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HEALTH SECTOR ASSESSMENT FOR NICARAGUA

Submitted by

United States Agency for International Development
Mission to Nicaragua

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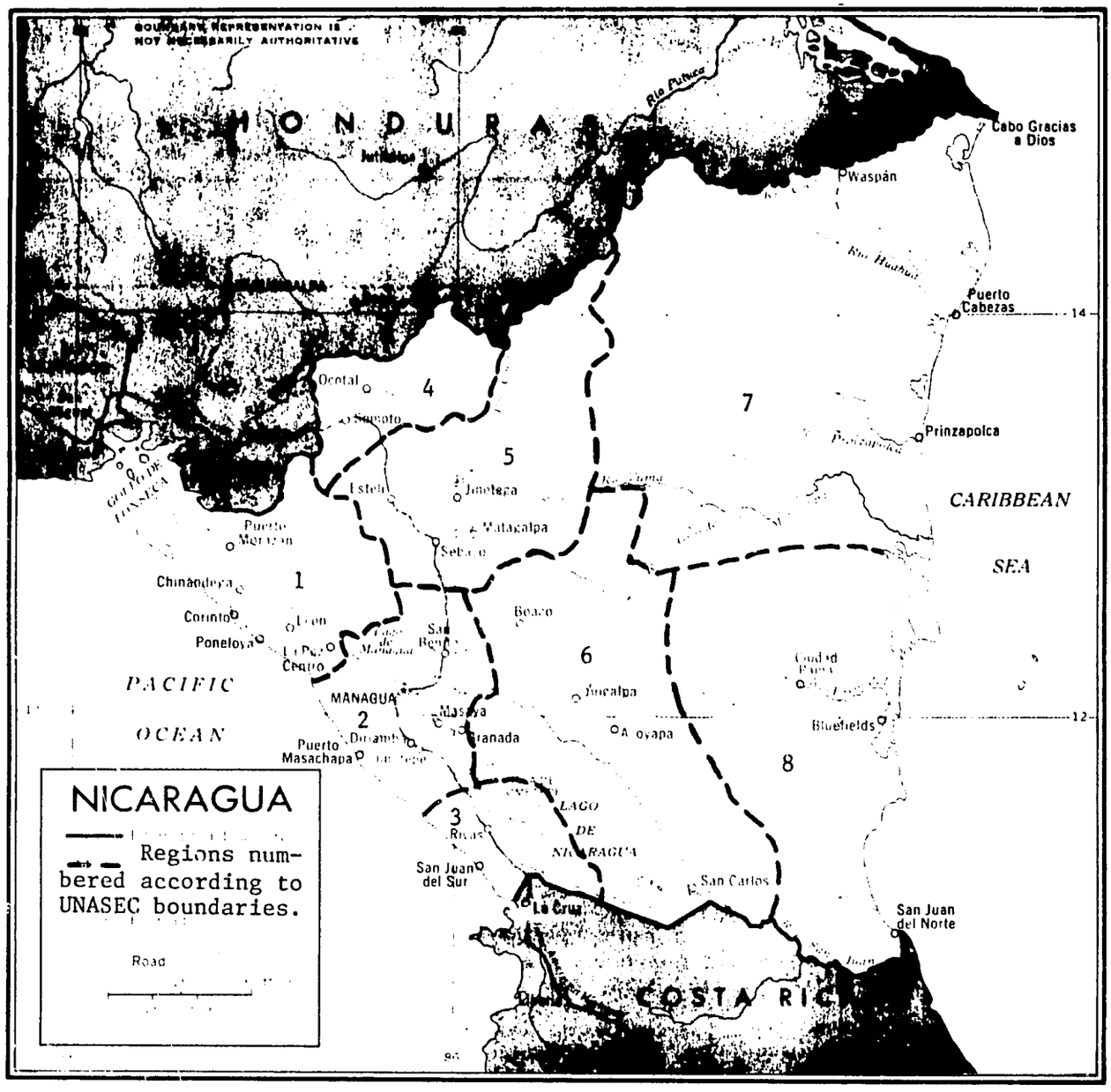
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PREFACE

The Mission views the broad term "Health" as inseparable from the remainder of terms which are descriptive of our environment. The Mission's health strategy is based on the assumption that health is a basic human right and that each individual and community must assume a major personal responsibility for achieving an improved health status or state of mind. For this reason the Mission views the improvement of health as interrelated with effective programming in agriculture, education, and urban reconstruction.

The Health Sector Assessment was undertaken with the Government of Nicaragua in April 1975 to identify priorities and to formulate strategies for the health sector. A full-time interdisciplinary team, the Unidad de Analisis Sectorial de Salud, operated from the Office of the Secretary to the President with inputs of major reports and resources from the Ministry of Health, the hospital systems, and other health agencies and with technical assistance from AID and the Pan American Health Organization. The health assessment process is considered continuous; likewise, strategy formulation must be rigorous enough to orient health programs toward the most important achievable objectives but flexible enough to allow continuous adjustment of the implementation mechanisms.

The text which follows focuses on those priority areas developed by this assessment process, which the Mission, AID Washington, and consultant staff have identified as being promising intervention points for AID assistance to the Nicaraguan health sector. This text is a companion document to the Syncrisis: Dynamics of Health in Nicaragua, which describes more broadly the Nicaraguan health sector, and to the twenty-one volumes of data, interpretation, and analysis produced by the Nicaraguan Health Sector Assessment team. No attempt is made to duplicate the extensive tables and background data of those texts to include economic, budget, and health service data, and background data which remains available for the interested reader. Instead, an effort is made to present programmatically data and possible programs

for assistance. The Mission strategy synthesizes these more limited programs and strategies and focuses them once again on the health sector as a whole. Thus, by continually refocusing on the major constraints and health problems, every program of bilateral assistance can be directed at or include components to deal with these health problems and constraints.

The major health problems have been identified through epidemiological means that are sensitive to the anthropological and cultural setting. They differ little from the problems of other developing countries. They are the massive morbidity and mortality consequences of enteritis, communicable diseases, malnutrition, malaria, etc. The major constraints on the system also differ little from the other developing countries. They include: failure of the health system to generate adequate human or fiscal resources; poor utilization and maldistribution of existing resources; inaccurate and incomplete statistical data and information; the inadequate management and technical skills of health professionals; lack of innovation, etc. These are all brought out in various parts of the text but need no real emphasis for an Agency which has participated in health projects around the world.

The solutions to these health problems are also not unique for this Agency, but they are or will be for Nicaragua; and to be successful they will involve considerable changes in attitude and behavior for the deliverers and recipients of health care. The work of this Mission and the Agency then becomes not one of primarily developing a new technology for the solution of these problems, but in adapting this technology to those parts of the health sector which are responsive or motivating those less responsive to participate in constructive change which has been identified by our joint planning efforts. Hopefully, along the way the efforts of the Mission and Nicaragua will repay the plentiful reservoir of waiting technology and expertise with a well-documented successful methodology or design for future health workers.

The efforts of AID and the Government of Nicaragua in health have reached an important, favorable point. The Executive Branch of the Nicaraguan Government has focused attention on the priorities and strategy of the health sector, and has provided high level managers who are competent and innovative in the major health agencies. If those managers can develop effective and innovative programs that motivate national leaders to allocate available funds to the health sector, it will

be possible to make major improvements in the health status of the country, especially in the rural areas. This initial planning process, the Health Sector Assessment, represents the first step and has led to new, broadened, multidisciplinary concepts of health; increased dialogue and cooperation between health entities; and a statement of national focus and strategy for health agencies. Being unique for Nicaragua the assessment was filled with difficulties but for all concerned it was instructive and a success. The Mission expects subsequent steps to be similar.

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CHAPTER 1

INTRODUCTION

The Government of Nicaragua and the Agency for International Development have a long history of cooperation in the health field. Over the last ten years AID participated in major loan programs for malaria eradication, and the construction of health centers, hospitals and a medical warehouse, while grant programs focused on disaster relief, medicine acquisition, maternal and child health, and family planning. To build effective coordination of the various activities within the health sector and to provide more effective and efficient health services, particularly in rural areas, the Nicaraguan Government and AID jointly undertook in 1975 a health sector assessment.

1.1 Background

While a national health sector assessment has many goals, a special interest in initiating the project was to improve Nicaragua's capacity to plan and implement coordinated health sector programs based on solid data and sound methodology of analysis. Establishment of a major health problems, and identification of alternative programs for implementation were intended to be the major ways of achieving the goal. The Nicaraguan health sector assessment is in preliminary form as this report is being completed. It consists of 21 chapters of data tables and summary text. It supports proposals outlined in the Mission Intensive Review Request but lacks priority ranking of health projects, project costs, or epidemiological impact statement.

The present document draws heavily on the data collected by the Nicaraguan analysis team and is a summary of selected health problems, selected alternative solutions, and selected priority programs for Nicaragua. We do not cover the broad scope of description and analysis to

be found in the previous AID Bolivia and Dominican Republic health sector assessments. 1/ We analyzed only those problem areas in the sector which expert opinion and previous studies which are described in this chapter identified as being most critical to Nicaragua and most in harmony with AID priorities for helping the poor majority of the population. In Nicaragua, that majority is located primarily in rural areas. In addition, this assessment makes a conscious attempt to study ways that health, nutrition, and population affect each other. We show these relationships in several chapters, but particularly in the chapters on Health and Development (Chapter 2), Maternal and Child Health - Family Planning (Chapter 5), and Nutrition (Chapter 8).

The assessment which follows is a companion to the 1974 health sector description, Syncrisis: Dynamics of Health in Nicaragua. 2/ The vast array of descriptive material on health status, resources, institutions, and problems in the sector which is adequately covered in Syncrisis is not repeated here. Numerous references to Syncrisis sections are supplied at various points for your further review.

In the remainder of this introduction we provide an overview of the Nicaraguan health sector, so as to put the assessment process into at least its institutional context. Then a cursory review of relevant sector and subsector studies is provided, followed by a discussion of the Nicaraguan Health Sector Assessment carried out by the Nicaraguan Government. Finally, an analysis of the Nicaraguan national health policy and some of its specific objectives is attempted.

1.2 Overview of the Health Sector

To provide a brief perspective and orientation to the Nicaraguan

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1/ United States AID Mission to Bolivia, Bolivia Health Sector Assessment. La Paz: January 1975; USAID Mission of the Dominican Republic, Health Sector Assessment for the Dominican Republic, Santo Domingo: February 1975.

2/ Barbara Holland and Joe Davis, Syncrisis: Dynamics of Health in Nicaragua. Washington: U.S. Department of Health, Education, and Welfare and U.S. Government Printing Office, 1974.

health sector, we describe the general nature of the public health sector and composition of the institutions mentioned throughout this report. A paucity of data is available regarding the formalized private health sector and it is not dealt with in great depth; however, it provides about 10% of the services and accounts for a major amount of the expenditures for pharmaceuticals. The high expenditure for pharmaceuticals by the private sector is related to the operation of a large number of parteras and curanderos who operate outside of governmental supervision or the formal private health sector. In rural areas they account for the majority of "care" provided to the population. Their impact on the health picture of Nicaragua is considerable, and methods for their incorporation into the "health team" are dealt with in the MCH-FP and Strategy Chapters.

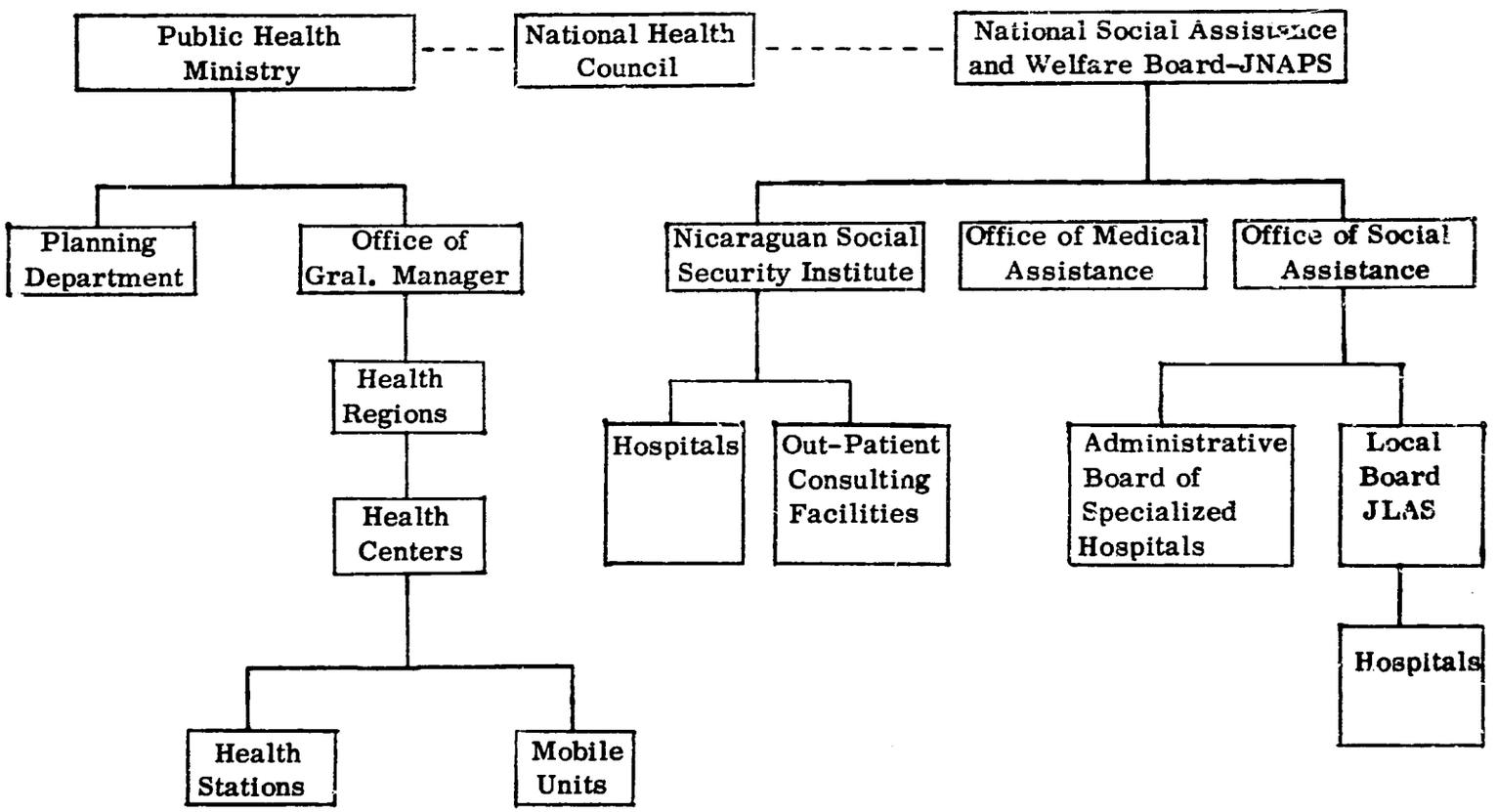
The public health services agencies shown in Figure 1.1 include at first glance two major institutions: the Ministry of Health and the National Social Assistance and Welfare Board (JNAPS) or the "national hospital system." Since the National Health Council is new, hence untested in practice, it will not be described in this section, except to note that it is composed of representatives from the other organizations on the chart and that it may provide for future improvements in sector coordination and operations (see further discussion in Chapter 3). Figure 1.1 is deceiving in its tidiness, as it does not reveal the fragmented nature of the system. In fact, the Health Ministry deals mostly with preventive programs and the national hospital system emphasizes curative services. The local social assistance and welfare boards (JLAS), which operate the departmental (state) hospitals, and the Social Security Institute (INSS) remain nearly autonomous in their sources of financing and allocation of budgets.

The structure of the public health sector is a result of evolutionary type planning by successive limited comparisons in response to demand patterns which were determined by the traditional medical professions in the absence of knowledgeable medical consumers and has been characterized by little integration or coordination of services until the present. However, it is also true that the functions of each organization are quite well defined so that duplication of effort is not as widespread as it might appear.

The Ministry of Public Health administers no hospitals but conducts health services through an extensive network of health centers, posts, and mobile units. In addition the Ministry carries out a vertical malaria

Figure 1.1

Nicaraguan Health Service System



eradication program and periodic mass immunization campaigns. DENACAL, the water and sewer authority, is also organizationally a part of the Ministry but is largely autonomous in operations. The legal provisions regarding inter-institutional relations in the sector are confusing and conflicting. It appears that the Ministry has authority for overall direction in the sector, but this is not necessarily the case in practice.

The national hospital system, JNAPS, is an autonomous organization headed by the wife of the President of the Republic of Nicaragua and directed by a twelve member board of health sector representatives, including two representatives each of workers, employers, and the minority political party. The agency manages four chronic care hospitals, specializing in leprosy, tuberculosis, psychiatry, and physical rehabilitation. In addition it by law coordinates and supervises the activities of the local social assistance and welfare hospitals throughout the country. Major sources of income for the hospital system is the national lottery, national treasury and local taxes.

