

ECONOMIC AND SOCIAL BENEFITS
OF FAMILY PLANNING
IN GUATEMALA

A Report Prepared By:
DAVID E. HORLACHER

During The Period:
NOVEMBER 25-30, 1979

Under The Auspices Of The:
AMERICAN PUBLIC HEALTH ASSOCIATION

Supported By The:
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
OFFICE OF POPULATION, AID/DSPEC-C-0053

AUTHORIZATION:
Ltr. POP/FPS: 11/19/79
Assgn No. 582-005

Agency for International Development
Library
Room 105 SA-18
Washington, D.C. 20523

CONTENTS

	<u>Page</u>
INTRODUCTION	1
EXECUTIVE SUMMARY	5
THE GUATEMALAN POPULATION	8
NATIONAL DEVELOPMENT GOALS OF GUATEMALA	9
POPULATION DYNAMICS	10
Birth, Death, and Growth Rates	10
Age Distribution and Child Dependency	10
The momentum of Population Growth	11
Population Growth Under Four Fertility Assumptions	12
EFFECT OF FUTURE POPULATION GROWTH ON GUATEMALA'S ECONOMY	13
Arable Land Per Capita	13
Gross National Product and Gross National Product Per Capita	13
A. The GE TEMPO Study	14
B. Assuming Six Percent Rate of Growth of GNP	15
C. Assuming 5.7 Percent Rate of Growth of GNP	15
Investment	16
Labor Force and Employment	18
Housing	19
Education	21
A. Primary Education	21
B. Secondary Education	23
Health	25
A. Manpower Requirements	25
B. Attended Births	26
C. Abortions	27
IMPACT ON THE GUATEMALAN FAMILY PLANNING PROGRAM ON FERTILITY DECLINE	29
Role of Development	29
Family Planning Programs	29
The Guatemalan Program	30

APPENDICES

- Appendix A: List of People Interviewed
- Appendix B: Explanation of Terms Used To Measure
Fertility Decline Under Population
Projections
- Appendix C: Statistical Information

INTRODUCTION

INTRODUCTION

This report, prepared during a brief mission to Guatemala, is an assessment of the economic and social implications of the proposed expansion of the national family planning program. It is not a model for other studies. To the contrary, far more comprehensive and authoritative studies can be prepared and compared by national scholars, program managers, and public officials who are working in Guatemala and are more cognizant of local conditions and research findings.

Nonetheless, this study may be useful in preparing analyses tailored to specific national requirements and research resources. Managers of family planning programs and their counterparts in donor agencies may wish to consider this format when preparing economic and social justifications for project proposals. Given such analyses, program managers can demonstrate how specific family planning activities can advance national objectives by increasing per capita income, savings and investment, and arable land per capita; by reducing unemployment rates; and by raising literacy, health, and nutrition levels while ameliorating the environmental stresses caused by rapid urbanization. Furthermore, such analyses can show that the benefits of family planning programs can be obtained at far lower cost, using fewer public resources than any other alternative would require.

Though a strong family planning program is an essential component of an comprehensive approach to public health care, it would be most unfortunate to view it solely in this light. Because population size, structure, and change influence every aspect of social and economic development, planners in developing countries must fully incorporate demographic studies into both the planning process and planning documents.

Often, national planners (and their counterparts in donor agencies) fail to emphasize sufficiently the effects of demographic trends. Rapid population growth is usually considered an external variable to which planners must adjust passively. Planners rarely consider how development strategies affect demographic rates, and even less often do they consider the deliberate alteration of demographic trends given to facilitate attainment of planning objectives.

Studies patterned on this report could foster (perhaps strengthen) collaboration between family planning and development planning agencies, and also encourage the useful exchange of information and ideas between the two groups.

The format of this report resembles that of Remak and Elpern's study of the effects of Guatemalan population growth and Robinson's study of the effects of population growth in Honduras.*

Like these two reports, this report has a simple structure consisting of five major components. The first section compares Guatemalan demographics with those of other nations in the region. The second section identifies those development planning objectives which can be served by increased family planning activity. The differential impact of alternative population projections on the attainment of economic goals is considered in the third section, and the social effects of alternative population projections in the fourth. The final section calculates the costs of achieving alternative levels of fertility and compares the costs and benefits of the population projections considered in the preceding sections.

*R. Remak and N. Elpern, Guatemala--The Effects of Declining Fertility, Publication No. 69, TMP So GE, TEMPO Center for Advanced Studies, Santa Barbara, California, August 1969; and Warren Robinson, Honduras: The Interrelationship of Population and Development, The Futures Group, Washington, D.C., 1979.

~~Earlier studies are often useful in preparing reports of this type.~~ This report is based primarily on the work done of Dr. Jorge Arias de Blois and Dr. Martin Carranja Orllana.*

Dr. Arias' study contains a detailed analysis of the growth, characteristics, and composition of the Guatemalan population. It also includes a set of population projections and a discussion of their implications for production, education, health, and housing. Dr. Carranja Orrellana's study updates the Arias projections and details their implications for the size of the labor force and the demand for educational services, housing, and national and child health care.

Comparable studies of Latin American countries have been especially useful, although in preparing the last section of this report, the authors had to use estimates of the cost-effectiveness of the national family planning program, which had been prepared for the Guatemalan program.**

This report addresses only those aspects of population/development interaction described in earlier and readily available studies. Many other aspects of the relationship could be considered. For many nations, the problem of meeting future energy needs is a major concern of long-range planners. Studies may be available to quantify the implications of alternative population trajectories for energy supply and demand. For example, many nations must import fuel; others are net energy exporters. In many developing countries, firewood is a primary energy source. Changes in population can affect supply and demand, and the various population variables can be extremely important and should be

* Jorge Arias de Blois, Poblacion de Guatemala, and Martin Carranja Orllana, Director General of Statistics, Interpretacion de Las Proyecciones de Poblacion en Terminos de Demanda de Servicios Basicos (1950-2000).

**Michael Bloom, Robert Carno, Debra Hoffman, and Mario Jaramilio, "An Assessment of AID's Bilateral Population Program in Guatemala 1977-1979," American Public Health Association, Washington, D.C., June 1, 1979.

considered when making long-range projections of the international trade balance and when planning long-range resource and environmental programs. Obviously, the linkages between population and development are complex and pervasive, and cannot be described and analyzed fully within the scope of this report. However, although limited, this report should encourage more thoughtful and comprehensive demographic studies of other countries.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

By the year 2000, Guatemala's population will have doubled, from seven million to nearly 14 million. The country's rapid population growth is due to high fertility and declining mortality rates, which have resulted in a high child dependency ratio and a large number of young persons soon to enter child-bearing age. Current fertility rates must be reduced to stem population growth and to solve the concomitant problems of rapid urbanization. For every decade that a replacement level of fertility is delayed, the population will increase 13 percent.

Guatemala's current development plan calls for substantially increased investment in small farmer agriculture, education, and health to provide more equitable distribution of development benefits among all segments of the population. The proposed effort to assist family planning would have a significant positive effect on the attainment of these goals at a modest cost in resources.

A number of studies have been made to calculate the economic and social consequences of four alternative fertility projections. The projections reveal that reduction in the total fertility rate (TFR) from 5.9 to 3.2 by the year 2000 will have certain predictable consequences:

- o Arable land per capita will be 28 percent greater in the year 2000.
- o Per capita income will be 28 percent greater.
- o The demographic dependency ratio will be 63 per 100 for all working ages, as compared to 98 per 100 if the TFR remains at 5.9.
- o The economic dependency ratio will decrease from 272 per 1,000 in the year 2000 to 203 per 1,000. If Guatemala can reduce the funds required to provide services for the dependent population, government savings and investment can be increased.

- o Projected government expenditures for social services in the year 2000 will be 104,000,000 quetzals less.
- o Capital per worker will be six percent greater.
- o The number of new jobs that must be created by the year 2000 to maintain current levels of unemployment will be reached by 160,000.
- o The capital cost of maintaining unemployment at current rates can be reduced by 1,701,000 quetzals.
- o The reduction in capital cost due to lowered fertility will total 2,413,000 quetzals, if female labor force participation rates increase 50 percent between 1980 and the year 2000.
- o The number of new housing units needed will decline by 353,000. Given an average cost of 5,000 quetzals per housing unit, 1,765,000 quetzals could be saved and otherwise invested.
- o The number of primary school age children will be reduced by 712,000.
- o Assuming current enrollment rates, 16,400 fewer new primary grade teachers will be needed.
- o The number of young persons not receiving primary education will decline from 1.2 million to 730,000.
- o If enrollment rates for primary education increase to 90 percent, the number of children enrolled can be reduced by 870,000 and the number of teachers required by 29,000.
- o There will be 540,000 fewer school-age persons.
- o The current number of doctors per person can be maintained through the year 2000 by training 63 doctors per year. If the TFR remains at 5.9, 100 doctors per year must be trained.
- o To reach the goal of one physician per 1,000 people, 3,462 fewer physicians must be trained.
- o To meet the goal of 4.5 nurses for every 10,000 persons, 769 fewer nurses must be trained.
- o By the year 2000, there will be 94 percent more births if TFR remains at 5.9.
- o If the TFR declines to 3.2, medical care for 100 percent of births in the year 2000 can be provided with the same resources required to provide medical care for 69 percent of the births if TFR remains at 5.9.

- o Assuming a constant expenditure per person of nine quetzals, the annual saving to the government on health care will be 32,000,000 quetzals, if the TFR is reduced from 5.9 to 3.2 by the year 2000.

Efforts to reduce the fertility rate are most effective when rapid social and economic development is accompanied by implementation of a strong family planning program. The Guatemalan family planning program can contribute significantly to fertility decline and is a cost-effective method of raising per capita income and per capita investment; of reducing unemployment, illiteracy, and health care costs; and of improving maternal and child health.

Less effort will be required in the future if the TFR is reduced now. To achieve a TFR of 3.2, the birth rate must decline by 83,400 between 1980 and 1985, and by 280,000 between 1995 and 2000. The number of couples participating in family planning must increase from 311,000 (1980) to 403,000 (2000). (These figures are roughly comparable to the current targets of the Guatemalan family planning program).

Family planning is clearly the most cost-effective way to realize the savings described above. A couple-year of protection (CYP) in Guatemala costs approximately two to four quetzals; since these are crude estimates, a conservative estimate is 10 quetzals per couple-year of protection. If the TFR is six and the average number of child-bearing years per couple is 30, approximately five couple-years of protection are required to prevent a birth. The approximate cost per birth prevented is 50 quetzals -- a fraction of the cost of educating, housing, and providing employment for every additional child born.

