indicator - H	H	M	L	L	L	M	H
	Social Indicator - H	H	M	M	M	L	M	H
	Technical Indicator - H	L	M	L	M	L	H	H

Note: H = High (3)
M = Medium (2)
L = Low (1)

Malawi, and Nepal. Kenya's potential was rated medium for the in-service approaches from Indonesia, Kenya, Nigeria, The Philippines, and Zimbabwe.

Malawi rated low across the board for all in-service approaches selected with the exception of Nepal's. Tanzania rated medium for approaches from Bangladesh, India, Kenya, Malawi, Nepal, Nigeria, the Philippines, and Zimbabwe. Low ratings were noted for approaches from Indonesia and Malaysia. Uganda rated medium for approaches from India, Kenya, Nigeria, Nepal, and the Philippines, and had low ratings for in-service approaches from Malaysia, Indonesia, and Zimbabwe.

Zambia's potential was rated low for in-service approaches from Indonesia, Kenya, Malaysia, and Nigeria. Medium ratings were scored for approaches used in Bangladesh, India, Malawi, Nepal, the Philippines and Zimbabwe. Zimbabwe had high ratings across the board, indicating that the potential for success in adapting the selected in-service approaches was very good. Average ratings for each of the seven Sub-Saharan countries' feasibility to implement the 10 in-service programs examined is presented in Table 28.

Summary For Proposition II

The purpose of this chapter was to validate proposition II, which stated that there were in-service approaches which can be adapted in Sub-Saharan countries from other developing countries. The review of the literature revealed that there are in-service practices being used in other LDCs, however, several prerequisites must be met before transfering and implementing any preferred in-service strategy.

First, sound policies would have to be formulated and directed toward authorizing specific functions to be performed such as budgeting, allocation of resources, provision of incentives, implementation, and evaluation of any in-service activities. Second, specific organizational structures must be formulated pertaining to specific duties, and the

Table 28.

Country Potential to Adapt In-Service Practices

Country	Bangladesh	India	Indonesia	Kenya	Malawi	Malaysia	Nepal	Nigeria	Phillipines	Zimbabwe
Botswana	H	H	H	H	H	H	H	H	H	H
Kenya	H	H	M	M	H	M	H	M	M	M
Malawi	L	L	L	L	L	L	M	L	L	L
Tanzania	M	M	L	M	M	L	M	M	M	M
Uganda	H	M	L	M	H	L	M	M	M	L
Zambia	M	M	L	L	M	L	M	L	M	M
Zimbabwe	H	H	H	H	H	H	H	H	H	H

Note: H = High; M = Moderate; L = Low

chain of command and individual responsibilities for those involved must be established.

Next, an understanding of concepts pertaining to in-service practices must be ensured. This involves an understanding of all potential intra- and inter-organizational relationships to be included. The establishment of a clear in-service mission can be realized through having a management group knowledgeable of proper planning procedures.

Proper knowledge of planning procedures would reveal those specific requirements which must be met before the correct in-service practice(s) can be selected. Presentation of specific country requirements were provided in this study and revealed that there were deficiencies in each of the selected countries. Indicators of performance revealed each country's potential to implement each of the in-service practices selected for analysis. Identification of different infrastructure variables was considered very important because educational operations are part of the entire system. Economic, social and technical variables were selected for this study because they directly affect the quality of teachers and the entire educational process.

Upon determining the system's past performance, specific needs can be established through needs assessment. Then goals can be established before selecting the in-service strategy to be implemented. Based on the findings, most of the selected countries have the potential to implement one or more of the identified in-service practices to develop their teacher corps.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

It was the purpose of this study to verify the need for developing teachers in seven Sub-Saharan countries using in-service activities so as to improve the quality of education at the elementary and secondary levels. The study also identified in-service training activities which have been used in other developing countries and matched those in-service activities with the selected Sub-Saharan countries to determine if they can be adapted to train local underqualified teachers in service.

The study first identified educational problems in developing countries at the elementary and secondary levels as they relate to the quality of teachers and consequently to the quality of education.