The local social assistance and welfare commissions are appointed by the National Board and administer general hospitals in their towns. They operate much more independently than would appear, since each has the power to impose a sales tax in its jurisdiction on consumer goods. The Managua Local Board receives a 2% tax on all sales in Managua, giving it a larger budget than that of the entire Health Ministry.

Organizationally a part of the National Social Assistance and Welfare Board, the Social Security Institute (INSS) is the best financed arm of the sector through its collection of quotas from workers (3% of salaries), employers (6%), and a government contribution of 3%. It mainly provides hospital treatment but also care to wives and children up to the age of two. The Social Security Institute is in charge of five hospitals and is now expanding, but its coverage of the population is still less than 10%.

Delivery of adequate health services has been constrained by the high incidence and prevalence of disease, a high population growth rate, widespread poverty and illiteracy, undefined national priorities for health, nutrition, and population, deficiencies in administrative and technical capability, ineffective standards for and supervision by health professionals and Nicaraguan health agencies, and lack of professional motivation. The 1972 earthquake was an additional burden with its destruction of nearly all hospitals and health agency buildings in Managua.

The long history of one party rule in the country has brought stability but has limited innovation and remains an overriding political reality. This arrangement in the past resulted in a centralized decision making process with limited delegation of responsibility and authority which often required the President to personally intervene in issues affecting even small amounts of sector resources. Thus the health sector and many health sector personnel lacked the motivation and innovative-experimental approach necessary to make a major impact on the enormous health problems facing the health agencies with limited resources. However, the new management team for the MOH and JNPAS has created a revitalized image of the health sector.

1.3 Previous Health Sector Studies

During the 1970's a large number of health studies have been carried out by the Nicaraguan Government, Pan American Health Organization, and AID-sponsored consultants. A number of these are very specific to particular problems, such as the training of nurses and physicians, or malaria eradication. The more broadly conceived or otherwise significant health system studies during this period are discussed here, with a brief analysis of their conclusions and impact. The AID-backed 1975 Health Sector Assessment is intended to build upon the existing data and problem description by studying possible new interventions, priority programming, and implementation strategies.

Quadrennial Projections. In 1971, the Ministry of Health participated with the Pan American Health Organization in the preparation of Quadrennial Projections, 3/ which attempted to point out existing health problems and provide direction for 1972-1975. The purpose of quadrennial projections in general appears to be the development of a broad base of information as a necessary first step for comprehensive health planning and programming. In Nicaragua it was used by the Pan American Health Organization to develop its program strategy for the country.

3/ Pan American Health Organization, Quadrennial Projections for Nicaragua. Washington: 1971.

The document provides a voluminous collection of data on all aspects of the country, especially about health resources, institutional needs, and problems. The document utilized the existing data base provided by Nicaraguan government agencies, and it was prepared by a team of PAHO consultants, assisted almost exclusively by Health Ministry personnel. The document offers an extensive catalog of programs and catalogue goals for the period, though concentrating on those of the Health Ministry. A major limitation of the projections is that little analysis of strategies, alternative actions, or priority setting is offered. The document recognizes that several steps follow in the planning process and that this diagnosis must be complemented with annual updating and data evaluation, discussion, programming, execution, and evaluation.

Syncrisis: The Dynamics of Health in Nicaragua. The Syncrisis for Nicaragua undoubtedly is the most complete overview of the Nicaraguan health system produced prior to the Health Sector Assessment. As described above, it includes descriptions of the disjointed priorities and programs caused by the 1972 Terremoto. Syncrisis clearly identifies the major health sector problems that continue to face Nicaragua: extensive malnutrition, high prevalence rates of infection and parasitic disease, rapid population growth, and poor sanitation. All are exacerbated by a poorly developed health planning and institutional management capability. The current sector assessment attempted to discover ways that health programs could best solve these difficult problems.

American Hospital Association Study. An evaluation study of the national hospital system (JNAPS) was conducted by an American Hospital Association team in late 1973. 4/ The following general conclusions of the report summarize the problems encountered.

1. Conditions are generally poor in all hospitals.

4/ Jose Gonzalez and Joseph P. Peters, Una Evaluacion de las Condiciones y Practicas en los 24 Hospitales Operados Bajo la Junta Nacional de Asistencia y Prevision Social y las Juntas Locales de Asistencia y Prevision Social en la Republica de Nicaragua. Washington: American Hospital Association, 1973.

2. Institutions have not achieved any uniformity of administrative organization.

3. Many hospitals lack such essential services as blood banks, clinical laboratories, and diagnostic X-ray.

4. With some notable exceptions, hospitals are obsolete, dilapidated, dingy, overcrowded, unsanitary, and lack many essentials to the physical comfort, safety, and well-being of patients.

5. Maintenance of equipment and physical surroundings is poor.

6. Sanitary conditions are universally poor.

7. Isolation techniques and practices are almost medieval.

8. Much of the care provided can be best described as custodial.

9. Food is usually prepared in an unsatisfactory and unsanitary environment.

The remedying of such conditions could no doubt absorb much of the scarce resources available to the health sector, so that careful analysis of alternative approaches and priorities remains essential.

Evaluation of AID Health Centers Loan. During 1973, Practical Concepts Incorporated evaluated the utilization, management, quality of care, and staffing and equipping of the 55 health centers built by an AID Loan of 1968-1973. 5/ They concluded that the objective of bringing more medical services and preventive care to more people, especially

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5/ Practical Concepts Incorporated, The Management Improvement Program of Nicaragua's Ministry of Public Health. Washington, D.C.: 1975.

in rural areas, was accomplished but that an efficient, effective system was not produced. The findings specifically showed lack of maintenance of vehicles and equipment, insufficient manpower (many had no physician), and an acute shortage of medicines. Only 9.4% of services were given outside these centers showing little outreach work, despite low utilization of facilities which would allow personnel to be used in this way. The major conclusion seemed to be that no provisions were made to provide these centers, once built, with adequate personnel, supplies, and management support.

Health Plan, 1976-1980. Published by the Health Ministry in mid-1975 and submitted for inclusion in the Health Sector Assessment, the 1976-1980 plan for health is the second national health plan produced in Nicaragua. The first Health Ministry plan was presented in 1964 and addressed the 1965-74 decade. 6/ This earlier plan was prepared largely by Pan American Health Organization advisors from outside Nicaragua, following closely the PAHO/CENDES methodology developed in Venezuela. A 1971 evaluation of the earlier plan found little implementation due to scarce financial resources, lack of trained personnel, and insufficient administrative support.

The 1976-1980 Health Plan is very different in its approach and method. Even though the earlier plan was developed by PAHO and Health Ministry personnel, it included the National Hospital System, Social Security Institute, and other agency resources and programs. The new plan is limited exclusively to Ministry programs. This is a serious limitation as a sector plan, since the Ministry executes only 19% of the health sector budget.

The new plan does clearly define quantitative goals and proposed strategy for each program. No analysis of alternative interventions appears. There is neither a clear set of priorities nor budget allocation criteria nor a focus on geographic areas. The rationality of these goals and the financial and administrative capability of carrying them out is not documented. The Nicaraguan Assessment concluded that the Health Ministry lacks such capability, but the Nicaraguan public sector has had

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6/ Nicaragua Ministerio de Salud Publica, Plan Nacional de Salud 1965-1974. Managua: Direccion de Planificacion, 1964.

a positive history in recent years of providing resources for well defined needs. Ministry policy, strategy, and goals are clearly spelled out in the plan and these are close to ideal, but there is often no plan for the budgetary and administrative structure to fulfill these objectives.

National Hospital System Evaluation. During early 1975 the National Hospital Board (JNAPS) directed a very critical examination of the operational capacity of its 25 hospitals, to include staffing, equipment, and maintenance. 7/ They found a combination of poor physical plant, lack of equipment, uncleanliness, and poor quality of medical attention. In general, their findings parallel those of the 1973 American Hospital Association study. Extensive repair, remodeling, or replacement was needed in 15 facilities, with all of them lacking proper hygiene, adequate preventive medicine programs, and effective plant and equipment maintenance. In 19 hospitals there were no emergency facilities. Various personnel categories were found to be in short supply, particularly pharmacists, dieticians, and trained administrators. Additionally, an innovative system of ranking hospital services and individual hospitals provides a ready reference for determining hospital priorities, and establishes a methodology for subsequent evaluation of improvement programs. The study concludes with a strong recommendation that all future studies receive the complete participation of other health sector organizations. It was precisely such an approach to health sector analysis that AID encouraged when the Nicaraguan Assessment was conceived and initiated.

1.4 Nicaraguan Health Sector Assessment

As early as mid-1973 an effort was made by the Agency for International Development to motivate national planning personnel to develop a multi-agency health sector assessment team. Efforts began to bear fruit only after the completion of a similar assessment in the agricultural sector by a Nicaraguan analysis group known as UNASEC. Working with the UNASEC leadership in late 1974, AID developed a strategy for proceeding with a health sector assessment. The strategy emphasized the development of a national health planning capability through the operation

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7/ Nicaragua Junta Nacional de Asistencia y Prevision Social, Evaluacion de la Atencion Hospitalaria en Nicaragua. Managua: 1975.

of a multi-disciplinary assessment team of professionals from various health and related institutions in the government. While day to day technical work was to be under the direction of a technical coordinator, overall supervision and authority for the assessment came from Dr. Carlos Dubon, former leader of the UNASEC group. In his present position, Dr. Dubon is a Cabinet Minister and top advisor to President Somoza and in a key position to determine budget priorities and resolve inter-agency conflicts. Dubon also is Chairman of Nicaragua's National Planning Council.

From its inception, the assessment team followed the UNASEC pattern of a high Nicaraguan profile and a low consultant profile. The use of Pan American Health Organization personnel and AID-sponsored consultants was implicitly downplayed. The Nicaraguans assumed that the two-year UNASEC study developed enough in-country planning capability but, as the requirements grew for implementing the ambitious INVIERNO national agriculture program, few experts remained and little experience was transferred to the health sector assessment team.

The Nicaraguan Health Sector Assessment team was selected by January 1975 and named as the Unidad de Analisis del Sector Salud. Unfortunately, progress was very slow in the ensuing six months due to a variety of circumstances, including the slow administrative institutional response of AID. Leadership conflicts within the Unidad slowed productivity, and two successive technical coordinators left during this period. This resulted in several major changes in the methodological approach and Unidad organization, consultant visits and workscopes, and the timetable for data collection, survey completion, and document preparation.

During the latter half of 1975, the Unidad carried out most of the original workscope activities including large scale surveys of health centers and hospitals and of households. The massive amount of data that was accumulated is not as yet fully analyzed beyond descriptive terminology. The assessment report which was completed by the Unidad in December is being termed: "A Preliminary Analysis of the Health Situation in Nicaragua."

The Unidad planned to complete the following analyses:

1. Measure the health status of the population.

2. Describe the conditioning factors that affect health.

3. Analyze the interactions of the above.

4. Identify and prioritize the problems discovered.

5. Explain the priority programs that are needed, according to Unidad criteria.

Unfortunately, the preliminary document covers only points 1 and 2, and is thus not by itself sufficient for setting priorities or orienting Nicaraguan decision-making.

The diagnostic nature of the Unidad preliminary report led AID to propose to the Nicaraguan Government that a high level seminar of health agency directors be convened. The primary objective of the seminar was to focus attention on the need for Nicaraguan policy-makers to review and solidify health sector priorities and strategies. The results of such a meeting could be used to identify AID priorities to the Nicaraguan government for health sector assistance and agreement on common grounds of interest. The process and end result of the successful meeting, held in January 1976 at Chinandega, are analyzed more fully in Appendix A, below. 8/

1.5 Nicaraguan Health Policy and Goals

The development of a viable national health policy for a country should guide development of health programming and specific strategies. Such a policy logically is complementary to, and subsequent to, the establishment of a broader national development policy. While the general nature of such policies may leave latitude for interpretation, the tecnicos are well advised to maintain political viability when developing their strategies and alternatives, lest their technically sound advice go unheeded. The relationship between planning and policy making in Nicaragua in this respect is still far from optimal as the chapters which follow demonstrate.

8/ A list of participants in the Chinandega Seminar is attached as Appendix F.

Nicaraguan National Development Policy. In 1973, the decade-old National Planning Office was made a dependency of the President's Office with the purpose of establishing medium and long term economic development plans. Its first accomplishment was the Five Year Development Plan 1971-75. The Plan emphasized improving the administrative capacity of the public sector, strengthening the government financial situation, and diversifying agriculture and industry. Little is said about health in this plan.

The 1976-80 Nicaraguan Development Plan considers the participation of social sectors such as health as a fundamental instrument for achieving better standards of living in the population. One of the general objectives in the social policy is to emphasize the improvement of the health of the people as a priority responsibility, and it proposes "a better distribution of all benefits to the less favored groups of society and to attain a harmonic development of the Nicaraguan people's expectations".9/

The difficulty in developing more concretely what is the Nicaraguan government health policy is that the health sector is still fragmented by at least three powerful government agencies, with no one exercising clear direction or authority over the others. The policies and priorities of the hospital and curative medicine sector are principally in the hands of the National Social Service and Welfare Board (JNAPS), Local Social Service and Welfare Board for Managua and other department, and the Social Security Institute. While the latter are actually a formal part of the National Hospital System (JNAPS), their independent source of financing and budget allocations means that they are often autonomous in their actions. The water supply and sewerage agency, DENACAL, operates autonomously within the Health Ministry organization in deciding its priorities and policies.

Additionally when considering health policy in Nicaragua one must always keep closely attuned to the pronouncements and speeches of the President. A strong executive tradition with little legislative or health agency independence of action previously meant that health policy decisions at most levels needed executive approval prior to change or

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9/ Nicaragua Ministerio de Salud Publica, Plan de Salud, 1976-80. Managua: 1975, p.15.

implementation. This pattern of executive decision making in health was re-enforced by the lack of planning and management skills present in the health sector.

Compared to other Latin American countries the Nicaraguan health sector has been fragmented in purpose and progress with no clear set of national priorities and a lack of leadership from health professionals. One of the key objectives of the assessment activity described herein is to minimize these problems by improving coordination and cooperation in the sector.

Taking into account the above, one can infer Nicaraguan government health policy by the recommendations of major health reports and plans. The clearest written expression of these policies are found in the recent Health Ministry Plan and the National Hospital Systems Evaluation (see Appendices G, H, and I). The most notable difficulty in using these statements as a guide to policy is the absence of clear-cut priorities or their relationships. More important, the Health Ministry and the JNAPS programs represent a minor portion of the sector budget, so that truly national health policy must be worked out through an intrasectoral body, such as the National Health Committee.

The recently convened seminar of health sector officials at Chinandega provided significant additional input to policy determination. It included a unique group of decision-making in health for the first time, including Ministers of Labor and Health, the three directors of the National Social Service and Welfare Board, the Director of INSS, the Director of National Planning, and the Secretary to the President, accompanied by members from the Nicaraguan Health Sector Assessment staff. Several elements of a sector policy and implementation strategy were developed.

The Minister of Health, speaking at this AID sponsored seminar summarized the strategies for the health sector with the following priorities:

1. Direct Nicaraguan Government health resources at the major health problems facing the population, especially enteritis, malaria, and communicable diseases in the rural areas through community health

projects and education in addition to reinforcing the activities of traditional health programs and facilities.

2. Extend the coverage of health services to groups with high morbidity and mortality rates with emphasis on women and children and the rural poor through the utilization of paramedical personnel and improved coordination, utilization of health services and the development of a rural health school.

3. Improve the administrative, physical, and technical capacity of the health agencies to utilize more fully the available resource through administrative reform and personnel training.

4. Complete the regionalization of health services with decentralization of authority and responsibility for project planning and administration to include appropriate budgetary and fiscal controls.

5. Improve the integration of curative and preventive health services through coordinated activities of planning and implementation, now a matter of practice through National Health Council and recent unified planning of the Health Sector Assessment Unidad.

6. Integrate family planning activities into the general maternal and child health activities of the Health Ministry and expand the coverage of both through the training and utilization of paramedical personnel, especially parteras.

The strategy statements of the Health Ministry were supported by other health position papers of health agencies, and these papers included more limited institutional strategies. The JNAPS presentation which was based on the National Hospital System Evaluation (1975) outlined the following program strategies:

1. The construction and refurnishing of three departamental hospitals to replace the

antiquated facilities presently in use (Bluefields, Matagalpa, Juigalpa) through international financing.

2. Standardization of the administration and medical services of hospitals throughout the JLAS system.

3. Institute an improved system of maintenance with emphasis on the rural hospitals by the training of maintenance personnel through a central JNAPS maintenance school.