An informal cost/benefit analysis of the proposed program reveals that its economic and social benefits outweigh the cost of its implementation. The findings of this report support the decision to provide integrated family planning services in Guatemala.*

*Outlined in Project No. 320-0263.

THE GUATEMALAN POPULATION

THE GUATEMALAN POPULATION

Guatemala's current population is approximately seven million. It has increased since 1778 by more than six and one-half million, and continues the increase at an estimated annual rate of 3 percent. (See Table 1, Appendix C.) The crude birth rate is approximately 43 per 1,000; the total fertility rate (TFR) is 5.9; the crude death rate is approximately 13 per 1,000. Guatemalans have a life expectancy at birth of more than 52 years. If the current level of fertility is maintained until the year 2000, the population is projected to increase to 14,905,500 (more than twice its present size). (See Table 2, which compares fertility and mortality rates for the years 1900 to 1969, and Table 3, which lists the estimated age-specific fertility rates and derived measures).

Guatemala is the most populous country in Central America, with nearly twice as many people as Honduras, and almost three times as many people as Costa Rica and El Salvador. (See Table 4 for estimated population totals for Central America for 1980; the projected 1980 population for Guatemala is 6,940,000.) If the term "urban" is used to describe the population living in cities with 10,000 or more inhabitants, 25 percent of the Guatemalan population would have been classified as urban in 1970. Only in Honduras does a smaller percentage of the population live in urban areas. (See Table 5.) Although high, the annual rates of population increase (see Table 6) for the years 1970 to 1980 are exceeded by those of all other Central American countries, except Costa Rica.

Guatemala's rapid population growth must be considered when designing programs to improve the country's standard of living and quality of life. One measure of the standard of living is Gross National Product (GNP) per capita, which can be raised by increasing total product and slowing the rate of population growth. In general, the prospects for success are greatest when both methods are used.

NATIONAL DEVELOPMENT GOALS OF GUATEMALA

NATIONAL DEVELOPMENT GOALS OF GUATEMALA

The Guatemalan Government incorporated a broadly-based production and employment strategy into its four-year (1975-1979) Development Plan. That plan called for substantially increased investment in small farmer agriculture and in education and health, and emphasized the equitable distribution of the benefits of growth among the population. It also called for major efforts to develop technology more appropriate to Guatemala's factor availabilities; in particular, it reoriented domestic industrial and agricultural production to emphasize use of labor and to reduce capital intensity. Improvements in education and health services were emphasized to increase the productivity of the country's human resources. Rational exploitation and conservation of natural resources were defined as development objectives, and the public sector was encouraged to promote Guatemala's development.

Among other specific economic and social development goals were expanded rural health coverage (to 60 percent of the population); reduced (by 20 percent; from 79 per 1,000 to 69 per 1,000) infant mortality; increased use of contraceptives by fertile women (from 13 percent to 18 percent), and reduced crude birth rate (from 44 per 1,000 to 39 per 1,000). The plan also set as a goal the 30 percent reduction in malnutrition in pre-school age children and pregnant or nursing mothers.

The analysis that follows shows how changes in the population can affect the attainment of Guatemala's major development goals and how an effective family planning program can improve social and economic conditions.

POPULATION DYNAMICS

POPULATION DYNAMICS

Birth, Death, and Growth Rates

As in most Central American nations, fertility in Guatemala has been high for much of this century. Although TFR is now almost 5.9, fertility has begun to decline. Between 1900 and 1904, the crude birth rate was 45.8; by 1973 it had declined to 43.3, (See Table 2.)

Improvements in health and sanitation have resulted in a significantly reduced death rate since the end of World War II, from 35.4 in 1900-1904 to 15.4 in 1973. Life expectancy at birth has risen from 40 years in 1950 to almost 53 years in 1970-1972 (see Table 7), but infant mortality, which was 163 per 1,000 births in 1950 and 80 per 1,000 births in 1973, remains high (see Table 8).

High fertility combined with declining mortality has resulted in a high rate of population growth in Guatemala. Between 1950 and 1976, for example, the population more than doubled from 3,024,000 to 6,237,000 (see Table 9). If the present growth rate of 2.6 percent continues, Guatemala's population will increase to approximately 12 million by the year 2000, and double in size by the year 2006.

Age Distribution and Child Dependency

Because of high fertility and reduced infant and child mortality, the percentage of children in Guatemala's population has increased in the last 25 years; approximately 43 percent of the population is now under 15 years of age (estimated and projected populations by age are shown in Table 10). The child Dependency rate is very high. For every 100 adults, slightly more than 75 children must be housed, fed, educated, kept in good health, and ultimately provided productive employment.

Present fertility levels will significantly influence future child dependency rates. Generally, the higher the level of fertility, the greater the burden of child dependency. Just as high dependency ratios strain the resources of individual households, so they also burden national economic and social development programs. A nation with a large dependent population must devote a disproportionate share of its public and private resources to meet the needs of children; this leaves fewer resources for investment in other sectors. Conversely, a significant reduction in child dependency can free a substantial body of resources for investment in other development programs.

The Momentum of Population Growth

Even if fertility declines immediately from the present average of 5.9 children per woman to a replacement level of slightly more than two children per woman, the population will continue to grow until the age distribution stabilizes. Because of past high growth rates, the number of women now entering their reproductive years exceeds the number leaving their reproductive years. This produces a momentum of population growth which in the short run, can be slowed but not halted. Even if each couple has only two children, the number born will continue to exceed the number who die each year for the next 50 years. Thus, even if Guatemala had reached a replacement fertility level (i.e., a Net Reproduction Rate (NRR) of unity) by 1978, its population would still have increased over the next five decades from 5.7 million to 9.1 million. For every decade that a replacement level of fertility is delayed, the population will increase approximately 13 percent. This fact underscores the importance of significantly reducing fertility as soon as possible.

Population Growth Under Four Fertility Assumptions

Although the momentum of population growth assures significant population growth in the future, any decline in fertility will reduce the growth that would otherwise occur. Four population projections based on alternative fertility assumptions (see Tables 11 and 12) support this fact. All four projections assume an increase in life expectancy at birth to 67 years by the quinquennium 1995-2000 and no international migration.

1. Projection A (Constant Fertility) assumes that the Gross Reproduction Rate (GRR) will remain constant at 2.89 until the end of the century.
2. Projection B (Slow Fertility Decline) assumes that the Gross Reproduction Rate will decline linearly, from 2.89 to 2.60, by the end of the century.
3. Projection C (Medium Fertility Decline) assumes that the Gross Reproduction Rate will decline from 2.89 to 2.10 in a path described by a logistic curve.
4. Projection D (Rapid Fertility Decline) assumes that the Gross Reproduction Rate will decline from 2.89 to 1.57 by the end of the century, in a path described by a logistic curve.

EFFECT OF FUTURE POPULATION GROWTH
ON GUATEMALA'S ECONOMY

EFFECT OF FUTURE POPULATION GROWTH ON GUATEMALA'S ECONOMY

Arable Land Per Capita

The total area of Guatemala is approximately 11 million hectares. Of this, 2.5 million hectares comprise the agricultural area which includes arable land, land under permanent crops, permanent meadows, and pastures. If fertility remains constant, food requirements will more than double between 1980 and 2000. Little growth in the supply of arable land per capita is anticipated. (See Table 13.) If the TFR remains constant, arable land per capita will fall from 0.4 hectares in 1980 to 0.18 hectares in the year 2000. If the TFR falls to 5.3, arable land per capita in 2000 will fall to 0.19 hectares; if it declines to 4.3, arable land per capita will fall to 0.21 hectares, and if it falls to 3.2, arable land per capita will be reduced to 0.23 hectares. Thus, arable land per capita will be 28 percent greater in 2000 if the TFR is reduced from 5.9 to 3.2.

Gross National Product and
Gross National Product Per Capita

While increases in Gross National Product (GNP) reflect the overall growth of the economy, per capita GNP better indicates the ability of the economy to provide an adequate standard of living for the people. Because GNP per capita is inversely related to population size, rapid population growth can nullify the potential gains from an increasing GNP. For example, between 1967 and 1976, real GNP in Guatemala grew at an average annual rate of 7.5 percent, but because of rapid population growth, GNP per capita increased only 3.7 percent per year. (See Table 14, which compares GNP and GNP per capita for the years 1967 through 1976).

Ultimately, a reduction in fertility will reduce the growth rate of the labor force, but GNP will expand somewhat faster under conditions of high fertility. However, the majority of those who will enter the labor force in the next 15 years have already been born, and a decline in population growth due to a decline in fertility will only marginally affect growth in the labor force. Therefore, in the year 2000, the level of GNP will be approximately the same under all fertility assumptions, but GNP per capita will be substantially higher if fertility declines. After 2000, GNP will increase more rapidly under conditions of high fertility, because of the increase in the labor force, but per capita income will continue to increase most rapidly under conditions of low fertility.

A. The GE TEMPO Study

In 1969 the GE TEMPO research group prepared a set of projections for two sets of fertility assumptions. Assuming the continuation of past patterns of technical progress and of employment and investment, Gross National Product was projected to reach a level of 11,400 million quetzals by the year 2000. Given constant fertility, per capita income was projected to rise to 830 quetzals by the year 2000. (See Table 15 for a summary of the TEMPO study.)

If the population projections prepared by Jorge Arias de Blois are used in conjunction with the TEMPO study, the per capita income will be 830 quetzals, provided the TFR remains constant at 5.9. If the TFR falls to 5.3, per capita income in 2000 will be 862 quetzals. If it falls to 4.3, the per capita income will be 951 quetzals, and if it falls to 3.2 by the year 2000, per capita income will rise to 1,060 quetzals per annum.

B. Assuming Six Percent Rate of Growth of GNP

If Guatemala can expand its GNP by 6 percent per annum over the next 20 years, the Gross National Product (in 1975 prices) will still vary under different fertility assumptions. If current fertility rates continue, per capita income will be 1,152 quetzals in the year 2000 (compared to 626 quetzals in 1976). If the TFR drops to 5.3 per capita income will be 1,196 quetzals. If it declines to 4.3 by 2000, per capita income will be 1,316 quetzals; and if it falls to 3.2 per capita income will be 1,469 quetzals, an increase of 314 quetzals over per capita income generated under conditions of constant fertility. (See Table 16.) To achieve this level with constant fertility, GNP would have to grow 9 percent a year, and this would require an increase in the rate of investment 18 percent to 27 percent of GNP (assuming a capital output ratio of 3).

C. Assuming 5.7 Percent Rate of Growth of GNP

Between 1960 and 1970 Gross Domestic Product (GDP) in Guatemala (measured in 1960 prices) increased from 1,044,000 quetzals to 2,276,000 quetzals. This corresponds to an average growth rate of real GDP of 5.7 percent. GDP per capita grew at a rate of 3 percent per annum during the same period. Arias has shown that if real GDP continues to grow at the rate of 5.7 percent until the end of the century, GDP (measured in 1960 prices) will be 9,620,000 quetzals.