Specific country studies of Botswana, Kenya, Malawi, Tanzania, Uganda, Zambia, and Zimbabwe were presented. The country studies focused mainly on teacher quality and, where applicable, specific problems were presented which contributed to the poor quality of teachers. In cases where information was available, specific profiles of teacher qualifications were provided.

A summary of some of the specific requirements necessary in order to develop teachers using in-service training was presented at the end of Chapter two.

In order to meet the established requirements, specific indicators which would determine each country's performance when implementing in-service programs were identified. The indicators were divided into three categories: (1) economic indicators, (2) social indicators, and

(3) technical indicators. Within each category of indicators were several variables which were rated using a four-point scale system.

The ratings of each of the selected indicators and the evaluation of each country's potential was done by a panel of African students attending the University of Alabama at Birmingham.

The study included a comprehensive review of the literature for Chapters two and three in order to verify the two propositions. The review of the literature revealed commonalities in the countries in terms of their historic, economic, social, educational, and political backgrounds.

This study provided a study in the history of educational development with specific references to the problem of teacher shortage in Botswana, Kenya, Malawi, Tanzania, Uganda, Zambia, and Zimbabwe. It also provided an opportunity to compare systems of education in different countries as well as those specific problems from administration to pupil performance which frustrate teacher participation in the educational arena.

Conclusions

The analysis of qualitative and quantitative data provided the basis for the following conclusions:

1. Most of the countries studied have similar educational problems relating to low gross enrollment ratios at the elementary and secondary levels.

2. There was a serious shortage of qualified teachers at the elementary and secondary levels. As a result, most Ministries of Education resorted to employing unqualified teachers.

3. Expatriate teachers were employed extensively to teach in secondary schools during periods soon after independence because there were not enough nationals qualified to teach at that level.

4. More problems were created when those expatriate teachers left due to unstable political conditions.

5. There were extreme shortages of materials and equipment in schools.

6. Disparities existed between urban and rural schools, especially when assigning qualified teachers and providing required materials and equipment. Urban schools were provided with better personnel, facilities, materials and equipment.

7. Changes in curricula, textbooks and educational philosophies soon after independence aggravated an already existing problem of teacher shortages in each of the countries.

8. Policy structures and educational plans for different periods were unrealistic and tended to be counterproductive in some of the educational systems.

9. The educational management systems were poorly coordinated. The problem of a lack of competent and qualified administrative personnel was echoed in most of the literature cited.

10. Although international organizations provided for in-service purposes in terms of (a) personnel, (b) grants, and (c) equipment, most of the countries saw a decline in the quality of services after the international involvement was terminated.

11. There were in-service activities which were being provided for teachers in some of the selected countries.

12. Economic data showed that there were inconsistencies in teacher salaries and educational expenditures, and that most of the countries needed to develop new economic ventures so as to generate more revenue for educational expenditures for both formal and non-formal educational programs.

13. Although there was a need to preserve national and tribal identities, a reduction in the number of official languages in some of

the countries would reduce expenses incurred by writing and translating textbooks and employing different personnel.

14. Problems of a lack of spare parts for educational equipment and shortages of trained technicians to repair broken equipment made futile plans for introducing vocational courses at the secondary level.

The evidence presented is highly supportive of the need for in-service teacher programs in the selected Sub-Saharan countries (Proposition I). Furthermore, there are in-service practices available from other developing countries which can be adopted in the selected Sub-Saharan countries (Proposition II). However, specific requirements in the selected Sub-Saharan countries would have to be met before such programs could be implemented.

Recommendations

The following recommendations are provided to enhance the focus, content, and perceptions of in-service activities in the selected Sub-Saharan countries.

Organization of In-Service Training

1. It is very necessary to organize a systematic structure with built-in authority, functions, and responsibilities for in-service education at the national, district, and local level. Such a systematic organizational structure can only be effectuated through realistic policy and legislation.

2. Based on the particular educational system of each country, the organization for in-service training can be entrusted to the Ministry of Education or a special body of experts with a good knowledge of systems planning who will work in close collaboration on in-service activities at all levels.

3. Ministry officials must enlist the aid and support of teachers' organizations, and community and business leaders who will have an

important role in furthering government's role and involvement in implementing in-service programs.