4. Improve the administrative capabilities of the health facilities through on the job training and formal schooling.

5. Increase the coordination between health facilities (hospitals, health centers and administrative offices) by establishing a radio communication system and improving the ambulance transport system.

6. Improve and unify the data collection system for health institutions.

The Secretary to the President - as well as other representatives including INSS - supported the strategies outlined by the Health Ministry and JNAPS and emphasized the importance of an active National Health Council with a strengthened planning and analysis unit similar to UNASEC.

The chapters which follow in this document are aimed primarily at analyzing in depth the key problems associated with the current sector programs and presenting alternative program interventions. Chapter 2 looks at the relationships between health and economic development, showing the complex set of dynamic interactions among health, nutrition, population, and general socio-economic development. Chapter 3 analyzes the role of health planning in the overall system as a sound base for the successful programs in health services. Chapters 4 to 8 are analyses of the major substantive program strategy areas which seem to most closely,

follow the lines of Nicaraguan Health Sector Assessment, Nicaraguan Government, and AID data, conclusions, and policy preferences. A number of alternative programs in each problem area are possible, but severe time limitations forced us to consider only a small number. Chapter 9 contains a AID Mission strategy for health.

CHAPTER 2

RELATION BETWEEN HEALTH AND SOCIO-ECONOMIC DEVELOPMENT IN NICARAGUA

This chapter explores the relationship between health and development in Nicaragua. Neither health nor development is a precise and unequivocal concept. Therefore, Part 2.1 will try to define more fully the scope of the chapter. The interrelationships are not simple, but complex, and Part 2.2 will sketch briefly some of the most obvious links and feedbacks between health and economic life. Part 2.3 will deal with the dynamic relationships between health and development. Part 2.4 analyzes the public sector and health including a treatment of "affordability" and some estimates of likely levels of public health funding in years to come. Part 2.5, a final section, includes policy conclusions.

2.1 Health and Development in Nicaragua: General Concepts

For many years per capita income or consumption was taken as an indicator of development. The higher the per capital income, it was assumed, the more the people of the country could afford. Table 2.1 shows Gross Domestic Product in Nicaragua from 1963 to 1974. In most of those years GDP grew faster than the 3% rate of population growth, and so by this yardstick, one would say that Nicaragua's rate of development has been adequate.[1]

But per capita income can no longer be accepted as the sole index of development. During the 1960's many countries experienced rising per capita incomes, but the lives of the people did not improve at all. Indeed, it seems to be the case that in the early stages of per capita

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[1] Jones, Charlotte, Nicaragua: Current Economic Situation. (Managua: USAID, June 1975)

income growth, the lot of the poor deteriorates.[2/]

For this reason developing nations, and this includes Nicaragua, no longer plan just for increases in per capita income, but include employment and income re-distribution among their goals. Probably for this reason also, the U.S. Congress, realizing that it makes little sense to tax the middle income Americans for the benefit of the wealthy minority in lesser developed countries, has mandated AID to concentrate its efforts on the poor majority of the developing world.

As economists have abandoned per capita income as the sole indicator of development, epidemiologists seem also to be abandoning morbidity and mortality statistics as measures of health. For example, Dr. Milton Terris suggests the inclusion of two components in a definition of health: a subjective feeling of well-being and an objective ability to function.[3/]

As so defined health is a component of development and depends on the activities of other sectors. And conversely, since all activity depends on the functioning ability of the members of society, the other components depend on health. A fuller definition of "functioning ability" will emerge from the following discussion of interactions between health and development in Nicaragua.

2.2 Linkages Between Health and Social and Economic Activity

2.2.1 Health in Nicaragua. If the definition of "health" given the above is used, then "health status" would be measured by the individual's "ability to function". This in itself would constitute an estimate of the ability of Nicaragua's citizens to fulfill their potentialities to the fullest possible extent.

For the purposes of illustration of the relation of health, nutrition and economic development, poor health status as seen in nutritional defi-

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2/ Adelman, Irma, and Morris, Cynthia Taft. Economic Growth and Social Equity in Developing Countries. (Stanford, California: Stanford Univeristy Press, 1973)

3/ Terris, Milton, "Approaches to an Epidemiology of Health". American Journal of Public Health (October 1975) 65:1037-1045

Table 2.1

Gross Domestic Product and Annual Rates of Increase
Nicaragua

1963 to 1964 (Millions of 1958 Córdobas)

Year \ Economy Activity	Gross Domestic Product	Annual Rate of Increase
1963	3171	
1964	3558	12
1965	3933	11
1966	4017	2
1967	4326	8
1969	4641	6
1970	4777	3
1971	5038	5
1972	5259	4
1973	5377	2
1974	5982	11

Sources: Kenneth Riddle & Kathleen Barrows (Eds.), Statistical Abstract of Latin America, 1972. Los Angeles: Latin America Center, University of California, 1974; and Charlotte Jones, Nicaragua; Current Economic Situation. Managua: U.S. Agency for International Development, 1975.

ciencies common to Nicaragua will be examined. The impact of these deficiencies on the "ability to function"will then be discussed more fully in an effort to show the economic effects of poor health. An in-depth analysis of nutritional problems in Nicaragua, along with proposals for intervention is found in Chapter 8 of this assessment.

Anemia. The Institute of Nutrition of Central America and Panama (INCAP), first documented in 1966 that anemia was a "widespread health problem" in Nicaragua. They estimated that from 33 to 59 percent of the families in rural areas in Central America fell below the desired level of iron intake. The existence of anemia in Nicaragua is a classic case of the interaction of agents (intestinal parasites), host weakness (inadequate diet), and environment (heat). Table 2.2 shows the percent of Nicaraguan families falling below recommended levels of iron in their diets.

Table 2.2

PERCENT DISTRIBUTION OF POPULATION BY IRON INTAKE LEVEL AND PERCENT TRANSFERRIN SOLUTION, NICARAGUA, 1971

Anemia Indications / Residence	Iron Intake Per Person Per Day		Percent Transferrin* Solution	
	≤ 12 mg	≤ 10 mg	≤ 20%	≤ 15%
Rural	43%	32%	32%	17%
Urban	37%	18%	25%	12%

* Transferrin is a serum B-globulin that binds and transports iron.

Source: Institute of Nutrition of Central America and Panama Nutrition Program, and Center for Disease Control, Nutritional Evaluation of the Population of Central America and Panama: Regional Summary. DHEW Publication No. (HSM) 72-8120. Washington: U.S. Public Health Service, 1971, p. 25

Malnutrition. The INCAP study found protein calorie malnutrition (PCM), and Vitamin A deficiency being severe problems in Nicaragua, especially among the 50% of the population with lowest incomes. Undernutrition can weaken the human host's resistance to disease causing organisms. Fever can also burn up calories, actually causing, or aggravating undernutrition.[4] The INCAP study goes further to infer a mal-distribution of foods in Nicaragua. Of special note is the mal-distribution of food within the family with children suffering the worst effects.

Infant mortality is a classical health indicator and a commonly accepted indirect measure of malnutrition. Such mortality is extremely high in Nicaragua (120/1,000). Height and weight can also indicate well-being in children. The INCAP study found that 6-year old boys averaged 11 centimeters below the standard and 18 year olds averaged 10 centimeters below the standard. The infants are born normal, lost about 12 centimeters until they are six years old, and then grow normally. Nicaraguan height loss, thus seems to be slightly below the Central American average.

Goiter and Mental Retardation. The INCAP study found the prevalence of goiter to be 40% among males and 54% among females. It did not mention its relation to cretinism or mental retardation, but the relationship is well known.[5] The hypothesis has been advanced that

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4/ Pollack, H. and D.R. Sheldon, "The Factor of Disease in World Food Problems." Journal of the American Medical Association (1970) 212:598-603

5/ Ramalingaswami, V., S.Srinivasan, A. Sinha, T.A.V. Subramayen, M.G. Deo, "Himalayan Endemic Mutism". Lancet (July 25, 1964) 22:176-177. J.C. Choufoer, Querido A. Van Rhijh, "Endemic Goiter in Western New Guinea II. Clinical Picture, Incidence and Pathogenesis of Endemic Cretinism". The Journal of Clinical Endocrinology and Metabolism (March 1965) 25:385-403. M. de Vissiher, C. Beckers, H.G. Van den Schroeck, M. De Smet, H. Ermaus, H. Galperin, and P.A. Bastenie, "Endemic Goiter in the Vele Region (Republic of Congo I." Journal of Clinical Endocrinology and Metabolism (February, 1961) 21:175-188. Pan American Health Organization. Endemic Goiter and Cretinism: Continuing Threats to World Health. Neto, eds. Scientific Publication No. 292. (Washington, D.C.: PAHO, 1974). A. Ibertson, H.K. Gluckman, M.S. Croyson, L.J.W. Strang, "Goiter and Cretinism in the Himalayas: A Reassessment" in Ibid, pp. 129-133.

differing degrees of mental retardation exist in goitrous areas, and that the effect of iodine deficiency is to reduce the average mental capacity of children born in these areas.6/

2.2.2 The Environment and Health. The health benefits of environmental sanitation are well known. We are here using the term environment, however, in a broader sense, to include the urban versus rural environment and its effects, as well as the effects of agricultural practices.

Urban-Rural Migration Health Indicators. Health indicators such as infant mortality, morbidity, and general mortality are usually negatively correlated with urbanization, indicating a long-run beneficial effect of urbanization on health. Table 2.3 contains a list of correlations between infant mortality and social indicators developed by the United Nations Research Institute for Social Development.7/ These simple correlations do not support simple conclusions, but they do serve as simple evidence.

The long run relationship, however, masks a number of short-term health hazards. A newly urbanized family must find food in a new environment. The diet may be less balanced than it was back in a rural setting. Long periods of unemployment create other problems for undernutrition. Unethical advertising combined with the necessity to work away from home may induce mothers to reduce the period of breast-feeding for infants. Finally, rapid migration puts a strain on public services such as schools and water supply.

Table 2.4 shows estimates of Nicaragua's urban-rural population to the year 2,000. The estimates, which may be on the low side, show that by the year 2,000 at least 60% of Nicaragua's population will be listed as urban so that health problems associated with the urbanization factor in development are likely to become even more important.

6/ Rodrigo Fierro-Benitez, Ignacio Ramírez, Eduardo Estrella, John Stanbury, "The Role of Iodine in Intellectual Development in an Area of Endemic Goiter", in Ibid., pp. 135-142.

7/ United Nations Research Institute for Social Development, "Data Bank, Annex III", mimeo, Geneva, April 1975, p. 2.

Table 2.3

Simple Correlations Between Infant Mortality Rates and Other Social Indicators, World-wide, 1975

Correlate Social Indicator	Correction with Infant Mortality
Expectation of Life at birth	-0.954
Crude Birth Rate	0.867
Dependency Ratio	0.714
Urban Population as % of total Population	-0.729
Proportional Mortality Ratio	-0.852
Calorie Consumption per Capita	-0.778
Animal Protein Consumption	-0.778
Cereals & Starch as % of total calories	0.703
Literacy Rate	-0.914
Primary and Secondary Enrollment	-0.884
Vocational Enrollment	-0.665
Average Number of Persons per room	0.645
% of dwellings with piped water	-0.766
% of dwellings with electricity	-0.854
% of population with water supply	-0.815
Newspaper circulation/1000	-0.734
Newsprint per capita	-0.574
Telephones per 100,000	-0.627
Television sets per 1000	-0.734
Domestic mail traffic per 1000	-0.658
Passenger cars per 1000	-0.612
% active population in communications, transportation and utilities	-0.718
Agricultural production per agricultural worker	-0.684
% of labor force in agriculture	0.840
Fertilizer consumption	-0.582
Electricity consumption	-0.592
Steel consumption per capita	-0.733
Coal consumption per capita	-0.687
% active population in manufacturing	-0.677
GDP manufacturing as % of total	-0.772
Foreign Trade	-0.619
Manufacturers as % of total exports	-0.595
GNP per capita	-0.718
Investment per active person	-0.731
Wager earners as % of total labor force	-0.803
Compensation of employees as % of total income	-0.746
Food expenditures as % of total	0.707
Professional, etc., as % of total	-0.665
Scientists & Engineers in research per 10,000 population	-0.587

Source: United Nations Research Institute for Social Development UNRISD 1970 Data Bank, Annex 3, Geneva: April 1975, p.2

Table 2.4

Urban and Rural Population Estimated
Assuming a Population Growth Rate of 3.18%, Nicaragua,
1970 to 2000

Year \ Population	Population in Thousands			Percent Urban
	Total	Urban	Rural	
1970	1832.6	830.2	1002.4	45.3
1975	2168.1	1039.2	1129.0	47.9
1980	2557.2	1289.6	1267.5	50.4
1985	3003.2	1586.1	1417.1	52.8
1990	3501.9	1928.0	1573.0	55.1
1995	4058.4	2322.9	1735.5	57.2
2000	4683.3	2776.7	1906.6	59.3

Source: Roger Evan Bove, Unpublished computer analyses. Suitland, Maryland: Socio-Economic Analysis Staff, International Statistical Programs Center, U.S. Bureau of the Census, 1975.

Water Supply and Waste Disposal. Among the notable public health benefits of economic development has been the improvement in sanitation and water supply. Many of the leading causes of mortality and morbidity in Nicaragua, particularly enteritis, malaria and other parasitic diseases are readily reduced through pure water and waste disposal. As of 1974, only 20% of the rural population had excreta disposal available (including latrines), and only 13.5% had easy access to water.[8]

One of the factors impeding further expansion of water and disposal services is the low income status of many people in a lesser developed country like Nicaragua. Some citizens in the cities may not be able to afford hook-up charges. In an attempt to overcome this problem the Nicaraguans, with AID support, have just initiated

[8] Charles Pineo, Consultant on Environmental Sanitation, USAID/Nicaragua, 1975.

a hook-up system for the urban poor whereby the cost of installation is included in the monthly bill and is spread out over 36 months.

Agricultural Practices and Health. The effects of production on human health should be considered, although little is known at present about such effects in Nicaragua. One effect that should be mentioned is the probable effect of agricultural practices on the prevalence of malaria in the country. It has long been recognized that extensive use of water in the cultivation of rice and sugar cane can aggravate the malaria problem.[9/]

In addition, it is well known that the mosquitoes in Nicaragua are exceptional in their ability to develop immunity to practically any spray used. It has been suggested that there may be some connection between this phenomenon and the methods to spray the cotton crop. An investigation of this relationship might produce a relatively low-cost way to increase the effectiveness of malaria control efforts.

2.2.3 Health and Education. Examination of the correlations in Table 2.3 reveals that of all the indicators, literacy has the second most significant meaningful negative correlation with infant mortality. While correlation does not prove causation, meaningful causal interpretations are possible. Acceptance of the scientific method and the disease theory of disease, knowledge of simple hygiene, and ability to read health education literature, would all seem to depend on literacy.

2.2.4 Health and Earning Power. Poor health can reduce earning power for a family through mortality, morbidity, and debility. If the breadwinner dies, obviously he can no longer support his family. Morbidity is slightly more complex. Occasional sickness can make an individual miss days of work. This is usually accounted for. However, serious sickness might cause an individual to drop out of the labor force completely. J. F. Knowles studied this latter factor using household data from Chile, and found a significant relationship between serious illness in 1962 and labor force participation in 1963.[10/]

9/ Peter Newman, Malaria Eradication and Population Growth with Special Reference to Ceylon and British Guiana. Bureau of Public Health Economics Research Series No. 10. (Ann Arbor: University of Michigan School of Public Health, 1965), pp. 117-118.

10/ James C. Knowles, The Economic Effects of Health and Disease in an Underdeveloped Country. (Ph. D. Dissertation) Madison, Wisconsin: University of Wisconsin, 1970.

There is also data about the effect of anemia on productivity. A study on an Indonesian rubber plantation found that workers branded by foremen as lazy were actually more anemic than their fellows.[11] When a group of these anemic workers was treated for iron deficiency -- either by supplementation or de-worming, their productivity increased by 20 percent. In a way, this is just the last in a whole series of studies, many of them methodologically flawed, but which together leave little doubt that productive ability, and hence earning ability, can be significantly increased by treatment for fever, anemia or malnutrition.[12] Similar studies by INCAP show that well-fed farm laborers are much more economically productive with an adequate diet, and the cost of the food is cutweighed many times by the value of the increased production.

The Food Chain and Nutrition. Anyone in the modern sector who buys food will have his or her nutritional status determined to some extent by the willingness and ability of suppliers to offer the different food items at the various prices that prevail in the market. Information on this "food chain" that leads from field to table is far from complete, but some attempt to summarize current knowledge may be helpful here.