Assuming that the rate of growth of GDP is independent of fertility levels (as the 1969 TEMPO study found), the level of GDP per capita in the year 2000 will largely depend on the fertility hypothesis. Arias found that per capita GDP (in 1960 prices) would be 701 quetzals if fertility remained constant. It

would be 728 quetzals if the TFR fell to 5.3; 802 quetzals if the TFR fell to 4.3; and 894 quetzals if the TFR fell to 3.2 by the year 2000. Thus, per capita domestic product would be 28 percent higher in the lowest fertility case than in the case of constant fertility.

Investment

Guatemala's ability to expand GNP to meet the population's growing needs will depend on the availability of funds for investment in development projects. Rapid population growth exacerbates the problem of generating savings from domestic sources. In Guatemala today, each member of the labor force must support at least two other persons: little income is left for saving or investment after basic expenses are met.

The demographic dependency ratio is defined as the number of persons aged 0 to 14, plus those over 65, divided by the number of persons aged 15 to 64. This dependency ratio is affected by future fertility and mortality rates. (See Table 17).

The economic dependency ratio (the number of persons outside the labor force per 100 members of the labor force) varies inversely with levels of fertility. Under conditions of constant fertility, the economic dependency ratio will increase from 226 (1976) to 272 by the year 2000. If the TFR falls to 5.3, the dependency ratio will fall to 251. If the TFR falls to 4.3, the dependency ratio will be 203 in the year 2000 -- 12 percent below the current economic dependency ratio. (See Table 18).

To the degree that Guatemala can reduce the funds otherwise required to provide services for an increased dependent population, government savings and investment can be increased if fertility declines. Government expenditures

in 1976 for social services comprised approximately 39 percent of total expenditures, or 183,000,000 quetzals (30 quetzals per capita). If that level is maintained, by the year 2000 annual government expenditures for social services will be 447,000,000 quetzals (assuming constant rates of fertility); 415,000,000 quetzals if the TFR decreases to 5.3; 382,000,000 quetzals if the TFR decreases to 4.3; and 343,000,000 quetzals if the TFR falls to 3.2. Thus, if the TFR falls to 3.2, a total of 104,000,000 quetzals in government expenditures will be freed for use in productive investment in 2000. (See Table 19.)

Per capita income is closely tied to productivity per worker, which varies inversely with the number of workers and directly with the health education and nutrition of the labor force, and with the rates of technical progress and capital formation. Because technical progress is often embodied in new types of equipment, per capita income also depends on the rate of capital formation. Therefore, growth in capital per worker is an important determinant of the productive capacity of the labor force.

In 1976, capital per worker in Guatemala was approximately 3,500 quetzals, and approximately 20 percent of GNP was devoted to capital formation. (See Table 20.) If that percentage is maintained in the future, and if the economy continues to grow at approximately 6 percent per annum, the capital stock will be 45,124,000 quetzals by 2000. If the TFR remains at 5.9, capital per worker will be 11,276 quetzals; if it declines to 5.3, capital per worker will be 11,459 quetzals in the year 2000. If the TFR declines to 4.3, capital per worker will be 11,708 quetzals; and if it declines to 3.2, capital per worker will be 11,970 quetzals. Thus, capital per worker will be 6 percent greater than if the TFR remains constant.

Labor Force and Employment

Unemployment and underemployment are major economic problems in Guatemala. Rapid population growth will increase substantially the labor force after 15 years, thus exacerbating an already serious problem. The number of persons expected to enter the labor force within the next 15 years has already been determined by the number of children born since 1964. A reduction in fertility will have no effect on the size of the labor force until after 1994.

In 1973, 76.4 percent of all males and 12.4 percent of all females aged 10 or older were active in the labor force. (See Table 21.) If these rates hold, with constant fertility, the labor force will grow from 1,749,000 (1973) to 4,001,000 by 2000. If the TFR declines to 5.3, the labor force will be 3,937,000 in the year 2000; if it declines to 4.3, there will be 3,854,000 workers; if it declines to 3.2, the labor force will number 3,769,000. (See Table 22.)

Current unemployment rates are difficult to measure. A comparison of the economically active population with the employed population reveals that in 1973, open employment was roughly 13 percent and the level of registered unemployed between 2.7 percent and 3.2 percent.* Assuming constant fertility, the economically active population will increase between 1980 and 2000 by 1,829,000 persons. If the current rate of unemployment is 13 percent, 1,591,000 new jobs must be created over the next 20 years simply to maintain current levels of employment. If the TFR falls to 5.3, the number of jobs required will decline to 1,536,000. If the TFR declines to 4.3, 1,463,000 new jobs will be required; if the TFR is 3.2, only 1,429,000 new jobs will be needed between 1980 and 2000. (See Table 23.)

*Guatemala Country Strategy Statement, 1981-1985, USAID/Guatemala, January 1979, p 17.

If the TFR is reduced to 3.2, the number of new jobs required will be reduced by 162,000. Between 1964 and 1973, the long-term incremental capital labor ratio was 10,500 quetzals per man. Assuming this ratio remains constant over the next two decades, the reduction in the number of required jobs will result in a savings of 1,701,000 quetzals ($10,500 \text{ Q} \times 162,000$). Or, put another way, current rates of employment can be maintained over the next 20 years at a capital cost, which will be 1,701,000 quetzals lower if the fertility rate is reduced from 5.9 to 3.2. (See Table 24 which shows the required rates of capital formation given alternative population projections.)

It is reasonable to expect that as the country develops economically and socially, the population will become more urbanized and better educated and more women will enter the labor force. If 50 percent more women enter the labor force by 2000, the number of required new jobs will increase substantially. (See Table 25. See also Table 26, which indicates the number of new jobs that must be created, and Table 27, which shows the capital requirements under four fertility assumptions.) The increase in female labor force participation, when combined with increased education, industrialization and urbanization, may facilitate the attainment of lower fertility rates.

Housing

In 1977, 1.62 million people (25.7 percent of Guatemala's population) lived in urban areas of more than 10,000 inhabitants. If present trends continue, approximately 2.69 million -- 30.8 percent of the 1985 population, or 38.4 percent of the present population -- people will be living in such areas by 1985.

If the TFR remains at 5.9, 1,196 million new urban housing units will be required by the year 2000. If the TFR is reduced to 5.3, 1,087 million new housing units will be needed; if it declines to 4.3, 975,000 new units will be needed. If the TFR declines to 3.2, the number of new housing units required will be 843,000 -- 353,000 fewer units than would be needed if fertility remains constant. If the average cost of housing is 5,000 quetzals per unit, the saving in resources will be 1,765,000 quetzals by the year 2000. That sum could be redirected to industrial capital formation. (See Table 29, urban housing requirements for alternative levels of fertility.)

Jorge Arias de Blois, who prepared a study of housing needs for all of Guatemala,* points out that if the average number of persons per housing unit is five and if the life expectancy of a housing unit is 50 years, 61,000 new houses will be needed each year, 37,000 because of population growth and 24,000 for replacement. If the TFR remains at 5.9, 141,000 new units will be required annually by the year 2000. If the TFR declines to 3.2, only 84,000 new housing units will be required each year. (See Table 30 for the number of new housing units required for the periods 1980-1984 and 1995-2000 (exclusive of replacement).)

The demand for new housing units is closely related to family formation. A study by Carlos A. Rodriguez., Director General of Statistics, projected the number of families in Guatemala using the four fertility assumptions described above. The demand for housing was then projected using the assumed average of 1.4 families per housing unit. (See Tables 31 and 32.) Rodriguez determined that by the year 2000, 352,700 more housing units will be needed if the TFR remains at 5.9.

*Jorge Arias de Blois, Poblacion de Guatemala, p 146.

Education

Rapid population growth in Guatemala is a significant obstacle to the achievement of national educational goals. In 1975 there were approximately 808,000 children of primary school age (7 to 11). Of these, 51.2 percent were actually enrolled in school. In 1975 there were approximately 848,000 children of secondary school age (13 to 18). Of these, 26 percent were actually enrolled in school.

A. Primary Education

If the TFR remains at 5.9, the primary school-age population will be 1,876,100 by the year 2000. If the TFR declines to 5.3, the primary school-age population will be 1,765,300; if it declines to 4.3, the primary school-age population will be 1,469,400. If the TFR declines to 3.2, the primary school-age population will be 1,163,800. Lowered fertility will reduce the number of school-age children by 712,300 by the year 2000. (See Table 33.)

An alternative study by the Director General of Statistics defined the primary school-age population as children aged 7 to 12. (See Table 34 for corresponding projections for the primary school-age population for the quinquennial years 1975 through 2000.) When the two studies are compared, the latter indicates higher growth rates in the student population for any given TFR.

In 1975 the proportion of primary school-age children actually enrolled was 51.2 percent. If this figure and the TFR remains constant, the number attending primary school in the year 2000 will be 1,261,400. (See Table 35.) If the TFR declines to 5.3 by the year 2000, the number of children attending primary school will be 1,121,600. If it declines to 4.3, the number enrolled

in primary education will be 958,100. If the TFR falls to 3.2, 766,800 children will be enrolled. Thus, reduced fertility will mean that 495,600 fewer children will be enrolled in primary grades by the year 2000 (assuming the proportion of primary school-age children remains at 51.2 percent).

The fertility rate will have an important effect on the demand for new teachers, schools, and financial support. If fertility remains constant, Guatemala will need 42,000 primary grade teachers by the year 2000 to maintain the constant enrollment rate of 51.2 percent and a student/teacher ratio of 30 to 1. If the TFR declines to 5.3 by the year 2000, the number of primary grade teachers required will be 37,400. If it declines to 4.3, 31,900 primary grade teachers will be needed; if it falls to 3.2, 25,100 will be needed. Thus, a reduction in fertility could reduce the demand for primary grade teachers by 16,400. (See Table 36.)

Fertility patterns will also significantly affect the number of children of primary school age who cannot be enrolled if enrollment rates remain at 51.2 percent. (See Table 37 for the number of primary school-age children not enrolled under alternative fertility assumptions.) In the year 2000, the number not enrolled will be 1,201,900 if fertility remains constant; 1,028,100, if the TFR declines to 5.3; 913,100, if it declines to 4.3. The number not enrolled in the year 2000 will be 730,800 if the TFR falls to 3.2. To reduce the number of primary school-age children not enrolled to the level that would prevail if the TFR fell to 3.2, enrollment rates at constant levels of fertility would have to be increased from 51.2 percent to 70.3 percent in the year 2000.