4. Individual and school-based programs must be afforded all the necessary moral support from higher authorities through the provision of schedules, activities, materials, equipment, personnel and incentives.

5. Practical application and evaluation of in-service training must involve the full participation of headmasters (principals), the faculties of teacher training institutions, supervisors, inspectors, independent scholars, and specialists for subject areas.

Categories of Involvement

1. When organizing in-service training programs, consideration should be given as to focus, content and clientele to be served. Specification should be made as to the category of the trainee(s), i.e., (a) unqualified, (b) qualified, (c) qualified individuals desiring to acquire new skills or further their qualifications to assume new duties and responsibilities.

2. Special consideration for in-service programs should be made pertaining to differences in needs for (1) elementary teachers, (2) secondary teachers, (3) urban teachers, (4) rural teachers, (5) vocational teachers, (6) academic teachers, or (7) special education teachers.

3. Specific recommendations and encouragement, through policy provisions, should be made for community, university, and international involvement at district and local levels. Such policy provision should encourage independent and autonomous decision-making pertaining to meeting local needs and designing local goals and objectives.

Facilities, Equipment, and Materials

1. Ministry officials should grant the widest possible facilities by encouraging church leaders, business leaders and other community

networks to avail teachers who wish to learn from them of their facilities/resources.

2. Through policy provision, adequate funds should be allocated for facility construction, especially in rural areas, and for adequate provision of relevant equipment needed for academic and vocational in-service activities.

3. Whenever possible and justifiable, Ministry officials should provide for travel and lodging expenses of participants, or make grants and subsidies available as compensation for those teachers participating in in-service activities.

4. Encouragement and incentives should be provided for teachers to use locally available materials, equipment, and facilities.

5. Teachers should be allowed to use a variety of instructional methods that can achieve a goal(s), for such acquired knowledge can be imparted to other inexperienced teachers in the same setting.

Financing for In-Service

1. Through policy provision and legislation, specific budgetary allocations should be provided so as to make in-service an ongoing practice.

2. Allowances should be provided for individuals, institutions or local schools to embark on new and innovative in-service approaches and practices.

3. Provision should be allowed for incentives to encourage teacher participation in established programs.

4. Encouragement should be made to allocate grants for further research as an ongoing process.

Research and Development

1. Further research by local and international scholars should be done concerning the impact of policies on educational changes in the selected countries since independence.

2. Further research should be done on the impact of national educational plans, specifically in relation to teachers and teacher development programs in the selected countries.

3. Perceptions and willingness to join the teaching force by highly competent nationals and college graduates should be investigated to determine the effect of such perceptions and willingness on the quality and quantity of teachers.

4. Research should be done on the impact of and progress made by international organizations in their attempts to work with teacher development programs.

5. Further research should be done to determine the extent of impact made by currently ongoing in-service programs on teacher quality and instructional approaches used after in-service participation.

6. Further experiments should be made on interregional and international collaboration among the selected countries to develop teachers in different regions or countries for specialized arenas so as to consolidate resources and facilities.

Other Recommendations

In order to adequately and accurately maintain and retain acceptable pupil/teacher ratios, projections of population of school-age pupils by fertility, mortality, and migration should be done by region on a regular basis. Projections of how many students each school can hold depending on the supply of teachers and other resources must be done to avoid overcrowded conditions, especially in rural areas.

Linkages must be established and analyzed to determine relationships between population projections, student enrollment trends, economic and social trends, and teacher supply projections. There should be built-in standards to assure the existence of quality and quantity in the supply of teachers at the elementary and secondary levels.

Findings from the literature revealed that in-service practices that were used in other developing nations required sound policies, sound management practices, and adequate resources. These requirements would place a burden on some of the selected Sub-Saharan countries in attempting to implement these programs. Therefore, a thorough systems analysis of each countries' potential is necessary before any efforts can be made to initiate the implementation of any preferred in-service program.

In the absence of sufficient resources, attempts also can be made to solicit financial support from international agencies such as UNESCO, UNICEF, USAID, IBE, and the World Bank.

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