The chain begins with the farmers' willingness and ability to grow food. Of the foods commonly consumed in the cities, only rice, and to some extent, beef are grown on the large plantations. A large part of the urban food supply depends, then, on the motivation and efficiency of the many small farmers who grow vegetables, corn, sorghum and beans.

In the typical lesser developed countries, with continuous balance of payments difficulties, if this food supply does not grow as fast as the demand for food, determined to a great extent by population and income growth, then less will be offered at every price, prices will be bid up; or if prices are fixed, shortages will develop. If industrial workers must pay more for food, then wages will rise, increasing costs and slowing industrial growth. For the unemployed, rising food cost means a deteriorating nutritional state and a greater susceptibility to disease.

11/ S. S. Basta and A. Churchill. Iron Deficiency and the Productivity of Adult Males in Indonesia. Staff Working Paper No. 175. (Washington, D.C.: World Bank, 1974).

12/ C.E.A. Winslow, The Cost of Sickness and the Price of Health. WHO Monograph Series No. 7 (Geneva: WHO 1951).

The possibilities of such deteriorating cycle in Nicaragua seem slim, but not completely unlikely based upon some preliminary agriculture production data. The English summary of the agriculture assessment is not clear on this, but the production of beans, fruit and vegetables seems to be growing slower than the expected rate of growth of demand, while the production of corn and sorghum is not keeping pace with the rate of growth of combined human and livestock demand.[13/]

Food storage and transport facilities constitute the next link in the chain. In 1968, Jacques May reported inadequate storage facilities, but at the time AID was financing an improvement, and it is difficult to judge the present situation.[14/]

In centers of population, distribution, jobbing and retailing seem to be fairly concentrated in the hands of the same firms. Often the same firm will conduct retail operations in the capital, wholesale operations in the provinces, and also deal in the export-import trade. In the smaller towns, a single store is generally owned by a wealthy townsman, often the owner of a local plantation. This creates a "company store" situation in many areas. In addition, there are pulperías, small stores, run by local poor people, which sell mostly locally grown food.

To prevent an undue rise in food prices, the National Institute of Domestic and Foreign Trade (INCEI) is empowered to buy domestic food, import food, and control exports. Its operations are financed by borrowing from the Central Bank. It can also stockpile food to maintain prices and encourage farmers to grow more. But it has had mixed success.

Of significant interest here, is the tax system. The whole system will be discussed more fully in the section on the public sector. The details of the current tax reform are not presently available, but the previous tax structure included a 5 cent per kilo tax on wheat, a general 5% sales tax, and a 3% surtax used in Managua to support hospitals.

13/ UNASEC. Nicaragua: Agricultural Sector Assessment. (LA/DR-DAEC/P-75-1) Washington, D.C.: USAID, 1975, pp. 76-77.
14/ Jacques May and Donna L. McClellan. The Ecology of Malnutrition in Mexico and Central America. Studies in Medical Geography No. 11 (New York: Hafner Publishing Co., 1972).

This, of course, raises the price of food, which might not per se affect nutrition because the demand for these basic commodities is relatively price inelastic, that is insensitive to price changes, particularly for low income people.

One would expect the substitution effect to be slight because, there is no substitute for food. The tax on wheat would tend to encourage greater use of rice and corn. There would be a fairly strong income effect, however, some families might have their incomes driven down to such a level that they could not afford adequate nutrition. This would lead one to suggest a more nutrition conscious tax system.

Health and the Individual in the Subsistence Sector. As noted earlier, practically no one in Nicaragua lives completely outside the market economy. Still, one third of the rural population lives on farms less than seven hectares in size, covering less than 3.5 percent of the farm area. Since they raise crops which form the basis of the average Nicaraguan's diet, they are crucial for the continued growth of Nicaragua's economy.

These farmers do not act like a businessman, carefully calculating profit and revenue. 15/ Neither do they fit the model of totally subsistence agriculture where nothing is bought or sold. Figure 2.1 gives an outline for analyzing the production of the subsistence farmer who grows most of his own food.

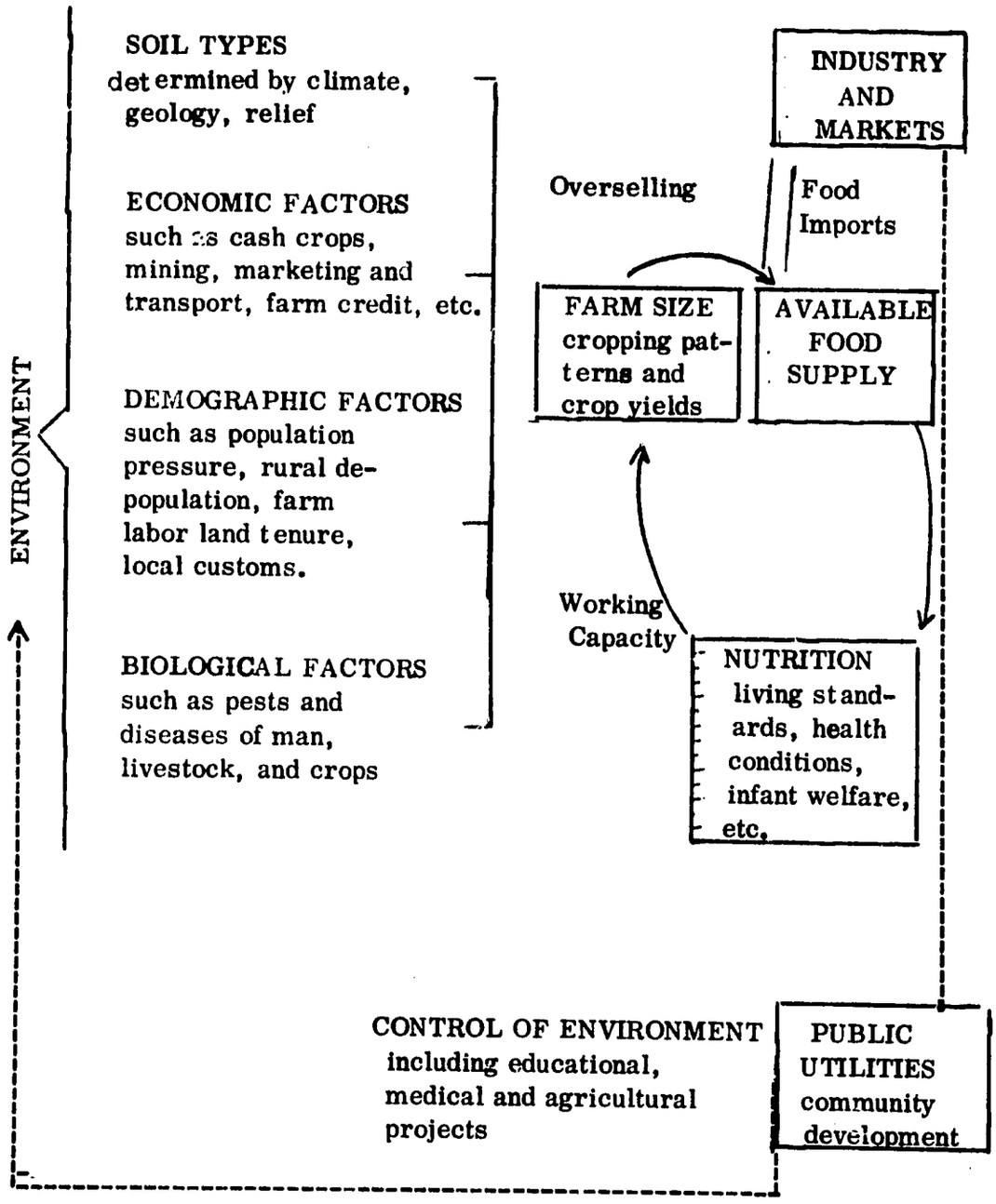
Two elements in this diagram seem to bear most especially on the problem at hand, the relation between health and medical care activities on the one hand, and "development" on the other hand. The first is the box at the bottom of the little circle entitled NUTRITION. This box is mistitled, because what the authors had in mind was the set of determinants of the farmer's working capacity. The other element is "environment". Here again, something is left out. In particular, note should be taken of what Coombs and Ahmed call "The Learning Environment". 16/

15/ A. V. Chayanov, The Theory of Peasant Economy. Edited by Daniel Thorner, Basile Kerblay and R.E.F. Smith. Homewood, Ill. Published for the A.E.A. by Richard Irwin, Inc., 1966.

16/ Philip H. Coombs, and Manzoor Ahmed. Attacking Rural Poverty: How Nonformal Education Can Help. (Baltimore and London: The Johns Hopkins Press for the IBRD, 1974)

Figure 2.1

Determinants of Welfare on the Peasant Farm



Source: I.S. Dema, Nutrition in relation to Agricultural Production. Rome: Food and Agriculture Organization of the United Nations, 1965, p. 109

The "Learning Environment" could be defined as the set of opportunities which give an individual a chance to learn those elements of modern culture which would contribute to his ability to fulfill himself. Modern medical facilities which work would seem a priority to form a part of that environment, militating against attitudes and showing the value of the scientific method. Wilfred Malenbaum, using admittedly poor statistics, found evidence that modern medical facilities do, in fact, seem to have that effect.17/

We have demonstrated in this section the abundant evidence that anemia, malnutrition and fever can reduce an individual's working capacity. If the aggregate viewpoint is forgotten, however, and it is realized that the whole family is a productive unit, then such facts as infant illness become important also. If the woman works in the fields, as she seems to, then obviously the need to care for a sick infant reduces her ability to produce, so that infant morbidity and mortality would have an effect. Aggregate mortality and morbidity figures give no clue to the number of days that an infant is sick, but studies of infants in other peasant areas yield very large estimates, such as 20 days out of 30. Frequent child-bearing, which follows partially from the macho value system of the hispanic milieu would further weaken the ability of the female to contribute.

If the productivity of adult members is low, then there would be a natural tendency to depend more on school age children. This, of course, would militate against efforts to raise the level of literacy.

One would expect a peasant family, when stricken by disease, to maximize its welfare as it sees it. The response to a fever would not be simple, and a study of a malaria epidemic in Paraguay tends to confirm this expectation. The study compared families which suffered in differing degrees from malaria. Interestingly enough, they did not reduce their production of cash crops. Malaria did, however, lead to a reduction in land cleared. It also led to a greater use of children for farm work. In place of corn, which is difficult to cultivate, the families harvested more manioc which is relatively easy to

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17/ Malenbaum, Wilfred, "Health and Productivity in Poor Areas", in Empricial Studies in Health Economics. Edited by Herbert E. Klarman. (Baltimore, Md.: The Johns Hopkins Press, 1970, pp. 31-57)

cultivate.[18] These results are suggestive in light of the endemnicity of malaria in Nicaragua.

In the economists' jargon, the net effect in this case was to reduce investment, both physical (clearing land) and human (education of children), and consequently to damage productive capabilities for the future to some unknown extent.

2.3 Health, Population and Development

A large body of theory exists on the relationship of population growth, health, and economic development. The precise direction and magnitude of these interrelationships are unresolved but economists have attempted to estimate effects through simulation models. Newman and Allen have used one such simulation in their study of population growth and economic development in Nicaragua.

Newman developed three projections based upon three assumptions about the fertility rates. In this way, he was able to include some of the dynamic considerations in tracing the relationship of population growth and economic growth. To simulate production in any year he used the familiar Cobb-Douglas Production Function: $Q = AK^a L^b$. Newman and Allen gave 100 different values to a and b to estimate what population growth does to national product and consumptions per capita under all possible assumptions. Newman summarizes his results as follows:

> "a reduction in fertility always significantly raises the rate of growth of per capita consumption, and reduces the vulnerability of the economy to severe fluctuations in economic activity, such as those caused by sudden falls in export earnings."

Table 2.5 shows the effect of high fertility on saving, hence on investment which is capital accumulation. By the year 2013, the per-

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18/ Gladys N. Conly, The Impact of Malaria on Economic Development: A Case Study. Scientific Publication No. 297. (Washington, D. C.: Pan American Health Organization, 1975)

Table 2.5

Levels of Domestic Net Product, Millions of 1958 Cordobas, Nicaragua, 1967 to 2013

Domestic Product / Year	Domestic net product: Low projection (1)	Domestic net product: Med. projection (2)	Domestic net product: High projection (3)	Percentage difference (1) ÷ (3) (4)
1967	3,752.4	3,752.4	3,752.4	100.0
1970	4,362.4	4,362.2	4,362.2	100.0
1975	5,525.6	5,521.2	5,520.7	100.1
1980	7,008.2	6,988.5	6,985.3	100.3
1985	8,728.4	8,703.1	8,694.1	100.4
1990	10,745.4	10,805.6	10,793.7	99.6
1995	13,182.5	13,447.1	13,462.4	97.9
2000	16,132.5	16,749.5	16,894.7	95.5
2005	19,633.3	20,750.3	21,229.7	92.5
2010	23,648.2	25,450.5	26,600.2	88.9
2013	26,304.1	28,649.8	30,421.3	86.5

Source: Peter Newman and R. H. Allen, Population Growth and Economic Development in Nicaragua. Washington: Robert Nathan, Inc., 1967, p. 69.

It will be noticed here that if one pays attention only to the end points, 1967 and 2013, that total production rises faster in the medium projection than in the low projection and in the high projection than in the medium projection. This reflects the fact that the higher rate of population growth leads to an increase in the labor force, and the increased labor force more than compensates for the reduced rate of capital accumulation arising from the lower saving rate.

This relationship is not, however, consistent over the whole period. In the early years before children enter the labor force, they are equivalent consumers, but not producers, and they have an effect on the rate of capital accumulation. Table 2.6 shows the rates of growth of consumption per equivalent adult consumer.

Table 2.6

Consumption per Equivalent Adult Consumer
Millions of 1958 Cordobas, Nicaragua, 1967 to 2013

Year \ Consumption	Low Projection	Medium Projection	High Projection	Low-High
1967	2,761	2,761	2,761	-
1970	2,963	2,959	2,958	5
1975	3,125	3,100	3,096	29
1980	3,327	3,260	3,246	81
1985	3,509	3,383	3,344	165
1990	3,679	3,503	3,417	262
1995	3,857	3,640	3,487	370
2000	4,060	3,803	3,565	495
2005	4,286	3,980	3,645	641
2010	4,523	4,158	3,712	811
2013	4,666	4,265	3,748	918

Source: Peter Newman and R. H. Allen, Population Growth and Economic Development in Nicaragua. Washington: Robert Nathan, Inc., 1967

Here per capita consumption rises faster in the low projection and the rise is consistent. There are three forces taken into account here -- the previously mentioned relationships between increasing labor force and production and between equivalent adult consumers and saving (investment), as well as the effect of increasing the number of consumers and hence the denominator of the maximand. The combination of the two negative factors effectively and consistently overpowers the rising production due to the increase in the labor force.

It does not necessarily follow that the low rate of population growth is "better". This would only be true if consumption per equivalent adult consumer measured in monetary terms were the only choice criterion.

Population Growth and Public Investment. The effect of the rate of population on the division of national product between saving and investment is not the only effect, however. It also affects the type of

capital investment. As the number of children rises, more schools and teachers are needed. In addition, it will cost more to provide health facilities.

The Socio-Economic Analysis Staff of the International Statistical Programs Center of the U.S. Bureau of the Census, in coordination with the Nicaraguan Bureau of the Census, has done a number of simulations in the context of analyzing the effects of a family planning program.19/ The objective of the exercise used here was to estimate the effects of a family planning program on expenditures for education. Estimates were generated of new clients for the family planning program with the cost of health and education facilities that would be required by the population in the absence of a family planning program. Table 2.7 shows the assumed number of clients.

The investigators, using a smoothed age distribution based on the 1971 census, developed four estimates of probable population growth. Some crude summary indicators for each of the assumptions are given in Table 2.8.

Figures on education expenditures for the high and low population growth rates, with and without family planning are calculated. This makes it possible to calculate the saving in educational expenditures that would result from a family planning program, and to infer the magnitude of possible savings in health services. A number of fairly obvious relationships can be seen.

There are savings of capital costs for teachers, education, equipment and buildings, while operating costs savings would include teachers salaries and upkeep.

19/ See Roger Bove. "Savings to Nicaragua from Family Planning", Washington, 1975.