The government may decide to increase the proportion of children enrolled in primary school. If by 2000 enrollment is gradually increased to 90 percent,

the government's savings from reduced fertility will be much greater than those realized at current enrollment rates. If fertility remains constant, the number of children enrolled will be 2,217,000; 73,900 primary grade teachers will be required that year. If the TFR is reduced to 5.3 by 2000, the number of children enrolled will be 1,971,000 and the number of required school teachers 65,700. If the TFR is reduced to 4.3, 1,684,000 children will be enrolled and 56,100 primary school teachers will be required. If the TFR falls to 3.2 by 2000, the number of children enrolled will be 1,348,000. The number of primary school teachers needed will be 44,900.

If the rate at which teachers graduated over the last 10 years continues for the next 20 years, there will be 40,000 teachers, and a large deficit, unless the TFR falls to 3.2 or enrollment rates remain constant. (See Tables 38 and 39.) Funds otherwise needed for the continually increasing number of primary school-age children could be saved or used to reduce pupil/teacher ratios, to promote bilingual education in areas where Indian languages are spoken at home, and to increase enrollment in secondary schools or to provide additional vocational training.

B. Secondary Education

In 1975 approximately 848,000 young people had reached secondary school age (13 to 18). Of these, approximately 26 percent were actually enrolled in school. (See Table 40 for the number of children of secondary school age for selected years (1975 to 2000) under four fertility assumptions.) If the TFR remains at 5.9, the secondary school-age population will be 1,972,000 by the year 2000. If it declines to 5.3, the secondary school-age population will fall to 1,829,000; if it declines to 4.3, the secondary school-age population will

number 1,634,000; and if it falls to 3.2, the secondary school-age population will decline further to 1,430,000. Therefore, in the year 2000, there will be 540,700 more secondary school-age persons if the TFR is not reduced to 3.2.

If enrollment rates continue at 26 percent, secondary school enrollment in 2000 will be 512,500, assuming constant fertility. If the TFR falls to 5.3, enrollment will be 475,600; if it falls to 4.3, enrollment will be 424,800; if it falls to 3.2, enrollment will be 371,900. Thus, enrollment will decline by 140,600 in the year 2000, if the TFR is reduced from 5.3 to 3.2. (See Table 41.)

If enrollment rates continue at 26 percent, the number of secondary teachers required in the year 2000 will be 17,000, if fertility remains constant. If the TFR falls to 5.3, the number of teachers required will be 15,900; if it falls to 4.3, 14,200 teachers will be needed; if it falls to 3.2, the number of teachers required will be 12,400. Thus, 4,700 additional teachers will be needed if the TFR remains constant. (See Table 42.)

The government may decide to increase the proportion of enrolled secondary school-age children from 26 percent (1975) to 46 percent in 2000. If fertility rates remain constant, 907,000 young people will be enrolled and 22,900 new teachers will be required. If the TFR is reduced to 5.3 by 2000, the number enrolled will be 841,400 and the number of additional teachers needed will be 20,700. If the TFR is reduced to 4.3, the number enrolled will decline to 752,100, 17,700 new teachers will be required. If the TFR falls to 3.2, the number of young people enrolled in secondary school will be 658,000 and the number of new teachers needed will be 14,600. If present trends continue, the number of secondary school teachers will increase by 15,700 by 2000, and a deficit will result unless the TFR falls to 3.2. (See Tables 43 and 44.)

Health

Improved health advances human welfare and contributes to the increased productivity of the labor force. Rapid population growth interferes in two ways with government efforts to provide an adequate national health care system. First, high fertility is itself a primary cause of maternal and child illness and death. Second, rapid population growth makes it difficult to provide enough trained medical personnel, hospitals, clinics, and other services to meet the physician's health needs. High fertility contributes directly and indirectly to maternal and child morbidity and mortality. Numerous and closely spaced pregnancies result in high rates of disease and death for both mothers and children.

In Guatemala, 80 of every 1,000 infants die within a year of birth. More than 50 percent of all deaths in the country occur between birth and age 5. The mortality level of this group is due largely to environmental factors, particularly malnutrition. Diarrhea, pneumonia, and malnutrition are the major causes of childhood deaths.

A. Manpower Requirements

In 1975 the available health manpower in Guatemala included 1,800 doctors. There was one physician for every 3,380 people. If this ratio remains constant, 4,410 additional physicians (approximately 100 new doctors annually) will be needed by the year 2000, assuming a constant level of fertility. If the TFR falls to 5.3, the number of doctors needed will be 4,094 (92 to be trained annually). If the TFR falls to 4.3, the number of doctors needed will be 3,769 (79 to be trained annually). If the TFR falls to 3.2, 3,385 doctors will be

required (63 to be trained annually). Thus, if the TFR falls to 3.2, 1,025 fewer doctors will be required. (See Table 45.)

If over the next 20 years the level of service is gradually increased from one physician per 3,380 persons to one physician per 1,000 persons, the demand for new physicians will decline by 3,462. If the TFR remains at 5.9, new physicians (524 to be trained annually) will be needed; if the TFR falls to 3.2, the number of physicians required will be 11,443.

If the cost of training an additional doctor is 50,000 quetzals, the savings in educational costs by the year 2000 will be approximately 51,000,000 quetzals, assuming current levels of service. These savings could be used to train additional nurses. The Ten-Year Health Plan for the Americas, reported by the Third Special Meeting of Ministers of Health of the Americas, recommended that 4.5 fully trained nurses be provided for every 10,000 persons. The number of nurses required to achieve that goal by the year 2000 will depend on the level of fertility. If fertility remains constant, Guatemala will need 3,312 nurses by the year 2000. If the TFR falls to 5.3 by 2000, the number of nurses required will be 3,075; if it falls to 4.3, 2,831 will be required; and if it falls to 3.2, 2,543 will be needed. Thus, the targeted level of 4.5 nurses per 10,000 persons can be met with 769 fewer nurses, if the TFR declines to 3.2. (See Table 47 for the number of nurses required under alternative fertility assumptions.)

B. Attended Births

In 1973 only 68 percent of registered births involved medical care. The number of unattended births was as low as 22 percent in Guatemala City and over 90 percent in Quiche, Jalapa, El Progreso, and Baja Verapog. With the exception of Guatemala City and Peten, more than 60 percent of all births receiving any medical care were attended by midwives.

Requirements for medical services at birth will depend on fertility levels. At present, the annual number of births is approximately 298,000. If fertility remains constant, there will be 577,400 births each year between 1995 and 2000. If the TFR is reduced to 5.3, the number of births will decline to 479,800. If the TFR falls to 4.3, the number of births will be reduced to 399,700. If the TFR falls to 3.2, the number of births will fall to 297,400. Thus, by 2000, there will be 280,000 (94 percent) additional births each year if the TFR remains constant. (See Table 48.)

If levels of maternal care remain constant, and if 68 percent of all births receive some medical attention, 392,000 births will be attended by medical care. This figure will be greater than the total number of births if the TFR falls to 3.2. It will almost equal the number of births if the TFR falls to 4.3. In either case, providing medical care for 100 percent of all births will require no more effort than is now required to provide medical care for 68 percent of births.

C. Abortions

Studies indicate that 50 percent of maternal mortality in Guatemala City is due to induced abortion and that 20 percent of the hospital obstetrics budget is used to treat abortion cases. Abortion occurs frequently; in one study of 678 women who had an abortion, the average number of previous abortions was 1.5. Only 9.9 percent reported using any contraceptive during the month of conception, although upon return for a control visit, 56.5 percent reported using some form of contraception. Obviously, Guatemalan women would benefit from a family planning program.

In 1978 Guatemala spent 62,000,000 quetzals -- an average of nine quetzals per person -- on health. If health expenditures per person do not change and

if fertility remains constant, the government will have to spend 134,000,000 quetzals on health in the year 2000. If the TFR declines to 5.3, the government will have to spend 124,000,000 quetzals. It will have to spend 114,000,000 quetzals if the TFR declines to 4.3, and 102,000,000 quetzals if the TFR declines to 3.2. Thus, assuming a constant expenditure of nine quetzals per persons, the government will save 32,000,000 quetzals on health care if the TFR is reduced to 3.2 by 2000. These savings could be used to increase health expenditures per capita or to finance other aspects of economic and social development. (See Table 49.)

IMPACT OF THE GUATEMALAN FAMILY PLANNING PROGRAM
ON FERTILITY DECLINE

IMPACT OF THE GUATEMALAN FAMILY PLANNING PROGRAM ON FERTILITY DECLINE

Reduced fertility can contribute significantly to the rapid economic and social development of Guatemala. If the government's family planning program, as currently structured, can contribute to that decline, it will be a most cost-effective way of raising per capita income and per capita investment; of reducing unemployment; housing expenditures, educational costs, the size of the illiterate population, and health costs; and of improving maternal and child health care.

The Role of Development

It is well known that reduced fertility decline is a long-term consequence of social and economic development. Increased social and economic development resulting from successful family planning programs will reinforce the effects of these programs over time and initiate a cumulative interactive process whereby fertility decline fosters development and development accelerates fertility decline. Thus, the most effective way to reduce fertility is to combine rapid social and economic development with a strong family planning program.

Family Planning Programs

Family planning programs have an independent impact on fertility decline. A recent study of 94 countries showed that among developing nations with relatively advanced social and economic conditions, birth rates declined an average of 19 percent between 1965 and 1975. Birth rates declined by approximately 29 percent in countries with strong family planning programs, but only by 9 percent in countries with weak family planning programs. In countries with advanced

social and economic settings but no family planning programs, fertility declined only 3 percent. The same pattern prevailed in countries with more moderate social and economic settings. While birth rates declined 10 percent in these countries between 1965 and 1975, they fell an average of 19 percent in nations with strong family planning programs but only 6 percent in nations with weak family planning programs. The decline was only 2 percent in countries with no family planning programs.

The Guatemalan Program

Approximately 548,000 Guatemalan women required family planning services in 1978. There were 1,270,000 women aged 15 to 44; of these approximately 90 percent were fecund, and 69 percent, or 790,000 were sexually active. Of this number, 14 percent were either pregnant or trying to conceive. Thus, 612,000 women could have benefited from family planning services. Approximately 10 percent had acquired contraceptives from private sources. The remainder, 548,000, or 43 percent of women aged 15 to 44, received no publicly-provided family planning services. (See Table 50 for the number of women requiring family planning services in the years 1975-1980 to 1995-2000. These estimates are based on the assumption that 43 percent of women aged 15 to 49 are in need of family planning services.)

To reach a TFR of 3.2 by the year 2000, 2,500 fewer annual births must have occurred by 1980. Between 1980 and 1985 the number of prevented births must be even larger. To reduce the TFR to 5.3, 22,100 births must be prevented; to reduce it to 4.3, 52,800 births must be prevented. To reduce the TFR to 3.2, 83,400 of the 352,800 births projected must be prevented if TFR remains constant. (See Table 51.)