Table 2.7

Assumed Number of Clients for Family Planning, by Age Group, Nicaragua, 1970 Base= 1000, Years 1970 to 2000

CLIENTS / YEAR	Five-Year Age Group						
	15-19	20-24	25-29	30-34	35-39	40-44	TOTAL
1970	050	200	300	300	100	050	1000
1971	066	224	325	325	120	057	1118
1972	087	250	353	353	144	066	1253
1973	115	280	383	383	173	076	1409
1974	152	313	415	415	208	087	1590
1975	200	350	450	450	250	100	1800
1976	200	350	451	451	250	100	1802
1977	200	350	452	452	250	100	1804
1978	200	350	453	453	250	100	1806
1979	200	350	454	454	250	100	1808
1980	200	350	455	455	250	100	1810
1981	200	350	456	456	250	100	1812
1982	200	350	457	457	250	100	1814
1983	200	350	458	458	250	100	1816
1984	200	350	459	459	250	100	1818
1985	200	350	460	460	250	100	1820
1986	200	350	461	461	250	100	1822
1987	200	350	462	462	250	100	1824
1988	200	350	463	463	250	100	1826
1989	200	350	464	464	250	100	1828
1990	200	350	465	465	250	100	1830
1991	200	350	466	466	250	100	1832
1992	200	350	467	467	250	100	1834
1993	200	350	468	468	250	100	1836
1994	200	350	469	469	250	100	1838
1995	200	350	470	470	250	100	1840
1996	200	350	471	471	250	100	1842
1997	200	350	472	472	250	100	1844
1998	200	350	473	473	250	100	1846
1999	200	350	474	474	250	100	1848
2000	200	350	475	475	250	100	1850

Source: Roger Evan Bove Unpublished computer analysis, Suitland, Maryland: Socio Economic Analysis Staff, International Statistical Programs Center, U.S. Bureau of the Census, 1975

Table 2.8

Family Planning Parameters Under Four Crude Birth Rate Assumptions, Nicaragua, Years 1970 and 2000

Proj. / Indicator	High Projection		Constant Projection		Medium Projection		Low Projection	
	1970	2000	1970	2000	1970	2000	1970	2000
Crude Birth Rate	49	36	49	49	49	32	49	28
Gross Reproduction Rate	3.4	2.5	3.4	3.4	3.4	2.2	3.4	1.9
Total Fertility Rate	6.9	5.1	6.9	6.9	6.9	4.5	6.9	3.9

Source: Roger Evan Bove, Unpublished computer analysis. Suitland, Maryland: Socio-Economic Analysis Staff, International Statistical Programs Center, U.S. Bureau of the Census, 1975

Six years from the start of a proposed family planning program, an effect would be felt at the primary level. Twenty years later, the children of the first cohort would be having children of their own and so forth, so the calculated saving increases over time. The same pattern with a longer time lag occurs for secondary and higher education.

A comparison of the low growth rate simulation tables with that of high growth rate shows that the savings from a family planning program increases as the rate of population growth increases.

A rapid rate of population growth increases the labor force. Other things being equal this would increase production. But other things are not equal. The increased numbers of consumers leave less for capital accumulation. The reduction in the rate of capital accumulation would lead to a fall in the rate of growth of total production -- other things equal. The effect of the simulations was to show that the net effect of population growth on total production was positive. But if consumption per consumer is considered, the net effect is negative.

When the effect on public services is considered, then it biases investment away from more productive activities.

In summary, there is sufficient evidence in these simulated relationships to suggest strong reasons for incorporating family planning activities into future health programs.

Health, Population Growth and Development. The simulation exercise discussed above conceived of economic growth as determined largely by accumulations of capital and labor. It was concerned mainly with population growth, but some conclusions can be drawn about the effect of better health.

Better health would reduce the death rate. This is what Newman and Allen assumed in their simulation; that is, that death rates would fall to the levels of Australia and Northern Europe. If this factor only is considered, then total production would rise due to the increase in the labor force. This can be seen from their data on total production. Per capita consumption would, however, fall because the declining rate would increase the number of equivalent adult consumers. This would have a double effect. First, less production would be left over for capital investment, and second, there would be "more mouths to feed".

Newman's model uses a Cobb-Douglas production function. This function carries the implicit assumption that there would be no unemployment, so that the exercise cannot in any manner be considered a forecast. It just illustrates relationships.

The Census Bureaus model showed that increasing population growth would lead to increased expenditures on education. They also had estimates for increased expenditures on health, but their estimates included the implicit assumption that present health facilities reach 100% of the population. Since there was no way to aggregate everything here, there did not seem to be any reason for including them.

The Census Bureau model did, however, include a policy instrument. Suppose a falling death rate was accompanied by a falling birth rate accelerated by family planning activities one might have the best of both worlds: an increasing labor force without the drag on capital investment of a rise in equivalent adult consumers. The exact balance is not possible to estimate, however, because all feedback effects have not been combined in a single model. This is largely due

to the lack of cata from Nicaragua.

As noted earlier, these exercises do not take into account the likelihood of unemployment in the modern sector. More to the point for present purposes, they do not exhaust the possible effects of health on development, partially because they were designed to deal only with population growth.

In the classic framework, better health affects the labor force through mortality, morbidity and debility. It affects the rate of capital accumulation pretty much in the way it has been modeled in the previous sections. It affects land by making it available if the extent of disease has precluded human habitation. The models tell a lot about the effect of reduced mortality. They are silent about days lost from work due to morbidity, however, and they say nothing about the loss of productive ability due to debility. So far it has been impossible to obtain data on days lost from work in Nicaragua. Furthermore, debility, which is usually conceived of as physical weakness, should, if the foregoing sections on the effect of anemia, malnutrition and goiter have any truth, be given a much wider interpretation.

The framework in which these models operated was the "neo-classical framework". It carries the assumption that the main problem in less developed countries is a shortage of physical capital. It should be noted that development economists are not in agreement that this assumption is true. Even in developed countries, a number of studies have shown that accumulations of capital and labor cannot explain very much growth. It is, therefore, impossible to explain growth by increases only in capital and labor.

The human capital school has tried to explain this in terms of investment in man, but this concept also breaks in one's hands when nutrition, mental retardation, innovation, enterpreneurship and attitudes are added to the determinants of economic growth. The policy implication of this was made clear by Gunnar Myrdal:

> But if we do add investment in health to investment in education and define human resources in terms of two dimensions of population quality -- as occasional references invite -- we must include all costs in improving the conditions of health -- not just expenditures on health facilities . . . . The implication is that the new term "investment in man" should include not

> only the consumption of educational and health facilities, but practically all essential consumption if the underlying reasoning is to be logically consistent. The productivity effect on the margin of various items of consumption differs, however -- some consumption is relatively unproductive and some has a negative value for health. The real planning problem is how to squeeze and twist consumption in such a way as to speed up development.20/

Conclusion with Respect to Health and Development. If development is conceived of as the result of activities by self-motivated rational individuals, then there is no way that it can be programmed in a mechanical sense. The best a planner can do is give people a chance to develop the economy themselves. In this context, poor health stands as an obstacle in a number of ways.

First, as noted above, anemia, malnutrition and fever reduce the ability of an individual to perform manual labor. If development is seen as simply the result of manual labor, then poor health in Nicaragua, even given the paucity of present knowledge about actual situations there, is reducing the ability of people to function. Second, however, one must consider such factors as vitality. One study in Guatemala which compared workers with food supplements and workers without food supplements, found that not only were the former more capable of manual labor, but they also slept less, and worked more at home. Third, there is significant evidence that both malnutrition and goiter reduce reasoning capacity and speed of comprehension, and there is evidence that such conditions exist in Nicaragua. In addition, there is the effect of disease on school attendance. As the Paraguay study cited earlier showed, families suffering most from malaria, used their children more on the farm.

Finally, there is the poverty of the "learning environment". The absence of modern scientific medicine which operates successfully removes an opportunity for informal learning.

As Myrdal noted, however, a sincere intention to do anything about the above relationships would demand a willingness to affect the whole social environment. The exact role of health facilities, or health promoters is not at all clear.

20/ Gunnar Myrdal, Asian Drama, New York: Pantheon Books, 1968

2.4 Public Sector

The government budget has three functions: 1) The allocation of social and merit goods; 2) The stabilization of economic fluctuations; 3) The correction of a socially undesirable distribution of income. The performance of any of these functions will involve the government in the health of the citizenry. Most classic public health expenditures fall under the definition of social good allocations; unemployment and inflation inflict a heavy toll in physical and mental illness; a government provided medical care is usually justified on income distributional grounds.

These broad relationships deserve mention even though extensive investigation is impossible at the present time, for it is easy to forget that the whole budget, its mode of finance as well as its expenditures, can have an effect on the health of the people. Part A of this section will make some observations with respect to the tax side. Part B will discuss the expenditure side.

The Tax Structure. The Nicaraguan tax system has been criticized in the past for being income inelastic and regressive. A recent reform seems to have increased the income elasticity by increasing the share of income taxes in the whole system. Table 2.9 shows development of Nicaragua's tax structure between 1961 and 1968.

The new tax structure still contains many regressive elements. The sales tax remains, and the government now seems to collect and earmark some local sales taxes. This is not particularly blameworthy. Any tax system must, of necessity involve compromise between competing objectives and income taxes are notoriously difficult to collect in lesser developed countries. Nevertheless, the growing body of information on the effects of malnutrition should induce a new sensitivity to the effect of sales taxes on the health of the poor. At least staples, corn, sorghum and beans might be exempted, and the 5¢ per kilo tax on wheat, if not already repealed, might be.

The Expenditure Side. Even though all expenditures, such as those of INCEI have a relationship to health, this section will focus for the most part on government health expenditures, and then in a narrow sense. It is possible to ask three questions about a government expenditure: What determined it? Is it right? Is it well used? The last question refers to efficiency and will not be discussed here

as it is the subject of many other chapters of the assessment. The first question can be dealt with to some extent, and can shed some light on the answer to the second. But, it must be stressed that the second question is basically unanswerable.

One study found health expenditures the most variable across countries, with a coefficient of variation of 86.3%.[21] Other studies have also failed to find significant regularity between level of development and the percentage of Gross National Product that is spent by the government on health.[22], [23]

All this does not, however, deny that forces operate over time as Gross National Product rises, to increase health expenditures. The single greatest causal factor, however, seems to be not some concept of "affordability" but the political power of the urban worker. Pryor tried to explain health expenditures as a percent of Gross National Product in a sample of communist and capitalist countries. The most powerful explanatory variable in this study was the number of years the social security system had existed in the country.[24] Thorn tested the hypothesis that the rising political power of the urban worker would lead to increase in the level of social expenditures per capita. This reveals itself in the higher per capita social expenditure on urban workers within countries, and it leads to increases in the share of the budget devoted to social expenditures over time.[25] This is verified by the phenomenon that Lewis and Martin had observed, that if only health, education and administrative services are considered, there is no relationship between level of development and the percentage of Gross National Product that a government spends. If social security, defense and food and agriculture subsidies are added, then such a relationship exists.[26]

21/ Enweze, Cyril, "Structure of Public Expenditure in Selected Developing Countries: A Time Series Study", The Manchester School of Economic and Social Studies (1973)

22/ Frederic L. Pryor, Public Expenditures in Communist and Capitalist Nations. Homewood, Ill.: Richard D. Irwin, 1968

23/ Richard S. Thorn, "The Evolution of Public Finances During Economic Development". The Manchester School of Economic and Social Studies (1967)

24/ Pryor, footnote No. 22

25/ Thorn, footnote No. 23

26/ Martin and Lewis, p. 205

Table 2.9

Sources of Revenue for the Nicaraguan Government Years 1961 to 1968
Percentage Distribution

Source of Revenue / Year	Export Tax	Import Tax	Tax on Goods and Services	Income Tax	Tax on Net Worth	Other Taxes	Non-Tax
1961	2.8	45.6	18.5	8.2	3.3	5.7	16.0
1962	2.1	46.7	19.5	7.4	3.2	5.8	15.1
1963	1.8	40.8	23.9	8.8	5.3	4.2	15.2
1964	1.5	35.0	29.6	8.5	5.7	3.7	15.9
1965	1.5	34.5	28.2	12.0	6.2	2.1	15.5
1966	2.1	32.1	28.5	12.9	6.4	2.9	15.1
1967	2.2	30.5	30.5	14.6	6.8	5.7	9.7
1968	1.1	27.7	34.1	11.8	8.7	6.9	9.8

Source: Inter-American Economic and Social Council, Latin American Development and the Alliance for Progress. Washington: Organization of American States, 1973, Table A.1

It is possible to draw two conclusions from the considerations given above. First, some estimates can be gathered for the income elasticity of government health expenditures. Pryor estimated it at +0.86. Enweze's estimates varied from +0.29 for Uganda to +1.78 for Jamaica, with a mean of 1.25.[27] (But Enweze lumped health and welfare expenditures together.) In Enweze's study, as can be verified in Table 2.10, public expenditures on health as a percentage of Gross National Product varied from 0.6% to 9%. Second, it can be predicted that if political processes follow their usual pattern, the bulk of these expenditures will go to benefit established workers in the urban modern sector. Given the importance of the subsistence farmer who provides food to the urban sector, and the necessity for political power on his part to "push" for his share, efforts at rural community organization would a priori seem to offer a relatively high pay-off in terms of assuring a more ample distribution of health services, that one might presume would be more equitable.

Nicaraguan Government Health Expenditures. Examination of Nicaraguan Government health expenditures for the years 1967-73, as reported to the Inter-American Statistics Institute are shown in Table 2.10. Since the health component is not clearly defined, and "undefined" expenditures account for as much as 55% of the budget, this data is not very revealing except to show an approximate 10% of GON budget going to health during the period to include water and sewer activities not covered in all national budgets.

The expenditure of Nicaraguan health institutions for 1971-74 as abstracted from Unidad data are shown in Table 2.11.[28] This total budget in the sector, including the water and sewer agency, DENACAL, is seen to grow steadily from 223.1 million cordobas in 1971 to 342.6 in 1974, a total increase of 54%, with actual expenditures during the period increasing even more, at 91%. This table indicates roughly 231 cordobas expenditure per capita in health, or $3.30 in 1974. But several clarifications and elaborations of these figures are needed.

First of all the Health Ministry's total budget for operations and capital expenditures in 1974, was only 49.0 million cordobas, 81% of which was operating expenses, and 38% went just to the malaria eradication program. In other words, of the total 167 million cordobas in

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27/ Enweze, p. 445

28/ Unidad de Analisis Sectorial de Salud, Report, Vol. II, 4.10, Area Institucional, Aspectos Financieros

Table 2.10

Central Government Public Health Expenditures
As a Percent of GNP in Selected
Lesser Developed Countries, Years 1959 to 1968

Country \ Year	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	MEAN
Ceylon	7.7	9.1	10.1	9.8	9.7	9.4	9.4	9.4	10.6	9.6	
Ghana	1.2	1.2	1.5	1.4	1.5	3.5	3.3	2.1	2.5	3.6	
Guyana	5.0	3.9	3.3	3.8	3.7	3.7	3.3	3.6	3.7	3.4	
Honduras	1.6	1.4	1.5	1.3	1.4	1.4	1.6	1.7	2.0	2.0	
India	1.2	1.1	1.5	1.3	1.4	1.7	2.0	1.1	1.9	1.5	1.4
Jamaica	1.4	1.5	1.4	1.9	1.6	2.1	1.9	2.5	2.3	1.9	1.8
Kenya	--	1.5	1.7	1.6	1.4	1.1	1.7	1.4	1.7	1.8	1.5
Korea	--	1.5	1.4	1.8	1.5	1.1	1.1	1.4	1.5	2.0	1.4
Malaysia	--	--	1.8	2.2	2.1	2.2	2.2	2.5	2.5	2.7	2.2
Philippines	0.7	0.7	1.0	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.6
Tanzania	2.3	1.9	1.7	1.7	1.4	1.4	2.1	1.8	4.2	4.3	2.3
Thailand	0.9	1.0	0.9	1.2	1.3	1.6	1.8	1.7	1.9	1.6	1.3
Trinidad and Tobago	5.2	4.8	5.8	7.3	7.0	5.7	5.5	5.7	4.2	4.4	5.3
Uganda	3.3	3.1	3.1	3.1	1.6	2.0	2.2	1.8	1.5	1.8	2.4

Source: Cyril Enweze, Structure of Public Expenditure in Selected Developing Countries: A Time Series Study. Manchester School of Economic and Social Studies, 1973, pp. 435-442

Table 2.11

Government and Quasi-Government Health Sector
Operating and Capital Expenditures, Nicaragua, Years 1971 to 1975

Agency \ Expenditures	Budgeted (000 Cordobas) 1971	1972	1973	1974	1975	Spent (000 Cordobas) 1971	1972	1973	1974	1975
1. Ministry of Health	85.7	91.9	117.5	167.0	189.8	98.2	80.3	95.6	134.6	Not Available
2. Less: DENACAL and transfers	-55.1	-62.9	-87.9	-124.7	-76.2	-66.1	-53.4	-68.0	-85.6	
3. Ministry of Health, except DENACAL and transfers	30.6	29.0	29.6	42.3	113.6	31.3	26.9	27.6	49.0	
4. DENACAL (Water)			55.87	81.87	97.5					
5. JNAPS (Medical Services)	22.4	21.0	20.2	26.2		20.4	18.9	21.9	34.6	
6. JLAS-Managua (Medical Services)	28.3	31.4	33.5	33.2		26.9	29.8	28.5	64.1	
7. Social Security Institute (Medical Services)	86.7	99.0	103.9	116.2		107.0	102.2	81.1	150.6	
8. Total			243.0	299.7						

Source: Nicaraguan Health Sector Assessment, 1976, Part II, 4.10

Ministry budget, only 41.0 million was for operating programs (19.69 cordobas per capita) and of this the Malaria Service, SNEM, consumed the major share.

Another element in Health Ministry recent budget history which seems worth noting is its very large jump in expenditure from 1973 to 1974, as well as that of the Social Security Institute. It is obvious that even using total national population figures for per capita expenditures, Social Security by far spends more. But if we remember that Social Security only serves some 10% of the population, its per capita expenditure is even more dramatic. If we add the national hospital system (JNAPS and JLAS) expenditures to those of Social Security, it becomes obvious the tremendous variation in amount spent on curative rather than basically preventive care. The above is only a superficial analysis of Nicaraguan health expenditures. Further in-depth analysis coming from the Unidad study was expected but is still not beyond the largely descriptive stage. However, we can conclude that Nicaraguan health expenditures have increased much more rapidly than either the general budget indicated greater priority to health.

Table 2.12

Internationally Reported Nicaraguan Health Expenditures, 000 Cordobas, As a Percent of National Income, Years 1967 to 1973

Year	National Income (1)	Health Expenditures (2)	(2) as a Percent of (1)
1967	4359	60.7	1.4
1968	4557	59.5	1.3
1969	4941	69.6	1.4
1970	5500	80.7	1.5
1971	5884	98.2	1.7
1972	6383	65.7	1.0
1973	7138	73.3	1.0

Sources: United Nations Department of Economic and Social Affairs, Statistical Office, Statistical Yearbook, 1974. New York: United Nations, 1975;

The Concept of Affordability. There is no single concept of affordability. Thus, Ceylon, with a low per capita income can afford to spend nine percent of its budget on health while the Phillipines can only afford less than one percent (or could at the time of Enweze's study). To come to some conclusion, one needs a set of value premises expressed as goals and some measure of how different expenditures will lead to achievement of these goals. Affordability can only be considered in terms of the value of what is given up when funds are devoted to this use and not to another. Two considerations suggest that given the goal expressed above, of assuring the ability of citizens to perform, more funds could be devoted to rural development.

The first arises from the crucial role of the small farmer in future development. If the country is not to spend foreign exchange on food or see prices of food rise, the production of the subsistence farmer must rise. No one really knows how to bring this about, and in the face of uncertainty a "portfolio" should probably include health services.

The second arises from urban pressures on the budget. These pressures will be for curative medicine and for those urban workers who are relatively well off (those in industries covered by social security). It will most likely be impossible to withstand such pressures, and only by increasing total expenditures can there be any assurance that funds will flow to rural areas.

Within the education, health, rural development mix, it is difficult to establish priorities, but it is difficult to see how anything else can have such a high priority as to deny any possible increase in funds to these areas.

2.5 Conclusions

This chapter began by pointing out that national development no longer can be conceived in terms of one dimensional growth. There are a number of components, one of which is the health of the members of the society, health defined as a sense of well-being and an ability to function. The "ability to function" is a sort of open-ended term, but

agreement probably exist on what might constitute an obstacle to the ability to function. It was pointed out that lack of iodine in the diet, malnutrition, and low levels of literacy were most probably having a negative effect on the future ability to function of substantial numbers of Nicaragua's citizens.

Since many of these citizens are concentrated on the small subsistence farms that supply food for the urban sector, they are important for the future growth of the whole economy. If the production of food does not keep up with the growth of domestic demand, then either the price of food will rise in the modern sector driving up wages or Nicaragua will be forced to increase food imports, using up precious foreign exchange.

The low productivity of the subsistence sector is a complex of many factors, but it seems beyond reasonable doubt that the complex of malnutrition, anemia, and fever constitutes one of those factors. Secure land tenure, rural credit, and extension services would form part of the set of complementary inputs necessary to give these people a chance to increase their living standards and their ability to produce for the rest of society. Indeed, without complementary inputs, health care facilities would seem to have limited effectiveness even in assuring their health. The contribution of health facilities could go beyond simply setting broken legs, for they seem to form part of a whole "learning environment" that permits the individual to develop an openness toward new ways of doing things.

Anemia, malnutrition, and fever afflict workers in the modern sector as well as those in the traditional sector. Since the plantations are required by law to provide food and housing, it might be possible where the plantation owner might profit to induce better food and housing. If such actions would only increase his costs, however, the solution is strict inspection.

Strict sanitary inspection seems to be totally absent in the Nicaraguan public health "mix" even though laws are on the books. Enforcement of these laws plus implementation of environmental sanitation and sewage schemes that seem ready for implementation would seems on a priori grounds to be relatively cost-effective, and hence they might merit further investigation. Enforcement of the laws on iodization of salt would similarly seem to be cost-effective in the face of the growing body of information on the relationship between iodine

deficiency, cretinism and mental retardation.

In the implementation of these programs monetary incentive schemes would seem to bear further investigation. Bonus payments to project workers who meet or exceed target production levels already proved beneficial in water system construction. If such schemes are outside the capabilities of AID support, then the World Bank might be consulted for supplemental help.

Nicaragua's poor luck with malaria control may be due partially to methods of farming, particularly the cultivation of rice and cotton. Further investigation into the use of insecticides on the cotton plantations might uncover relatively low cost ways to increase the effectiveness of the malaria control program. The existence of malaria in areas where mosquitoes are not immune leads one to suspect the existence of managerial difficulties within the Malaria Control Agency, SNEM.

It is very easy to show in aggregate terms that population control has high payoffs. Some of the reasoning on which this was based is contained in the body of this chapter. In combination with activities to improve the life of the people, it would be extremely advisable. This advice, however, has been given many times before.

Living standards and health of people in the marginal areas of the cities is closely related to that of those in the agricultural areas. Attention to health of the poor cannot omit the existence of urban migration and its effect on health. The approach of Gunnar Myrdal of stressing interrelations has been called a counsel of despair and in the long run invalid, or else, as Hirschman has pointed out, no country would every have developed. On the other hand, this approach serves to underline the ability of an integrated approach to have effects beyond the expected sum of the effects of any of its parts taken singly. Rural credit together with rural sanitation and education may have more of an effect than rural credit alone in one place plus sanitation in another and education in another.

Much remains unknown about these relationships. It is known, for instance, that land reform should be accompanied by rural credit, that epidemics can cripple the productive capacity of a rural area for years. Attention to the family as a unit of production can reveal costs of infant disease that are not obvious to an aggregate view. Common

sense tells one that effects from a "learning environment" would be very slow in appearing. But it is not known what kind of health facility and what kind of credit, or how much of each to use and how to adapt these things to the needs of the people.

Nicaragua, where the decision to move in several fronts has been taken, might be the place to investigate some of these program relationships -- not in the sense of blamefully evaluating what has been done but in the sense of improving over time the effectiveness of what is being done by developing new knowledge that can be used as a model elsewhere.

CHAPTER 3

HEALTH PLANNING

The most general and far reaching conclusion of the health sector assessment is that the health sector must reach out more effectively to deal with the health needs of the people. To do so it will need to reassign priorities, increase and reallocate resources, modify programs, and offer higher quality services more efficiently than in the past. One must, therefore, investigate the capacity of the agencies and of the health sector as a whole to diagnose the situation, select appropriate objectives, compare and select among alternative strategies, and implement the selected program. We shall call this process "health planning."

3.1 Health Planning Procedures

This chapter concludes that until recently, there has been limited health planning carried out in Nicaragua. Although some health plans have been published, particularly by the Ministry of Public Health, they were usually based upon poor data, lack of critical thinking, and failure to secure adequate participation of local and national health officials in their preparation. While a start has been made, Nicaragua is still not self-sufficient in health planning. At this point even the information system needed as a basic resource for effective planning is inadquate in many respects. The epidemiologic information system analyzed in depth for the Nicaraguan assessment was characterized as

> "slow, inefficient and imprecise. Ideally, data collection should be provided for disease surveillance, program assessment, and health planning, as such, the development of an improved system should be given the highest priority." 1/

1/ Gerald Faich, unpublished consultant report, 1975.

In conclusion, some means must be adopted to strengthen the health planning capacity if a large AID Health Sector Loan is to be implemented in an effective and efficient manner. More importantly perhaps, an adequate health planning capacity must be institutionalized in the health sector for the long-term development of public health. The assessment of health planning is focused on three aspects:

1. Structure -- the organization unit that performs health planning.

2. Process -- the planning activities or phases.

3. Effects -- the changes that are consequent to the planning.

Primary concern is identifying changes that can be made quickly and efficiently but yet will have significant impact on planning's effectiveness. Due to the rapidity of the study, attention is given to summary indicators of planning practice, and no attempt was made to perform an exhaustive study. Moreover, attention is directed at the current planning capacity, the rate of improvement in recent years, and the potential for future progress.

Conceptually we shall refer to <u>structure</u> as the study of those aspects of planning involving:

a. Personnel--the number, behavior, training, experience and mystique of those who do health planning.

b. Organization--the way the personnel are grouped themselves but more importantly the formal arrangement of information channels and decision activities that relate the planning groups to their organization and to the sector as a whole.

c. Participation--the ways individuals and agencies outside of the planning group are included in the planning tasks.

d. Legal and political support.

e. Resources for planning--information, research funds, offices, equipment, finances and energy used in the planning process.

The basic health planning process includes the following: (1) health system diagnosis; (2) objectives formulation; (3) comparison and selection of alternative strategies to reach the objectives; and (4) evaluation of the implementation of the selected strategies. In order to evaluate the health planning process, we must ascertain if each activity is carried out, as well as how it is carried out. An indicator of the completion of each step is the content of the published health plans.

Diagnostic activities include those which focus on: (a) the population per se--its size, growth, distribution and attitudes toward health and health services; (b) the health status of the population; (c) the health services provided, especially their coverage, quantity, quality, accessibility, impact, and costs; and (d) health resources including human, physical and financial resources.

In the formulation of objectives, attention is directed at general goals, at more specific objectives, and at the priorities defined among goals and objectives.

Comparison and selecting of alternative strategies involves both the synthesis of program and project designs and the analysis of their cost-effectiveness and feasibility. Most importantly one focuses on the quality of design of alternatives, and on the extent to which real choice is developed and maintained through planning to assure decisions are available reflecting the larger vision of national development policy makers.

Evaluation is a continuing planning function involving the systematic comparison of the objectives proposed and reached, of the activities proposed and accomplished, and explanation of the problems encountered.

The effect of planning, or the impact of planning are taken to mean the degree to which desired change is accomplished through planning. Attention is directed at the actual success in implementing the actions planned, at the barriers to implementation, the changes in the health system that resulted, the contribution of health changes to national development, and at the success of the planning a stimulating health investment from national and international sources.

3.2 Inter-Institutional Planning

The existence of effective planning across sector institutional lines is a more likely means of optimal allocation of resources in the sector than through an individual agency approach. It was this reality that led to the assessment effort in Nicaragua as a multi-agency approach through the Unidad. This effort is so central to the successful development of a planning capability in the health sector that it is taken up separately (Appendix A). Before focusing on institutional planning in this chapter, however, other intrasectoral planning activities should be described.

3.2.1 National Health Committee. The National Health Committee is the formally established body for coordinating health sector agencies, but provides direction for planning in the sector. Composed of heads of all the major institutions in the sector, it has only met infrequently and with little real output. When the Unidad was created to analyze the health sector, it was to report to this committee. Thus far, however, little use has been made of the Committee as a coordinating mechanism, and the Unidad reported almost exclusively to the Secretary to the President, which limited its technical effectiveness.

3.2.2 The Office of National Economic Planning. The National Planning Office attached to the President's Office is officially and legally mandated to coordinate inter-institutional planning in each of the major sectors, including health. A social planning work group exists in the planning office with health coordination as one of their activities. But the Nicaraguan assessment concluded that despite its ample authority to coordinate sectoral institutions and planning activities in health, it has not achieved such coordination. The impact on the sector planning capability has been near zero.

What planning capability or activity has gone on in the sector, has thus been through the major institutions in the sector, Health Ministry, Hospital System, and Social Security. We now turn to an analysis of the structure, process and impact of these agencies planning for health.

3.3 Ministry of Public Health

The Health Ministry has one trained health planner who is the

chief of the office of Planning and Evaluation. This is a staff office of the Minister of Health, thus there appear to be direct lines of communication to the top Health Ministry policy makers. This represents the desired organizational location for a planning office.

In interviews with nine top Ministry officials, 1/ all of whom worked at the national level, there was general agreement that planning is very important at all levels--national, sectoral, regional, and institutional. When asked to identify which levels had ongoing planning processes, however, only the Ministry's national level planning was described. All nine of the persons interviewed stated that they participated actively in the health planning. Although no information was available on health planning courses given in Nicaragua, it is apparent that a structured or continuous program of this type does not exist in the country.

The Ministry's first health plan was presented in December, 1964 and addressed the 1965-1974 decade. 2/

This plan was prepared largely by Pan American Health Organization advisors from outside Nicaragua and followed closely the methodology developed by PAHO/CENDES. An evaluation by Pan American Health Organization in 1971 reported that little was done to implement this plan due to the scarcity of financial resources, lack of trained personnel, absence of administrative and legal support. Some annual adjusting of objectives and programming of isolated activities continued in the Health Ministry after the plan's publication.

In 1971, the Ministry participated in another health planning process, that of the Pan American Health Organization Quadrennial Projections. 3/

1/ Robert C. Bradbury, Unpublished consultant report. 1975.

2/ Republica de Nicaragua, Ministerio de Salubridad Publica, Plan Nacional de Salud 1965-1974, Direccion de Planificacion, Managua, December, 1964.

3/ Organizacion Panamericana de la Salud, Proyecciones Cuadrienales de las Actividades-Nicaragua, Washington, 1971.

Focusing on a diagnosis of the existing health situation and its conditioning factors, this process attempted to provide direction for future national and international investments in the health sector. Health problems were addressed by evaluating existing health programs and their administrative support.

The two most recent Ministry planning activities consisted of the preparation of a health system diagnosis and a five-year health plan. The results are published in two documents: Republica de Nicaragua, Ministerio de Salud Publica, Informe de la Situacion de la Salud durante el Periodo 1970 a 1974, Managua, 1975, and Plan de Salud 1967-1980, Managua, 1975. The following evaluation of planning activities, concentrates on this recent experience.

3.3.1 Evaluation of Health Planning Process. Although the Ministry's planning has confronted the basic planning activities, that is, health system diagnosis, goal, formulation, and alternative strategy analysis, it is apparent that the planning process is poorly operationalized. The central problems are the lack of continuity among the various activities carried out, and the failure to pursue the activities to their logical conclusion. Principal constraints have been the poor data base, failure of the local health institutions to participate in the planning, and the insufficient political support given to planning.

The health information system of the Ministry does not produce the data necessary for health planning. Knowledge of the population's health status is limited by low coverage of medically-certified death certificates and the poor participation of health institutions in the notable disease reporting system. Health services data is rudimentary and there is a system-wide absence of cost data. In many cases, especially concerning health resources, the data may be available, but there is little opportune organizing and processing. There appears to be little coordination between many of the agencies responsible for data collection and the Ministry planning office.

In spite of this deficient data base, the Ministry has produced an explicit description of its health system. From this description, the principal problem in the system is apparent to anyone with an evaluative focus. For example, preventable diseases cause a large proportion of deaths and health service use; the infant population suffers a tremendously disproportionate share of mortality and morbidity; health services are seldom delivered to the poor population especially in the rural areas;

and health resources operate in an uncoordinated and inefficient manner. While the Ministry has been hesitant to explicitly state its problems in any detail, adequate perception of the principal problems is reflected in its stated goals.

The health plan represents a remarkably complete expression of general and specific health goals. It also expresses program-specific objectives for service delivery and their impact on health status. The planning deficiency is that priorities are not stated. Resources are too limited to allow the attainment of all these expressed goals. Instead, decisions must be made on which goals should receive priority in resource allocation.

Another planning deficiency is the scant attention to identifying and comparing alternative programs or services for attaining given objectives. Instead, a "status quo" atmosphere is predominant, which means that existing programs and resources are merely projected into the future. Results of a recent survey of the top Ministry personnel demonstrate clearly the lack of creativity regarding alternative strategies for solving major health problems.

Field projects which employ innovative health services may be found operating in various parts of Nicaragua. Many focus on the rural area, including those of CARE, NIC-PMA, and the University of Wisconsin. But the Ministry does not have a research organization, and does little in the area of health services or epidemiologic research. Furthermore, there appears to be little Ministry coordination with the National Medical School. In light of this lack of research and the absence of cost data, there is little potential for cost/effectiveness studies to compare alternative strategies. Even more important, there appears to be little motivation to consider changes.