The achievement of specific family planning targets can lead to a reduction in TFR to 3.2 by 2000. The trajectory (see Table 52) calls for 396,000 users of family planning services by 1980. This figure is roughly consistent with the estimated total number of contraceptive users for the period 1979 to 1981, (see Table 53) and with family planning program targets, (see Table 54). The proposed program for family planning activity in Guatemala is neither inconsistent with the goal of achieving a TFR of 3.2 by 2000 nor with the desired economic and social benefits outlined in this report.

Economical social benefits can be obtained at relatively modest cost. A cost analysis of the Guatemalan family planning program computed the total output of the program measured in couple-years of protection (CYP) and the corresponding total project cost and net cost per couple-year of protection. (See Table 55.) The cost per couple-year of protection varies from a low of 1.04 quetzals to a high of 3.55 quetzals. Because these estimates are not exact, the actual cost per CYP may be as high as 10 quetzals. If the TFR is approximately six and the average number of child-bearing years per couple is 30, five couple-years of protection are needed to prevent a birth. Thus, even if the cost per CYP is 10 quetzals, the cost per birth prevented is only 50 quetzals -- a small fraction of the cost of educating, housing, and providing employment for a child resulting from an additional birth.

Guatemala's current family planning program is implemented through two major groups. APROFAM, which had a budget of 1,228,000 quetzals in 1978, dispenses family planning supplies through 600 Ministry of Health clinics and its own Community-Based Distribution Program. The Ministry of Health dispenses family planning supplies but has no separate budget for family planning services.

The Agency for International Development has tried to expand family planning services in both the public and private sectors. It also has worked to encourage the poor -- a majority of the population -- to accept such services. It intends to continue supporting APROFAM while encouraging increased public sector support of family planning. It plans to emphasize information, education, and communication (IEC) activities and the integration of family planning activities with other local programs.

Appendix A
LIST OF PEOPLE INTERVIEWED

Appendix A

LIST OF PEOPLE INTERVIEWED

Mr. Roberto Santiso
Executive Director, APROFAM

Mr. Victor Hugo Fernandez
Finance and Administration Director, APROFAM

Mr. Enrique Soto
Information Director, APROFAM

Mr. Scott Edmonds
Chief, Division of Public Health
USAID, Guatemala

Appendix B

EXPLANATION OF TERMS USED TO MEASURE FERTILITY DECLINE
UNDER POPULATION PROJECTIONS

Appendix B

EXPLANATION OF TERMS USED TO MEASURE FERTILITY DECLINE UNDER POPULATION PROJECTIONS

The economic analysis uses several terms in the population projections for the years 1980-2000. Each of the terms is explained below.

Crude Birth Rate (CBR) -- the number of births per 1,000 total population that occur during one year.

General Fertility Rate (GFR) -- the number of births per 1,000 women of child-bearing age (15-49 years) that occur during one year.

Total Fertility Rate (TFR) -- the number of births that would occur among 1,000 women during their lifetime, if throughout their lives they were exposed to a level of fertility at each age which is characteristic of the population in a given year.

Fortunately, the correlation between any pair of these measures is so high that given the value of any one of these rates, it is possible to calculate the equivalent value of the other two. The equations developed by Bogue-Palmore at the University of Chicago are as follows:

$$\text{GFR} = 4.4932 \text{ CBR} - 8.5945$$

$$\text{GFR} = 0.0328 \text{ TFR} - 10.305$$

$$\text{TFR} = 137.94 \text{ CBR} + 106.16$$

$$\text{TFR} = 30.195 \text{ GFR} + 343.28$$

$$\text{CBR} = 0.2141 \text{ GFR} + 2.2903$$

$$\text{CBR} = 0.0070 \text{ TFR} + 0.2453$$

For example, if one uses the 1978 CBR figure of 41 (estimated by the National Contraceptive Usage Study of Guatemala) in the above formulas its equivalent in TFR is 5.7. The reduction of the CBR to 37 by the end of 1982 translates into a TFR of 5.2, well below the high TFR projection of 5.3 by the year 2000. Given the impact of an effective 20-year (1980-2000) family planning project, a conservative estimate would reduce the TFR to 4.3 in the year 2000 (the CBR would be 30).

Appendix C

STATISTICAL INFORMATION

LIST OF TABLES

		<u>Page</u>
Table 1	Population of Guatemala, 1778 to 1980	C-6
Table 2	Crude Birth and Death Rates Per 1,000 (1900 - 1973)	C-7
Table 3	Estimated Age - Specific Fertility Rate (1964 and 1970, 1973)	C-8
Table 4	Estimated Total Populations for Central America, 1980	C-9
Table 5	Proportion of the Populations of Central American Countries Living in Cities of 10,000 or More Inhabitants (1970)	C-10
Table 6	Rates of Growth of Central American Countries (1970 - 1980)	C-11
Table 7	Estimated Life Expectancy at Birth for Selected Years (1950 - 1972)	C-12
Table 8	Estimated Infant Mortality Rates for Selected Years (1950 - 1973)	C-13
Table 9	Estimates and Projections of Total Mid-Year Population (1950 - 1976)	C-14
Table 10	Estimated and Projected Population By Age And Sex, March 1953 and Mid - Year 1976 (000s)	C-15
Table 11	Values of Fertility Measures in the Quinquennium, 1995 - 2000 (Under Four Alternative Fertility Hypotheses)	C-16
Table 12	Population Projections for the Years 1975 - 2000 (Under Four Fertility Assumptions)	C-17
Table 13	Projected Arable Land Per Capita in Selected Years, 1980 - 2000 (Under Four Fertility Assumptions)	C-18
Table 14	Gross National Product and Gross National Product Per Capita (1967 - 1976)	C-19

		<u>Page</u>
Table 15	TEMPO Projections of Economic Aggregates in 2000	C-20
Table 16	Projections of Per Capita GNP in 2000 Under Four Fertility Assumptions Assuming GNP Increases 6 Percent Annually	C-21
Table 17	Demographic Dependency Ratios for Selected Years, 1975 - 2000 (Under Four Fertility Assumptions)	C-22
Table 18	Economic Dependency Ratios in 2000 (Under Four Fertility Assumptions)	C-23
Table 19	Projected Levels of Government Expenditures for Social Services for Selected Years, 1976 - 2000 (Under Four Fertility Assumptions)	C-24
Table 20	Gross Domestic Product, Gross Domestic Investment, and Gross Domestic Investment as A Percent of Gross Domestic Product (1967 - 1976)	C-25
Table 21	Percent of 1973 Population Economically Active (by Age and Sex)	C-26
Table 22	Projections of the Economically Active Population Aged 10 or Over, for Selected Years, 1980 - 2000 (Under Four Fertility Assumptions)	C-27
Table 23	New Jobs Required by the Year 2000 to Maintain Current Levels of Unemployment (Under Four Fertility Assumptions)	C-28
Table 24	Required Capital Formation in the Year 2000 To Maintain Current Employment Rates (Under Four Fertility Assumptions)	C-29
Table 25	Employment Projections for Selected Years, 1980 - 2000, Given Increase in Female Labor Force Participation Rates (Under Four Fertility Assumptions)	C-30
Table 26	Job Requirements in the Year 2000 Assuming 50 Percent Increase in Female Age-Specific Labor Force Participation Rates (Under Four Fertility Assumptions)	C-31

	<u>Page</u>
Table 27	Requirements for Capital Formation by the Year 2000, Assuming 50 Percent Increase in Female Age-Specific Labor Force Participation Rates (Under Four Fertility Assumptions) C-32
Table 28	Projected Urban Population for 1977, 1985, and 2000 (Under Four Fertility Assumptions) C-33
Table 29	Change in Urban Population and Required New Urban Houses Between 1977 and 2000 (Under Four Fertility Assumptions) C-34
Table 30	Housing Units Required Annually to Accommodate Increase in Population (Under Two Fertility Assumptions) C-35
Table 31	Projected Number of Families for Selected Years, 1980 - 2000 (Under Four Fertility Assumptions) C-36
Table 32	Required Housing Units for Selected Years, 1980 - 2000 (Under Four Fertility Assumptions) C-37
Table 33	Number of Children Aged 7 to 11, in Selected Years, 1975 - 2000 (Under Four Fertility Assumptions) C-38
Table 34	Number of Children Age 7 to 12, in Selected Years, 1975 - 2000 (Under Four Fertility Assumptions) C-39
Table 35	Primary School Enrollment for Selected Years, 1975 - 2000, Assuming 51.2 Percent Enrollment Rate (Under Four Fertility Assumptions) C-40
Table 36	Primary School Teachers Required for Selected Years, 1975 - 2000 (Under Four Fertility Assumptions) C-41
Table 37	Children Aged 7 to 12 Not Enrolled in School in Selected Years, 1975 - 2000 (Under Four Fertility Assumptions) C-42
Table 38	Enrollment of Children Aged 7 to 12, Assuming Enrollment Rates Rise to 90 Percent by 2000 (Under Four Fertility Assumptions) C-43
Table 39	Teachers Required to Meet Demand for Primary Education, 1975 - 2000, (Under Four Fertility Assumptions) C-44

		<u>Page</u>
Table 40	Population Aged 13 to 18 in Selected Years 1975 - 2000 (Under Four Fertility Assumptions)	C-45
Table 41	Enrollment of Children Aged 13 to 18 in Selected Years, 1975 - 2000 (Under Four Fertility Assumptions)	C-46
Table 42	Secondary School Teachers Required in Selected Years, 1975 - 2000 (Under Four Fertility Assumptions)	C-47
Table 43	Secondary School Enrollment of Persons 13 to 18 Years of Age in Selected Years, 1975 - 2000 (Under Four Fertility Assumptions)	C-48
Table 44	Requirements for Secondary School Teachers in Selected Years, 1975 - 2000 (Under Four Fertility Assumptions)	C-49
Table 45	Requirements for Physicians in Selected Years, 1975 - 2000, to Maintain Current Levels of Service (Under Four Fertility Assumptions)	C-50
Table 46	Requirements for Physicians in Selected Years, 1975 - 2000, to Improve the Current Service Level (Under Four Fertility Assumptions)	C-51
Table 47	Requirements for Nurses in Selected Years, 1975 - 2000, to Improve Current Service Levels (Under Four Fertility Assumptions)	C-52
Table 48	Number of Births Annually in Five-Year Periods, 1975 - 2000 (Under Four Fertility Assumptions)	C-53
Table 49	Government Expenditures on Health in Selected Years, 1978 - 2000 (Under Four Fertility Assumptions)	C-54
Table 50	Number of Women Aged 15 to 19 Needing Public Family Planning Services (Under Four Fertility Assumptions)	C-55
Table 51	Reduction in Births Compared to Constant Fertility to Achieve Three Alternative Fertility Levels (By Year)	C-56
Table 52	Family Planning Program Targets to Reduce the TFR to 3.2 by the Year 2000	C-57

		<u>Page</u>
Table 53	Estimated Total Contraceptive Users, 1979 - 1981	C-58
Table 54	Family Planning Program Targets, 1979-1981	C-59
Table 55	Output and Cost of the Family Planning Program in 1978	C-60

Table 1
POPULATION OF GUATEMALA, 1778 TO 1980

<u>Date of Census</u>	<u>Population</u>	<u>Growth Rate</u>
1778	396,149	--
1880	1,224,602	1.11
1893	1,501,145	1.57
1921	2,004,900	1.02
1940	2,400,000	0.97
1950	2,790,868	1.50
1964	4,287,997.	3.07
1973	5,728,092	2.73*
1975	6,081,635	2.80*
1980	7,006,020	2.75*

* CELADE, Population Projections, 1974.