Planning should produce financial commitments to a series of priority programs or innovations in the health system. But another fundamental planning problem is the lack of relationship between the selected objectives and strategies, and the programming of resources. Financial resources appear to be programmed through a budgetary process that maintains the status quo by employing across the board increases while maintaining the past percentage distribution among programs and services. No evidence was uncovered that would indicate a budgeting process based on the estimated costs of attaining a priority objective or implementing a priority program. Also, manpower programming is

divorced from the plan's objectives and is very incomplete.

Finally, very little critical evaluation of the existing Ministry program is evidenced in the planning. In short, there is scant attention to identifying problems in terms of specific programs or subprograms.

3.3.2 Effects of Planning. The interviews cited above also contained a question asking for an evaluation of the planning practice. The general agreement was that the planning was fair, although three of the nine said it was poor. Considering that these persons had previously agreed that health planning was an important activity, one can interpret these findings as indicating that the practice is not meeting expectations.

While it is difficult to link planning practice to health system performance, it is apparent from other chapters of this Health Sector Assessment that the health status effects of preventable diseases and on the young age groups has not been diminished to any great extent. This surely reflects poorly on the current state of the art of planning in the Health Ministry.

3.4 National Board for Assistance and Social Welfare (JNAPS)

The National hospital system, JNAPS, has no formal planning unit within its organization, maintaining that such a permanent group would be too expensive. The closest approximation is the Division of Technical Programming, whose major function is the programming of new hospital construction. Within the Division is a statistical section which compiles and processes information relating to the services rendered in JNAPS hospitals. Neither is there a permanent planning unit in any of the local hospital systems for Managua (JLAS).

Analyzing and planning for the hospital sector on a global basis seems to be largely an ad hoc process. The major planning process in Nicaragua in recent times has been the result of such a process. Study groups for the purpose of studying each hospital were formed from personnel within three divisions of the JNAPS; technical programming, social assistance and medical attention. In addition, a group from the Central Bank was provided to do the socio-economic-analysis. A diagnosis of existing problems of physical and human resources was completed, categories of priority needs identified, and specific program

recommendations made. The recent national hospital study (JNAPS) on the status of the hospital system is a major positive step and represents a strong planning effort.

The output of the above process has been the development in mid-1975 of the Programa Quinquenal, or Five-Year Program, laying out construction and modernization plans, proposals for establishing a central mainteinance, statistics, and communication system and an improved administrative development. The Programa Quinquenal is a timely effort given the production of the Health Ministry Five-Year Plan at the same time as the Unidad health sector assessment activity.

3.5 Social Security Institute

The health planning of the Social Security Institute (INSS) has consisted largely of political decisions to extend coverage. In 1971, a Five-Year Plan (1972-1976) was prepared, which focused on priorities for extending social security coverage that were developed based upon the level of economic activity in each area, with highest priority given to the most active areas. All of the departmental capitals were to be covered by 1976. The coverage of rural populations was also addressed, and a field trial was started in Chinandega. After the 1972 earthquake, however, this plan was abandoned.

The Office of Rationalization and Methods, a staff office of the Director General, has the technical planning responsibility in social security. This office's expressed goal is to increase productivity throughout the organization and coordinate activities among the different social security administrative offices. Instead of establishing an alternative set of planning activities, however, the accomplishments of this office represent a piecemeal approach to solving minor administrative problems, e.g., revision of pharmacy procedures, and developing procedures for the motor pool.

The social security statistics system represents a solid foundation for improved planning. 4/ Health services, resources, and population

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4/ Instituto Nicaraguense de Seguridad Social, Anuario Estadistico, 1973. Managua, 1974.

data are quite complete. Deficiencies center on the lack of health status data (e.g., mortality or disability) and service cost data.

The failure of the Social Security Institute to establish an effective health planning process is best demonstrated by examining the decisions on goals and objectives, and program strategy. While the general goals, that is, maintenance or improvement of the health of the covered population, are suitable expressions of broad policy directions, specific goals referring to particular programs or system components are not expressed. Emphasis is placed on extending coverage to additional groups of workers, thus neglecting efforts to improve the effectiveness and efficiency of the existing system. Clearly, efficiency goals relate to the coverage extention goals, since increased efficiency would free more resources so that coverage may be extended. But this is what is ignored.

One of the principal problems with the Social Security Institute is that there is little motivation to maximize the health impact on the covered population by the rational use of the contributed funds. Instead, funds are collected and a wealth of resources is accumulated in a large bureaucracy, and health services are supplied in response to demand. Paradoxically, demand for outpatient consultant services probably outstrips the appropriate health needs, while other services, especially preventive medicine services, are neglected and health needs go unattended.

In summary, the Social Security Institute goals are overly focused on meeting service demand and extending coverage to other economically stable groups. Furthermore, there is scant consideration of alternative services or ways of providing services. While INSS devotes much attention to keeping abreast of the latest medical technology, this curative focus far outweighs the concern for prevention and early detection services. Research that examines the limiting conditions of health status of the social security affiliates and develops services which best address these health needs has been neglected. Existing services are not critically evaluated in terms of either their effectiveness (ability to improve health) or their efficiency (minimal use of scarce resources). Research on lower cost means of given deliverying services is also neglected.

Prior to the 1972 earthquake, the Social Security Institute made

marked progress in promoting inter-organizational coordination. Projects with the Health Ministry included a rehydration center in Managua and participation in immuzation and anti-tuberculosis campaigns; while projects with the national hospital system include rehabilitation and psychiatric hospitals. Social Security has also promoted a policy of institutional coordination with local Assistance and Social Welfare hospitals outside Managua. Instead of constructing separate facilities, this policy concentrates on using the existing local Assistance and Social Welfare hospitals and strengthening them by supplying equipment and repairs. This policy is commendable because it provides these institutions with a badly needed source of revenue as well as improvements. Unfortunately, however, progress in implementing this policy has not been marked.

The social security budgeting system is another obstacle to planning since it is a traditional line budget and is not expressed by programs. Hidden within this type of budget are such policy decisions as the cost of curative services versus preventive services and outpatient care versus hospitalization. The budgeting and accounting systems do not generate service cost data, again blocking such important planning studies as cost analysis.

3.6 National University, School of Health Sciences

Health manpower and human resources allocation are key elements in any health sector delivery system planning since personnel costs alone usually account for 60-70% of the sector budget. It is thus essential to include public institutions responsible for manpower training in a discussion of health planning activities. The central institution involved in health professional preparation is the Universidad Nacional Autonoma de Nicaragua (UNAN).

The University is the only institution of higher education in Nicaragua that trains professional personnel in the health sciences field. Located in Leon, the School of Health Sciences currently graduates students in medicine, dentistry, pharmacy and medical technology. In 1965 UNAN established the University Planning Commission, whose chief purpose was to draw up plans and programs for the short, medium and long range development of the university. There is however, no separate health manpower planning body, and no health planning professional on the university commission.

This planning body has closely coordinated its planning activities with the National Planning Office as well as with that of the Planning Office of the Education Ministry. Significantly, however, there is no close coordination either formally or informally with the institutions in the health sector which are the source of employment for most UNAN graduates in health sciences.

The Planning Commission has developed a University Development Plan whose priorities are:

1. to establish the basis for training professionals, scientists and technicians in harmony with Nicaragua's needs.

2. to enlarge the teaching staff through additions and training.

3. to create scientific research institutes to investigate major national problem areas. Such an institute for public health is planned.

4. to complete physical planning of the university centers in Leon and Managua.

The lack of a mechanism for intra-sectoral health manpower planning would seem to severely limit the University Planning Body from contributing optimally to the impact on health problems that efficient allocations of appropriate manpower is likely to convey. Even less is known, however, about the importance of health planning per se within the Commission. Since UNAN is the only medical, dental and pharmacology school in Nicaragua, its major resource planning impact at present is the determination of how many doctors, dentists and pharmacists are needed; what they are trained to do, and how they can best be used.

Recently, the university completed a joint planning of a significant addition to the School of Health Sciences with the Inter-American Development Bank (IDB). The planned project, involves some $13 million for the construction and equipping of a teaching hospital and separate teaching complex in Leon for strengthening the Schools of Health Sciences. At a time when most of Latin America is putting priority on the expansion of paramedical personnel, especially promoters and nurse auxiliaries, rather than costly physicians, the priority for such massive

spending on a medical school would at a minimum seem to require total sector participation in the planning, although no such process seems to have occurred.

3.7 Summary of Major Findings

Health planning is viewed in the foregoing discussion as the capacity of the individual agencies and the government health sector as a whole to perceive the need for, organize and implement major changes in the health system. Of particular concern are planning for major extensions or modifications in the mix of existing programs and planning for new departures in health. The very high levels of mortality and morbidity, the significant demographic problems and the inadequacy of existing health services to meet those health needs indicate the need for a great deal of health planning. Overall the public health sector does not now appear adequate in planning structure, and review of health plans indicates the resulting failures in planning process, and consequent inadequate planning impact.

Each of the agencies--Health Ministry, Social Security Institute, National Hospital System--has been characterized as inadequate in planning capacity. The situation within each agency has shown significant improvement over the past five years, however. The hospital system and Health Ministry have both prepared major health plans in the last year. Moreover all three agencies have accomplished major building programs over the last few years and are currently involved in administrative reforms programs. Thus continued strengthening of the intra-institutional planning capacity may be expected to eventually result in the strong organizations required. It may be noticed that even in the event of a major institutional reorganization of the public health sector, work done to strengthen planning for hospital based medical services and community based public health services will be required, and that such work done in the existing institutional framework should carry over in large part to later institutions.

Interagency planning, as typified by the health sector assessment, is very weak. Yet, integrative planning for the whole of government health programs appears especially needed in Nicaragua at this time, given the poor distribution of resources among institutions, the inequity of distribution of services, and the inefficiencies resulting from the

diffusion and poor organization of program responsibility. Here too, however, the health sector assessment and the coordination of the hospital system and Health Ministry in planning indicates recent progress and offers the promise of eventually developing a more adequate public-health-sectoral planning capacity.

Planning for the private sector has not been discussed. This reflects the fact that we could find almost no satisfying work at all in the area. Only the current project to train and equip traditional midwives, sponsored by AID, indicates any interest in the area. However, it appears that the retail sale of pharmaceuticals represents an activity economically as costly as the provision of all governmental health services. The potential of private sector programs is illustrated by data showing that half of all women engaged in family planning do so through the purchase of contraceptives in the private sector. Similarly in areas of the country where the conditions of life are most primitive (and the inhabitants most apt for the AID support as of the "poorest majority"). Private voluntary organizations are probably more important than the public health agencies in providing services to the people. While the PVO's are almost surely the most innovative agencies in organizing and administering services at the local level, there does appear to be a lack of central governmental capacity for stimulating additional PVO activities aimed at lacunae in the existing system of service coverage.

3.8 Suggested Alternative Actions

The most pressing planning need for AID is to strengthen the capacity of the Ministry of Public Health to plan for a Rural Health Program. The proposed health project will cover two of the eight zones of the country. For its accomplishment AID can (and must plan to) provide planning backup in the form of technical assistance, and thus compensate for the weakness of the existing planning capacity. On the other hand, to adequately extend the proposed service to the other six regions, and to modify designs, curricula and programs to meet the exigencies of the varying health problems, the Ministry planning capacity will have to be significantly increased. It would appear that a portion of the rural health service project should thus be directed at planning improvement.

3.8.1 Planning for Rural Health Delivery System. Long term training for at least three professionals, with emphasis on rural health system planning is one approach to the planning problem. Out of country training would be a necessity, either in Latin America or the U.S. The health planning Masters of Public Health at University of Michigan would be a likely mode for such training, since it has a program designed for LDC nationals. Cost for such training would likely be some $10,000 per year and AID offers scholarships to cover such training.

Such trained planners would be most effective if located both at central Ministry level, and key regional locations, in Regions II and V if that is where resources are to be concentrated. It would also be beneficial to have a trained health planner within the National Planning Office, to interface with other sectors.

3.8.2 Inter-Agency Planning. The unification and reform of the public health agencies in Nicaragua has been recommended by the UASS. Such a step would be the most beneficial possible program for public health in the long term, if it could be accomplished. If such a program were given the full support of the President and of a capable Minister of Health, and if it were strongly supported with technical assistance, training and other investments, there appears to be a reasonable possiblity of its success. It seems likely that full AID support would involve four to six million dollars in loan and grant funds over a four to five year period.

Institutional development in planning capability should also include development of a health services analysis research and evaluation unit within the sector, which should be a multi-disciplinary team to cover the areas of health, nutrition and family planning. A team composed of one generalist health planner, an M.D., an economist, a social scientist and a nutritionist would be appropriate. Exploration of relating such a plan to the University's proposal to establish a health research institute should be pursued.

A program to revitalize the planning capability and structure of the public health sector is an urgent need for an effective long term health strategy. Such reform should be contemplated only with the strongest possible signals from the Nicaraguan Government that changes will continue to be backed fully at the highest levels of government. Without

such assurances AID should contemplate in the future a reduced health sector program, and one which deals specifically with innovative, geographically-localized action programs oriented toward the rural and marginal-urban poor.

3.8.3 Management Information System. Effective planning depends on information appropriate for presenting decision-makers with alternatives. Establishing both a centralized unified sector information capability as well as improvements at the local level should be considered. Developing data collection instruments which paraprofessionals can be trained to administer would be a low-cost approach to improved information.

3.8.4 AID Role in Sector Planning. Finally, because there is no adequate Nicaraguan capacity to plan for private sector initiatives in the health sector, AID should finance or conduct a special study. The study should be low in profile and narrow in scope. Commercial or university sources in Nicaragua might be sought to do the study, supplemented by technical assistance. Key planning issues in such a study would be (a) potential for additional health and family planning outreach through support of the commercial pharmaceutical sector, and (b) the potential for more effective care in remote areas through increased activities of private voluntary organizations. It is emphasized that attention should be directed not only at the nominal problem, but also at institutionalizing a capacity in the private sector to do health planning for the private sector.

It is suggested that AID also conduct an internal evaluation of the management of its health program so that it can continue to plan and implement effectively for health sector support to Nicaragua.

CHAPTER 4

PERSONAL HEALTH SERVICES IN NICARAGUA'S RURAL AREAS

The objectives of this chapter are to indicate the paucity and poor quality of the personal health services available to the rural population of Nicaragua and to suggest cost-efficient strategies for improving this situation. A large proportion of the high mortality and morbidity rates in this population may be reduced by planning and implementing a program of basic personal health services with widespread coverage. The major health problems are those that characterize developing countries, that is, enteritis, respiratory infections, malnutrition, diseases preventible by immunizations, and accidents, with children less than five years of age suffering a vastly disproportionate share of the mortality and morbidity.

In addition to preventive programs in the environmental sanitation and nutrition areas, personal health services are necessary to confront these problems. Maternal and child health services and immunization services have been discussed in other chapters. The concern here, therefore, is with early detection and treatment services that address the latter stages of the most common health problems. These are ambulatory services, and their effective delivery does not require a high level of technical training. They will require home visits to extend the coverage of the health center, and must incorporate a major emphasis on health education. Equipment and facility requirements are also minimal although simple laboratory tests and a few types of drugs are essential for an effective program. Basic hospital services will be needed to accept referrals of a small percentage of patients.

The delivery of personal health services to the rural population has recently become a top priority of the Nicaraguan Government and

its Ministry of Public Health (MOH). In his recent political campaign, 1974, President Somoza emphasized a rural development policy that included health improvements. In the Health Ministry's most recent health plan, this policy is developed further.

The general objectives of the Ministry's policy is to improve distribution of the benefits to the rural areas and marginal urban areas by 50% of the actual coverages using community participation mechanisms. In addition the Mobile Health Science Units (PUMAR) will be increased and strengthened especially in colonization areas to provide 30% of all health services to the dispersed rural population. A program of transportation acquisition and maintenance to complement the development of rural activities. Finally, new cadres of health personnel will be developed either through the participation of rural health promoters and practical midwives or the new professionals that will be trained at the proposed National Rural Health School.

The target population for attempts at strengthening the personal health services delivery system is the rural areas. The 1971 Census defined Nicaragua's rural population as persons living in towns with less than 1,000 population, and the Census estimated this to be 981, 574, (52.3% Rural of the total population). Assuming at 3% annual growth rate, the 1975 rural population would be about 1,104,770.

But this breakoff at 1,000 population is not meaningful in terms of public health needs and the health system to meet these needs. In most departments only the capital is a city which has an urban population of more than 10,000 to 20,000 concentrated in a relatively metropolitan center. The remaining towns have a small population which is often scattered over a large area. Thus, for our purposes, we have defined the target population for rural personal health services delivery as the total department population minus the population of its capital. This excludes some areas with rural characteristics that are located within the municipal boundaries of the departmental capitals. Such an exclusion is justified because of the potential access in the capitals to hospitals and the larger health centers and the complexity of the political context. In short, the proposed health promoter-rural health center - community health committee program is more suitable to the areas outside the departmental capitals.