Source: Jorge Arias de Blois, La Población de Guatemala.

Table 2
 CRUDE BIRTH AND DEATH RATES PER 1,000
 (1900 - 1973)

<u>Year</u>	<u>Crude Birth Rate</u>	<u>Crude Death Rate</u>	<u>Rate of Natural Increase (%)</u>
1900-1904	45.8	35.4	1.04
1905-1909	43.6	34.0	0.96
1910-1914	46.6	33.0	1.36
1915-1919	43.2	40.8	0.24
1920-1924	48.3	33.7	1.46
1925-1929	49.2	32.6	1.66
1930-1934	46.2	31.7	1.45
1935-1939	44.2	30.7	1.35
1940-1944	45.2	30.7	1.67
1945-1949	49.1	26.5	2.26
1950-1954	50.9	23.4	2.75
1955-1959	49.0	20.0	2.90
1960-1964	47.6	18.0	2.96
1965-1969	44.0	16.4	2.76
1970	41.6	14.9	2.67
1971	43.8	14.4	2.94
1972	44.2	13.3	3.09
1973	43.4	15.4	2.80

Source: 1900 - 1959: O. Andrew Collver, Birth Rates in Latin America: New Estimates of Historical Trends and Fluctuations, University of California, Berkeley, 1965.

1960 - 1973: Population Index 41:3 (July 1975), pp. 546 and 551.

Table 3

ESTIMATED AGE-SPECIFIC FERTILITY RATES
(1964 and 1970 - 1973)

<u>Age</u>	Births per 1,000 Women				
	<u>1964</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
15 to 19	146	136	146	140	133
20 to 24	297	276	292	280	265
25 to 29	296	246	255	277	262
30 to 34	244	207	216	241	228
35 to 39	188	174	179	174	164
40 to 44	83	76	83	89	77
45 to 49	23	22	21	21	19

Source: The 1964 and 1970 - 1972 totals and age-specific fertility rates are based on registered births by age of mother (United Nations, 1970, Table 14; and United Nations, 1976, Table 23) and estimated mid-year female population, by age, based on the adjusted census populations for 1964 and 1973, respectively. Total and age-specific fertility rates for 1973 are based on total registered births for 1973 (United Nations, 1976, Table 20) distributed by age of mother using the distribution of births by age of mother for 1972 and estimated female population for mid-year 1973.

Table 4

ESTIMATED TOTAL POPULATIONS FOR CENTRAL AMERICA, 1980

<u>Country</u>	<u>Estimated Population</u>
Costa Rica	2,286,000
El Salvador	4,813,000
Guatemala	6,940,000
Honduras	3,595,000
Nicaragua	2,669,000

Source: Report on Demographic Trends and Projections for Central America, Inter-American Development Bank, 1977.

Table 5

PROPORTION OF THE POPULATIONS OF CENTRAL AMERICAN COUNTRIES
LIVING IN CITIES OF 10,000 OR MORE INHABITANTS
(1970)

<u>Country</u>	<u>Percent</u>
Costa Rica	31
El Salvador	26
Guatemala	25
Honduras	24
Nicaragua	35

Source: Report on Demographic Trends and Projections for
Central America, Intra-American Development Bank,
1977.

Table 6

RATES OF GROWTH OF CENTRAL AMERICAN COUNTRIES
(1970 - 1980)

<u>Country</u>	<u>Percent Increase</u>
Costa Rica	35.8
El Salvador	42.0
Guatemala	33.4
Honduras	42.3
Nicaragua	46.1

Source: Report on Demographic Trends and Projections for Central America, Inter-American Development Bank, 1977.

Table 7

ESTIMATED LIFE EXPECTANCY AT BIRTH FOR SELECTED YEARS*
(1950 - 1972)

<u>Year</u>	<u>Life Expectancy At Birth (Years)</u>
1950	40
1964	48
1970-1972	53

* Life expectancy at birth for 1950 and 1964 was derived from 1950 and 1964 life tables. The life expectancy at birth for 1970 - 1972 was derived from empirical life tables generated at the Bureau of the Census using age-specific death rates derived from averages of registered deaths for 1970, 1971, and 1972, by age and sex (see United Nations, 1973, Table 24; United Nations, 1974, Table 16; and United Nations, 1976, Table 13), and estimated population for 1971, by age and sex, based on the 1973 adjusted census population.

Source: Country Demographic Profiles, Guatemala, U.S. Census Bureau, p. 6.

Table 8
ESTIMATED INFANT MORTALITY RATES FOR SELECTED YEARS
(1950 - 1973)

<u>Year</u>	<u>Infant Deaths per 1,000 Live Births*</u>
1950	163
1964	111
1970	88
1971	82
1972	79
1973	80

* Infant mortality rates for 1950 and 1964 were derived from 1950 and 1964 life tables constructed by CELADE (1969, pp. 48-49; 64-65). Infant mortality rates by sex from the life tables were weighted by a sex ratio at birth of 1.05 to estimate the infant mortality rate for both sexes. The rates from 1970 to 1973 were estimated using registered infant deaths and births.

Source: Country Demographic Profiles, Guatemala, U.S. Census Bureau, p. 6.

Table 9

ESTIMATES AND PROJECTIONS OF TOTAL MID-YEAR POPULATION
(1950 - 1976)

<u>Year</u>	<u>Population (000s)</u>
1950	3,024
1951	3,108
1952	3,189
1953	3,264
1954	3,356
1955	3,452
1956	3,545
1957	3,643
1958	3,742
1959	3,850
1960	3,969
1961	4,094
1962	4,220
1963	4,343
1964	4,470
1965	4,595
1966	4,725
1967	4,861
1968	4,996
1969	5,129
1970	5,262
1971	5,407
1972	5,572
1973	5,743
1974	5,909
1975	6,081
1976	6,237

Source: Country Demographic Profiles, Guatemala, U.S. Census Bureau.

Table 10

ESTIMATED AND PROJECTED POPULATION BY AGE AND SEX,
MARCH 1973 AND MID-YEAR 1976 (000s)

Age	Adjusted Census, March 1973		
	Both Sexes	Male	Female
0-4	992.7	505.0	487.8
5-9	815.0	416.1	398.9
10-14	716.6	366.0	350.6
15-19	611.2	311.8	299.3
20-24	507.0	258.6	248.4
25-29	424.5	216.4	208.1
30-34	346.3	176.3	169.9
35-39	287.9	146.4	141.5
40-44	237.6	120.5	117.0
45-49	195.4	98.5	96.8
50-54	159.3	79.6	79.7
55-59	128.5	63.5	65.0
60-64	98.2	48.0	50.2
65-69	73.1	35.3	37.7
70-74	49.8	23.8	26.0
75 and over	55.9	26.1	29.8

Age	Projected Population, Mid-Year 1976		
	Both Sexes	Male	Female
0-4	1,063.6	541.6	522.0
5-9	890.9	454.1	436.8
10-14	768.5	392.5	376.0
15-19	674.4	344.2	330.2
20-24	565.4	288.3	277.1
25-29	468.9	238.9	229.9
30-34	388.3	197.7	190.6
35-39	317.0	161.1	155.8
40-44	262.8	133.3	129.5
45-49	215.6	108.8	106.8
50-54	175.4	87.8	87.6
55-59	140.9	69.8	71.1
60-64	109.4	53.7	55.7
65-69	80.2	38.9	41.3
70-74	55.7	26.7	29.1
75 and over	59.6	27.8	31.7

Source: Country Demographic Profiles, Guatemala, U.S. Census Bureau, p. 4

Table 11

VALUES OF FERTILITY MEASURES IN THE QUINQUENNIA, 1995 - 2000
(UNDER FOUR ALTERNATIVE FERTILITY HYPOTHESES)

<u>Rate</u>	<u>GRR</u>	<u>TFR</u>	<u>CBR</u>	<u>NRR</u>
Constant	2.89	5.9	40.7	2.6
High	2.60	5.3	38.2	2.3
Medium	2.10	4.3	33.2	1.9
Low	1.57	3.2	27.0	1.4

Source: Proseminario Nacional Sobre Población y Desarrollo en Guatemala, 1977, p. 42.

Table 12

POPULATION PROJECTIONS FOR THE YEARS 1975 - 2000
 (UNDER FOUR FERTILITY ASSUMPTIONS)
 (000s)

<u>Year</u>	<u>TFR</u>			
	<u>5.9</u>	<u>5.3</u>	<u>4.3</u>	<u>3.2</u>
1975	6,242.6	6,242.6	6,242.6	6,242.6
1980	7,358.6	7,315.9	7,262.4	7,212.7
1985	8,737.7	8,594.7	8,403.0	8,212.8
1990	10,415.6	10,094.8	9,676.4	9,230.1
1995	12,442.8	11,832.4	11,108.8	10,293.8
2000	14,905.5	13,837.1	12,738.7	11,443.6

Source: Interpretación de las Proyecciones de Población en
Terminos de Servicios Basicos (1950 - 2000),
Dirección General de Estadística, p. 13.

Table 13

PROJECTED ARABLE LAND PER CAPITA IN SELECTED YEARS, 1980 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Land (Hectares)</u>				
	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	0.41	0.35	0.25	0.21	0.18
5.3	0.41	0.31	0.26	0.22	0.19
4.3	0.41	0.31	0.27	0.24	0.21
3.2	0.41	0.32	0.29	0.26	0.23

Table 14

GROSS NATIONAL PRODUCT AND GROSS NATIONAL PRODUCT PER CAPITA
(1967 - 1976) *

<u>Year</u>	<u>GNP (Millions of Quetzals)</u>	<u>GNP Per Capita (Quetzals)</u>
1967	2,228.9	458
1968	1,433.7	487
1969	2,560.2	499
1970	2,669.7	507
1971	2,664.3	492
1972	3,077.3	552
1973	3,298.2	574
1974	3,483.7	590
1975	3,575.9	588
1976	3,905.2	626

* 1975 prices.

Source: Boletín Estadístico, Bank of Guatemala.

Table 15

TEMPO PROJECTIONS OF ECONOMIC AGGREGATES IN 2000

	<u>1965</u>	<u>Fertility Constant</u>	<u>Fertility Decline</u>
Population	4.3	13.8	9.4
GNP	1.4	11.4	10.6
GNP Per Capita	330	826	1,127
Labor Force (Millions)	1.2	3.7	3.2
Employment (Millions)	1.0	3.5	3.0
Rate of Unemployment	15	7.7	5.9
Labor Force Participation Rate	.276	.272	.341
Capital Per Worker	2,460	5,200	6,200
Proportion of Income Saved	.0509	.114	.123

Source: "Los Efectos De La Baja En La Fertilidad," 69
TMP-50, Vol. II, August 25, 1969, p. 2.

Table 16

PROJECTIONS OF PER CAPITA GNP IN 2000 UNDER FOUR
FERTILITY ASSUMPTIONS ASSUMING GNP INCREASES 6 PERCENT ANNUALLY

<u>TFR</u>	<u>GNP Per Capita*</u> <u>(Quetzals)</u>
5.9	1,152
5.3	1,196
4.3	1,316
3.2	1,469

* 1975 prices.

Table 17

DEMOGRAPHIC DEPENDENCY RATIOS FOR SELECTED YEARS, 1975 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	92	91	93	96	97	98
5.3	92	90	90	89	89	87
4.3	92	88	85	82	79	76
3.2	92	87	81	73	67	63

Source: Interpretación de las Proyecciones de Población en Terminos de Demanda de Servicios Basicos (1995 - 2000). Dirección General de Estadística, p. 17.

Table 18

ECONOMIC DEPENDENCY RATIOS IN 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Economic Dependency Ratio</u>
5.9	272
5.3	251
4.3	230
3.2	203

Table 19

PROJECTED LEVELS OF GOVERNMENT EXPENDITURES FOR SOCIAL SERVICES
FOR SELECTED YEARS, 1976 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)*

<u>TFR</u>	<u>Expenditures (Millions of Quetzals)</u>					
	<u>1976</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	183	221	262	312	373	447
5.3	183	220	258	303	355	415
4.3	183	217	252	290	333	382
3.2	183	216	246	277	309	343

* The table assumes that government expenditures will remain at 30 quetzals per capita.

Table 20

GROSS DOMESTIC PRODUCT, GROSS DOMESTIC INVESTMENT, AND
GROSS DOMESTIC INVESTMENT AS A PERCENT OF GROSS DOMESTIC PRODUCT
(1967 - 1976) *

<u>Year</u>	<u>GDP</u> <u>(Millions of Q)</u>	<u>GDI</u> <u>(Millions of Q)</u>	<u>GDI/GDP</u> <u>(100)</u>
1967	2,278.5	383.1	16.8
1968	2,492.1	478.7	19.3
1969	2,626.7	396.0	15.1
1970	2,762.6	451.9	16.4
1971	2,914.9	512.6	17.6
1972	3,153.2	449.3	14.2
1973	3,362.2	523.3	15.6
1974	3,541.4	658.0	18.6
1975	3,645.9	586.9	16.1
1976	3,921.8	784.7	20.0

* 1975 prices.

Table 21

PERCENT OF 1973 POPULATION ECONOMICALLY ACTIVE
(By Age and Sex)

<u>Age</u>	<u>Male</u>	<u>Female</u>
Total, 10 years and over	76.4	12.4
10-14	27.0	4.2
15-19	72.8	15.1
20-24	90.6	17.4
25-29	95.0	15.0
30-34	95.8	14.1
35-39	95.9	13.9
40-44	95.7	14.1
45-49	95.3	13.6
50-54	94.0	12.9
55-59	92.4	12.0
60-64	87.7	10.2
65 and over	69.8	7.1

Source: Country Demographic Profiles, Guatemala, U.S.
Census Bureau, p. 14.

Table 22

PROJECTIONS OF THE ECONOMICALLY ACTIVE POPULATION,
 AGED 10 OR OVER, FOR SELECTED YEARS, 1980 - 2000
 (UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Population (000s)			
	1980	1985	1990	2000
5.9	2,172.0	2,518.3	2,917.5	4,001.5
5.3	2,172.0	2,518.3	2,913.6	3,937.8
4.3	2,172.0	2,518.3	2,908.9	3,854.0
3.2	2,172.0	2,518.3	2,904.4	3,769.8

Source: Interpretación de las Proyecciones de Población en Terminos de Demanda de Servicios Basicos (1950 - 2000), Dirección General de Estadística, p. 18.

Table 23

NEW JOBS REQUIRED BY THE YEAR 2000 TO MAINTAIN CURRENT LEVELS
OF UNEMPLOYMENT (UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Growth of Labor Force</u>
5.9	1,591,000
5.3	1,536,000
4.3	1,463,000
3.2	1,429,000

Table 24

REQUIRED CAPITAL FORMATION IN THE YEAR 2000 TO MAINTAIN
CURRENT EMPLOYMENT RATES (UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Capital Required (Millions of Quetzals)</u>
5.9	16,706
5.3	16,128
4.3	15,361
3.2	15,004

Table 25

EMPLOYMENT PROJECTIONS FOR SELECTED YEARS, 1980 - 2000,
GIVEN INCREASE IN FEMALE LABOR FORCE PARTICIPATION RATES
(UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Employees (000s)			
	1980	1985	1990	2000
5.9	1,889.6	2,267.6	2,715.9	3,968.7
5.3	1,889.6	2,267.6	2,712.3	3,905.5
4.3	1,889.6	2,267.6	2,707.9	3,822.4
3.2	1,889.6	2,267.6	2,703.7	3,738.9

Table 26

JOB REQUIREMENTS IN THE YEAR 2000 ASSUMING 50 PERCENT INCREASE
IN FEMALE AGE-SPECIFIC LABOR FORCE PARTICIPATION RATES
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>1980 - 2000</u>
5.9	2,079.1
5.3	2,015.9
4.3	1,932.8
3.2	1,849.3

Table 27

REQUIREMENTS FOR CAPITAL FORMATION BY 2000 ASSUMING
50 PERCENT INCREASE IN FEMALE AGE-SPECIFIC LABOR FORCE
PARTICIPATION RATES (UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Capital Required</u> <u>(Millions of Quetzals)</u>
5.9	21,830
5.3	21,167
4.3	20,294
3.2	19,417

Table 28

PROJECTED URBAN POPULATION FOR 1977, 1985, AND 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Persons (Millions)</u>		
	<u>1977</u>	<u>1985</u>	<u>2000</u>
5.9	1,620	3,757.2	7,601
5.3	1,620	3,695.7	7,057
4.3	1,620	3,613.3	6,496
3.2	1,620	3,531.5	5,836

Table 29

CHANGE IN URBAN POPULATION AND REQUIRED NEW URBAN HOUSES
BETWEEN 1977 AND 2000 (UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Change in Urban Population (000s)</u>	<u>Required New Urban Houses (000s)</u>
5.9	5,981	1,196
5.3	5,437	1,087
4.3	4,876	975
3.2	4,216	843

Table 30

HOUSING UNITS REQUIRED ANNUALLY TO ACCOMMODATE INCREASE
IN POPULATION (UNDER TWO FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>1980 to 1984</u>	<u>1985 to 1989</u>	<u>1990 to 1994</u>	<u>1995 to 2000</u>
5.9	49,240	58,800	71,120	85,560
3.2	35,880	36,480	38,400	41,360

Table 31

PROJECTED NUMBER OF FAMILIES FOR SELECTED YEARS, 1980 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Families (000s)</u>				
	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	1,423.5	1,690.1	2,014.6	2,406.7	2,882.1
5.3	1,415.1	1,662.4	1,952.6	2,288.7	2,676.4
4.3	1,404.7	1,625.3	1,871.6	2,148.7	2,464.0
3.2	1,395.1	1,588.6	1,875.3	1,991.1	2,213.5

Source: Interpretación de las Proyecciones de Población en
Terminos de Demanda de Servicios Basicos, 1950 -
2000. Dirección General de Estadística, p. 26.

Table 32
REQUIRED HOUSING UNITS FOR SELECTED YEARS, 1980 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Housing Units (000s)</u>		
	<u>1980</u>	<u>1990</u>	<u>2000</u>
5.9	843.9	1,167.2	1,633.5
5.3	841.4	1,149.1	1,573.4
4.3	834.0	1,095.3	1,427.6
3.2	828.1	1,043.5	1,280.8

Table 33

NUMBER OF CHILDREN AGED 7 TO 11, IN SELECTED YEARS, 1975 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Children			
	1975	1980	1990	2000
5.9	811.3	924.2	1,321.5	1,876.1
5.3	811.3	921.2	1,286.0	1,765.3
4.3	811.3	917.9	1,179.8	1,469.4
3.2	809.3	916.8	1,084.0	1,163.8

Source: Proseminario Nacional Sobre Población y Desarrollo
En Guatemala, March 31, 1977, p. 40.

Table 34

NUMBER OF CHILDREN AGED 7 TO 12, IN SELECTED YEARS, 1975 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Children (000s)</u>					
	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	1,021.9	1,170.3	1,392.7	1,703.2	2,056.7	2,463.6
5.3	1,021.9	1,168.2	1,372.8	1,621.6	1,895.4	2,190.7
4.3	1,021.9	1,165.5	1,348.4	1,512.2	1,678.7	1,871.2
3.2	1,021.9	1,163.4	1,326.4	1,405.7	1,445.8	1,497.7

Source: Interpretación de las Proyecciones de Población en
Terminos de Demanda De Servicios Basicos, 1950 - 2000,
Dirección General de Estadística, p. 22.

Table 35

PRIMARY SCHOOL ENROLLMENT FOR SELECTED YEARS, 1975 - 2000,
 ASSUMING 51.2 PERCENT ENROLLMENT RATE
 (UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Students (000s)					
	1975	1980	1985	1990	1995	2000
5.9	523.2	599.1	713.1	872.0	1,053.0	1,261.4
5.3	523.2	598.1	702.9	830.3	970.4	1,121.6
4.3	523.2	596.7	690.4	774.2	859.5	958.1
3.2	523.2	595.7	679.1	719.7	740.2	766.8

Table 36

PRIMARY SCHOOL TEACHERS REQUIRED IN SELECTED YEARS, 1975 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Teachers (000s)*</u>					
	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	17.4	20.0	23.8	29.1	35.1	42.0
5.3	17.4	19.9	23.4	27.7	32.3	37.4
4.3	17.4	19.9	23.0	25.8	28.7	31.9
3.2	17.4	19.9	22.6	24.0	24.7	25.6

* Based on assumed enrollment rate of 51.2 percent.

Table 37

CHILDREN AGED 7 TO 12 NOT ENROLLED IN SCHOOL
 IN SELECTED YEARS, 1975 - 2000
 (UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Children (000s)					
	1975	1980	1985	1990	1995	2000
5.9	498.7	571.2	679.6	831.2	1,003.7	1,201.9
5.3	498.7	570.1	669.9	791.3	925.0	1,028.1
4.3	498.7	567.8	658.0	738.0	819.2	913.1
3.2	498.7	567.7	647.3	686.0	705.6	730.8

Table 38

ENROLLMENT OF CHILDREN AGED 7 TO 12,
ASSUMING ENROLLMENT RATES RISE TO 90 PERCENT BY 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Children (000s)					
	1975	1980	1985	1990	1995	2000
5.9	510.4	674.3	918.8	1,260.0	1,686.3	2,217.2
5.3	510.4	675.5	905.6	1,199.7	1,554.0	1,971.6
4.3	510.4	677.1	889.1	1,118.7	1,376.4	1,684.1
3.2	510.4	678.5	875.0	1,039.0	1,185.4	1,347.9

Source: Interpretación de las Proyecciones de Población en
Terminos de Demanda de Servicios Basicos, 1950 -
2000, Dirección de Estadística, p. 22.

Table 39

TEACHERS REQUIRED TO MEET DEMAND FOR PRIMARY EDUCATION,
1975 - 2000 (UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Primary School Teachers (000s)</u>					
	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	17.0	22.6	30.6	42.0	56.2	73.9
5.3	17.0	22.6	30.2	40.0	51.8	65.7
4.3	17.0	22.6	29.7	37.3	45.9	56.1
3.2	17.0	22.6	29.2	34.7	39.5	44.9

Source: Interpretación de las Proyecciones de Población en
Terminos de Demanda de Servicios Basicos, 1950 -
2000, Dirección de Estadística, p. 23.

Table 40
 POPULATION AGED 13 TO 18 IN SELECTED YEARS, 1975 - 2000
 (UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Persons (000s)					
	1975	1980	1985	1990	1995	2000
5.9	848.5	986.1	1,124.2	1,327.6	1,627.2	1,971.2
5.3	848.5	985.8	1,122.1	1,316.6	1,559.2	1,829.1
4.3	848.5	985.3	1,119.8	1,303.6	1,470.1	1,634.9
3.2	848.	984.9	1,117.8	1,291.9	1,384.9	1,430.5

Source: Interpretación de las Proyecciones de Población en Terminos de Demanda de Servicios Basicos, Dirección General de Estadística, October 1978, p. 24.

Table 41

ENROLLMENT OF CHILDREN AGED 13 TO 18 IN SELECTED YEARS,
1975 - 2000 (UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Students (000s)*					
	1975	1980	1985	1990	1995	2000
5.9	220.6	256.4	292.3	345.2	423.2	512.5
5.3	220.6	256.3	291.7	342.3	405.4	475.6
4.3	220.6	256.2	291.1	338.9	382.2	424.8
3.2	220.6	256.1	290.6	335.9	360.1	371.9

* Enrollment rates assumed to be 26 percent.

Table 42

SECONDARY SCHOOL TEACHERS REQUIRED IN SELECTED YEARS, 1975-2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Teachers (000s)*					
	1975	1980	1985	1990	1995	2000
5.9	7.4	8.5	9.7	11.5	14.1	17.1
5.3	7.4	8.5	9.7	11.4	13.5	15.9
4.3	7.4	8.5	9.7	11.3	12.7	14.2
3.2	7.4	8.5	9.7	11.2	12.0	12.4

* Enrollment rate assumed to be 26 percent.

Table 43

SECONDARY SCHOOL ENROLLMENT OF PERSONS 13 TO 18 YEARS OF AGE
IN SELECTED YEARS, 1975 - 2000 (UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Students (000s)</u>					
	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	219.3	294.5	379.0	503.6	682.9	907.0
5.3	219.3	294.6	379.7	499.5	654.4	841.4
4.3	219.3	294.5	380.4	494.5	617.0	752.1
3.2	219.3	294.3	381.1	491.0	581.2	658.0

Source: Interpretación de las Proyecciones de Población en
Terminos de Demanda de Servicios Basicos, 1951 -
2000, Dirección General de Estadística, p. 24.

Table 44

REQUIREMENTS FOR SECONDARY SCHOOL TEACHERS IN SELECTED YEARS,
1975 - 2000 (UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Teachers (000s)					
	1975	1980	1985	1990	1995	2000
5.9	7.3	9.8	12.6	16.8	22.8	30.2
5.3	7.3	9.8	12.7	16.6	21.8	28.0
4.3	7.3	9.8	12.7	16.5	20.6	25.0
3.2	7.3	9.8	12.7	16.4	19.4	21.9

Source: Interpretación de las Proyecciones de Población en
Terminos de Demanda de Servicios Basicos, 1975 -
2000, Dirección General de Estadística, p. 25.

Table 45

REQUIREMENTS FOR PHYSICIANS IN SELECTED YEARS, 1975 - 2000,
TO MAINTAIN CURRENT LEVELS OF SERVICE
(UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Physicians*</u>					
	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	1,800	2,177	2,585	3,082	3,681	4,410
5.3	1,800	2,164	2,543	2,987	3,501	4,094
4.3	1,800	2,149	2,486	2,863	3,287	3,769
3.2	1,800	2,134	2,430	2,731	3,046	3,386

* Assumed level of service is one physician for ever 3,380 persons.

Table 46

REQUIREMENTS FOR PHYSICIANS IN SELECTED YEARS, 1975 - 2000,
TO IMPROVE THE CURRENT SERVICE LEVEL
(UNDER FOUR FERTILITY ASSUPTIONS)

<u>TFR</u>	<u>Number of Physicians</u>					
	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	1,800	2,534	3,599	5,336	8,430	14,905
5.3	1,800	2,519	3,540	5,172	8,017	13,837
4.3	1,800	2,501	3,517	4,957	7,528	12,738
3.2	1,800	2,484	3,383	4,729	6,974	11,443
Number of Persons Per Physician	3,380	2,904	2,428	1,952	1,476	1,000

Table 47

REQUIREMENTS FOR NURSES IN SELECTED YEARS, 1975 - 2000,
 TO IMPROVE CURRENT SERVICE LEVELS
 (UNDER FOUR FERTILITY ASSUMPTIONS)

<u>TFR</u>	<u>Number of Nurses</u>					
	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
5.9	1,387	1,635	1,942	2,315	2,765	3,312
5.3	1,387	1,626	1,910	2,243	2,629	3,075
4.3	1,387	1,614	1,867	2,150	2,469	2,831
3.2	1,387	1,603	1,825	2,051	2,288	2,543

Table 48

NUMBER OF BIRTHS ANNUALLY IN FIVE-YEAR PERIODS, 1975 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Births (000s)				
	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
5.9	298.2	352.8	415.0	487.2	577.4
5.3	288.6	330.7	376.3	425.1	479.8
4.3	276.7	300.0	326.4	358.7	399.7
3.2	265.7	269.4	270.8	278.8	297.4

Source: Interpretación de las Proyecciones de Población en
Terminos de Demanda de Servicios Basicos, 1950 -
2000, Dirección General de Estadística, p. 28.

Table 49

GOVERNMENT EXPENDITURES ON HEALTH IN SELECTED YEARS, 1978 - 2000
(UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Expenditures (Millions of Quetzals) *					
	1978	1980	1985	1990	1995	2000
5.9	62	66	79	94	112	134
5.3	62	66	77	91	106	124
4.3	62	65	76	87	100	114
3.2	62	65	74	83	93	102

* Health expenditures assumed to be 9 quetzals per capita.

Table 50

NUMBER OF WOMEN AGED 15 TO 49 NEEDING PUBLIC FAMILY PLANNING
SERVICES (UNDER FOUR FERTILITY ASSUMPTIONS)

TFR	Number of Women (000s)*				
	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
5.9	654	768	902	1,069	1,275
5.3	654	768	902	1,065	1,257
4.3	654	768	902	1,054	1,210
3.2	654	768	902	1,023	1,191

* Assumed to be equal to 43 percent of women aged 15 to 49.

Table 51

REDUCTION IN BIRTHS COMPARED TO CONSTANT FERTILITY TO ACHIEVE
THREE ALTERNATIVE FERTILITY LEVELS (BY YEAR)

TFR	Number of Births (000s)				
	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
5.9	0	0	0	0	0
5.3	0.6	22.1	38.7	62.1	97.6
4.3	1.5	52.8	88.6	128.5	177.7
3.2	2.5	83.4	144.2	208.4	280.0

Table 52

FAMILY PLANNING PROGRAM TARGETS TO REDUCE THE TFR
TO 3.2 BY THE YEAR 2000

<u>Year</u>	<u>Family Planning Users (000s)</u>	<u>TFR</u>
1975	270	6.1
1980	311	5.5
1985	348	5.0
1990	376	4.4
1995	394	3.9
2000	403	3.2

Table 53

ESTIMATED TOTAL CONTRACEPTIVE USERS, 1979 - 1981
(000s)

<u>Year</u>	<u>Public Sector</u>	<u>Private Sector</u>	<u>Total Users</u>
1979	244	111	355
1980	261	116	377
1981	277	112	389

Table 54

FAMILY PLANNING PROGRAM TARGETS, 1979 - 1981
(000s)

<u>Year</u>	<u>Women Aged 15-44</u>	<u>Women Needing FP Services</u>	<u>Targeted New Acceptors</u>	<u>Continuing Acceptors</u>	<u>Percent Women in Need/Covered</u>
1979	1,637	704	95	214	0.30
1980	1,687	725	95	228	0.31
1981	1,740	748	95	242	0.32

Table 55

OUTPUT AND COST OF FAMILY PLANNING PROGRAM IN 1978

<u>Program</u>	<u>Couple Years Of Protection</u>	<u>Total Project Cost</u>	<u>Net Cost* (Quetzals)</u>
Sterilization - APROFAM	90,510	175,974	1.74
Clinical Services - APROFAM	51,433	220,491	3.44
CBD - APROFAM	27,031	112,050	3.55
Direct Distribution - MOH	30,878	65,290	1.04

* per year of protection.

Source: "An Assessment of AID's Bilateral Population Program in Guatemala, 1977 - 1979," American Public Health Association, Washington, D.C., June 1, 1979.