Particular attention will be given to the non-departmental capital population in UNASEC Regions 2 and 5 because these are the highest

priority regions of the Nicaraguan Government in its rural development program (INVIERNO), as well as its proposed rural health program. In Region 2, the non-capital population in 1975 is estimated at 204,625, and for Region 5 at 194,566. Thus, the priority target population is 399,191 (or 37.5% of the country's non-departmental capital population (see Table 4.1).

4.1 Brief Description of Existing Services

Primary responsibility for delivering personal health services to rural areas lies with the Ministry of Public Health (MOH). The local social service boards (JLAS) have hospitals in most of the departmental capitals that may be used by the rural population on both an inpatient and outpatient basis. What little utilization data that exists on the actual catchment areas of these hospitals, however, suggests that accessibility problems (long distance, high costs, overcrowded conditions, etc.) keep all but a very small proportion of the rural population from using these services. Little attention has been given to referral systems from the Health Ministry rural health center to JLAS hospitals. The Nicaraguan Social Security Institute (INSS) focuses on the large urban areas, with two exceptions. (1) coverage of the population of three mining communities, Siuna, Bonanza, Rosita, and (2) a small pilot program for rural residents in Chinandega. Although INSS has included extension to rural areas in its policies for the past several years, these policies have resulted in little action.

4.1.1 Health Personnel. An overview of the health personnel situation in Nicaragua demonstrates the concentration in the large urban centers, and the strength of Social Security and JNAPS relative to the Health Ministry. Table 4.2 presents personnel data for selected Latin American countries. Nicaragua is relatively well off in terms of physician and nurse auxiliary availability but lags quite far behind Costa Rica and Panama in graduate nurses.

The distribution of the Health Ministry personnel by geographic region is shown in Table 4.3. It is clear that health workers tend to be concentrated in the Managua area, even though the Ministry's service

Table 4.1

Rural Health Delivery System Population,
Regions 2 and 5, Nicaragua, 1975

Area		Population
REGION 2		
1.	Managua Dept.	546,827
	Capital	484,744
	Rest (5 towns)	62,083
2.	Masaya	103,717
	Capital	50,844
	Rest (8 towns)	52,873
3.	Granada	80,026
	Capital	50,032
	Rest (3 towns)	29,994
4.	Carazo	80,062
	Capital	20,385
	Rest (7 towns)	59,676
Total Region II		810,630
	Capitals	606,005
	Rest (23 towns)	204,625
REGION 5		
1.	Matagalpa	189,241
	Capital	67,897
	Rest (9 towns)	121,344
2.	Jinotega	102,016
	Capital	78,694
	Rest (3 towns)	23,321
3.	Esteli	89,100
	Capital	39,200
	Rest (4 towns)	49,900
Total Region V		380,354
	Capitals	185,788
	Rest (16 towns)	194,566
Proposed Target Population		399,191

Source: Roger Evan Bove. Unpublished computer analysis, Suitland, Maryland; Socio Economic Analysis Staff, International Statistical Programs Center, U.S. Bureau of the Census, 1975.

Table 4.2

Number of Physicians, Graduate Nurses, and Nursing Auxiliaries with Ratios per 10,000 Population, Selected Countries, Various Years

Health Workers / Country	Physicians			Graduate Nurses		Auxiliaries	
	Year	Number	Ratio	Number	Ratio	Number	Ratio
1. Argentina	1972	49,950	20.9	14,621	6.1	23,850	10.0
2. Nicaragua	1972	1,385	7.0	469	2.4	1,915	9.6
3. Costa Rica	1973	1,323	7.0	870	4.6	3,180	16.8
4. Panama	1972	1,070	7.0	1,059	7.0	2,119	13.9
5. Peru	1972	8,023	5.5	5,040	3.5	11,357	7.9
6. Chile	1973	5,572	5.4	2,324	2.3	19,527	18.9
7. Colombia	1972	10,317	4.8	2,700	1.2	14,990	6.7
8. Dominican Republic	1974	1,755	3.8	317 a/	0.7	3,012	7.0
9. Honduras	1972	780	2.9	316 b/	1.1	1,647	5.9
10. El Salvador	1972	952	2.5	974	2.6	2,664	7.1
11. Guatemala	1971	1,208	2.3	751	1.4	3,673	6.9

a/ 1972; b/ 1973

Source: Pan American Health Organization, Health Conditions in the Americas, 1969-1972, Washington : 1974, p. 226

Table 4.3

Distribution of Ministry of Health Workers by Regions, Nicaragua, 1972

Health Workers / Region	Physicians		Graduate Nurses		Auxiliary Nurses	
	Number	Rate/ 10,000 Population	Number	Rate/ 10,000 Population	Number	Rate/ 10,000 Population
1	270	7.9	11	0.3	24	0.7
2	792	10.4	53	0.7	77	1.0
3	25	3.2	4	0.5	7	0.9
4	31	2.6	2	0.2	14	1.1
5	91	2.5	10	0.3	23	0.6
6	45	3.1	4	0.3	15	1.0
Atlantic	39	2.2	5	0.3	12	0.7
Unknown or other	65		---		---	
Total	1,358	6.8	89	0.4	172	0.9

Source: Rossman, et al, Sumario de los Recursos de Salud en Nicaragua, 1972

delivery institutions are more widespread. A comprehensive Pan American Health Organization diagnosis of the Nicaraguan health system in 1971 identified the low availability of trained personnel at all levels as a critical health system problem. Note that Tables 4.3 and 4.4 are not consistent, and it is not immediately clear why these numbers vary so widely. These discrepancies could represent country errors or changes in the labor force definitions.

As Table 4.4 demonstrates, only 8-12% of Nicaraguan's employed physician, graduate nurses, and nurse auxiliaries work in Ministry health centers. (These health centers represent the sole source of institutionalized health services for more than half of Nicaragua's population.) Of the 115 MOH health centers 25 (or 21.7%) were without physician services for at least two months during the first semester of 1975 (ten were without doctors for the entire six months). The 1974 evaluation of the Ministry health centers conducted by Practical Concepts, Incorporated, (PCI) found that none of the 109 medium and small size health centers had a health educator on staff. Furthermore, there were major staffing shortfalls in nurse auxiliaries, sanitation inspectors, and laboratory technicians.

Without doubt the rural population relies on its indigenous health practitioners, especially the curanderos and parteras empiricas, for most of its health care. While little empirical data are available, it is generally agreed that much of the rural population would prefer these indigenous practitioners to the health center staff, except in the case of very serious health problems, usually involving trauma or very serious illnesses. These consumer attitudes have often been cited as principal causes of the low utilization levels of the rural health centers. The Pan American Health Organization diagnosis concluded that curanderismo, homemade medicine, self medication, and deficient health behavior contribute to late diagnosis, and medical treatment. This situation is aggravated by the scant biological defenses caused by malnutrition in important population groups and also by the high consumption of alcoholic beverages.

4.1.2 Physical Resources. Turning to health facilities, the Health Ministry operated 119 health centers and 152 health posts in 1974, increasing 57% and 55% respectively from 1970. These increases were caused by an AID loan for the construction and equipping

Table 4.4

Health Workers Employed by Health Ministry, Nicaragua

Facilities / Health Workers	Total (1)	Health Ministry all levels (2)	Health Ministry in Health Centers or PUMAR (3)	(3)/(1) (4)	(3)/(2) (5)
Physicians (1973)	1,400		168	12.0%	
Graduate Nurses (1971)	481	89	55	11.4%	61.8%
Auxiliary Nurses	2,094	246	182	8.7%	74.0%

Source: Pan American Health Organization, Quadrennial Projections for Nicaragua, Washington: Pan American Health Organization 1973

of rural health centers. Additionally, the Health Ministry operates eleven mobile health units and 59 family planning clinics. The Practical Concepts, Inc., evaluation found the health centers in fair physical condition, and the most common problem was poor building security contributing to losses and damage by vandalism.

Drugs, medical supplies and equipment, and transportation services are all problematic for the Ministry health centers, largely because of the centralization of control at the national level and the insensitivity of this level to the operational difficulties of the rural health centers. The availability of the equipment needed to deliver basic health services is acceptable, but it is often in poor condition due to the scant concern for maintenance; laboratory equipment is scarce; and, supplies are not replaced in an opportune manner. Much wastage of X-ray and dental equipment occurs in health centers because this equipment is not used. The new national drug supply system (CAM) has improved the availability of medicines in the health centers, but there are persistent problems, due mainly to the preparation and processing of requisitions from the health facilities, of shortage, varying pricing policies, and inadequate inventory control systems. Transportation problems remain chronic, despite the 30 vehicles provided to the health centers under the AID loan. Again, maintenance problems abound, as well as poor administrative practices that result in shortages of gas coupons and viaticos.

The problems encountered during supervisory visits in late 1974 and early 1975 at 117 Ministry health centers serve to summarize this dismal situation. Table 4.5 demonstrates that the most common problems were equipment, followed by personnel, medicines, and facilities. All but the medicines problems were difficult to resolve in the short term.

In 1974, the National Board for Social Assistance (JNAPS) operated 10 general hospitals. (Two new hospitals were opened in Managua in 1975). Almost all of these hospitals are located in departmental capitals, and the inequitable distribution of hospital beds is demonstrated in Table 4.6.

An evaluation of these hospitals was conducted by the American Hospital Association in late 1973. Table 4.7 summarizes some of the results, and indicates the multiple problems encountered. For example,

Table 4.5

Problems Identified in 117 Ministry of Health Health Centers by Supervisory Teams (October 1974 - March 1975)

Disposition / Type of Problem	Total Problems Identified	Number of Problems Per Health Center	Percent of Problems Resolved
Personnel	238	2.0	26
Medicine	227	1.9	55
Equipment	391	3.3	20
Facilities	221	1.9	16
Community Relations	63	0.5	70
Specific Programs	69	0.6	45
Relations with Other Programs	17	0.1	29
Total	1,226	10.5	31

Source: Lawrence Posner and Michael Dalmat, Management Improvement Program of Nicaragua's Ministry of Public Health. Washington: Practical Concepts, Inc., 1975, p. V.6.

Table 4.6

General Hospital Beds, Nicaragua 1973
National Board for Social Assistance

Region \ Beds	Number of General Hospital Beds	Number of Beds per 10,000 Population
1	535	15.6
2	1,053	13.7
3	112	14.2
4	135	10.6
5	430	11.9
6	153	9.0
Atlantic	129	8.3
Total	2,547	12.7

Source: Nicaragua National Board for Social Assistance.

Table 4.7

Evaluation of Nicaraguan Hospitals, 1973

(0 = Not available; 1 = Unacceptable; 2 = Limited; 3 = Adequate)

City / Hospital \ Service	Clinical Laboratory	Newborn Nursery	Room Operating	Pharmacy	X-Ray
BLUEFIELDS					
Hospital San Pablo	2	2	2	2	1
BOACO					
Hospital	0	3	2	3	0
CHINANDEGA					
Hospital San Vicente	3	3	2	3	3
CORINTO					
Hospital San Jose	3	3	3	3	2
ESTELI					
Hospital San Juan de Dios	3	2	3	3	3
GRANADA					
Hospital San Juan de Dios	1	2	2	3	2
JINOTEGA					
Hospital Victoria	3	0	3	3	3
JINOTEPE					
Hospital Regional Santiago	3	3	3	3	3
JUIGALPA					
Hospital Asunción	2	2	2	1	1
LEON					
Hospital San Vicente	2	3	2	No info	2
MASAYA					
Hospital San Antonio	2	2	3	2	2
MATAGALPA					
Hospital San Vicente	1	1	2	3	2
MATIGUAS					
Hospital San Jose	0	0	0	2	0
NANDAIME					
Hospital Luis H. Debayle	1	2	2	3	0
OCOTAL					
Hospital General Somoza	1	3	2	3	3
RIVAS					
Hospital San Jose	1	2	2	2	2
SAN CARLOS					
Hospital Salvadorita	0	0	1	1	0
SOMOTO					
Hospital San Luis	3	1	3	2	1

Source: José González and Peters, An Assessment of Conditions and Practices in 24 Nicaraguan Hospitals, Washington: American Hospital Association, 1973

7 (36.8%) of the 19 either did not have X-ray services or they were unacceptable; 8 (42.1%) had major problems with clinical laboratories; and 5 (26.3%) with the newborn nursery.

4.1.3 Financial Resources. The geographic distribution of the financial resources allocated in the health sector is very inequitable, with Managua receiving a vastly disproportionate share. A 1972 study of the Health Ministry budget (see Table 4.8) shows that 74.7% is spent in Managua, which has only 25.4% of the country's population. (This was before the December, 1972, earthquake.)

Both this inequitable distribution and the paucity of financial resources allocated to health centers is indicated by an analysis of the budget of the MOH's medical services subprogram. Table 4.9 shows the breakdown of the 1975 budget for the personnel costs of the Health Ministry health centers. Personnel costs represent 72.2% of the health centers' operating costs. In per capita terms, Regions 2, 3, and Atlantic lead with C$5.96, C$5.65 and C$5.34 respectively; while Regions 5, 1, and 6 are the lowest with C$2.87, C$3.52 and C$3.95 respectively.

The area outside of the departmental capitals trails in the per capita amount budgeted as follows: Capitals -- C$5.15; Rest C$4.13. Ideally, this rural area should receive a higher per capita Health Ministry medical services budget since the health centers have sole responsibility for this area, while the departmental capitals are also covered by JNAPS hospitals and often by Social Security institutions. Also, the budgeted amounts are extremely low, as one cannot expect much coverage from the health centers when their average personnel budgets are only C$4.64 (or about $0.65) per capita.

4.1.4 Health Services. The production of the health centers may be measured in terms of the services delivered. Ideally, data should be available on the quantity of such services as physician consultations, graduate nurse consultations, auxiliary nurse consultations, drugs prescriptions filled, health education classes and conferences, referrals to other institutions, home visits, and laboratory exams performed. Unfortunately, little quantitative data has been collected, and we are generally limited to the number of physician consultations.

From 1970 to 1974, the number of medical consultations delivered in the public sector hospitals and health centers in Nicaragua rose from

Table 4.8

Geographic Distribution of Health Ministry Health Budget, Nicaragua, 1972

Budget Distribution / Area	Percent Population (1)	Percent Health Budget (2)	Deviation (2) - (1) (3)
NATIONAL CONCENTRATION (Managua)	25.4	74.7	+49.3
WESTERN PACIFIC (Chinandega, León)	17.1	12.1	- 5.0
EASTERN PACIFIC (Granada, Masaya, Carazo, Rivas)	16.6	4.7	-11.9
CENTRAL (Boaco, Chontales, Rio San Juan)	8.5	1.1	- 7.4
NORTHWEST (Nueva Segovia, Madriz, Estelí)	10.5	1.5	- 9.0
NORTHEAST (Matagalpa, Jinotega)	14.0	2.8	-11.2
ATLANTIC	7.9	3.1	- 4.8

Source: Rossmann, et al., Sumario de los Recursos de Salud en Nicaragua, 1972, p.7

Table 4.9

Geographical Distribution of Ministry of Health Personnel Budget for Medical Services Subprogram (Health Centers) Nicaragua, Year 1975

	Medical Services Budget	C$ Per Capita	% Total Personnel Budget
Region I	1,239,384	3.52	13.0
Capitals	463,056	3.51	
Rest	776,328	3.53	
Region II	4,696,980	5.96	49.3
Capitals	3,705,984	6.30	
Rest	990,996	4.99	
Region III	457,824	5.65	4.8
Capitals	108,528	4.82	
Rest	349,296	5.97	
Region IV	537,912	4.13	5.6
Capitals	179,856	7.11	
Rest	358,056	3.41	
Region V	1,058,748	2.87	11.2
Capitals	418,104	2.32	
Rest	640,644	3.39	
Region VI	685,896	3.95	7.2
Capitals	251,232	4.88	
Rest	434,664	3.56	
Region Atlantic	848,568	5.34	8.9
Capitals	167,412	5.91	
Rest	681,156	5.21	
Total	9,525,312	4.64	100.0
Capitals	5,294,172	5.15	
Rest	4,231,140	4.13	

a Does not include 532,044 cordobas that could not be assigned to geographical regions.

Source: Nicaragua, Presupuesto General. Managua: Nicaragua, Ministerio de Hacienda, 1975

1,616,000 to 2,571,752, representing a 14.8% annual increase. The number of medical consultations in MOH health centers increased from 360,000 in 1971 to 432,572 in 1974, for an annual increase of 6.7%. Assuming an annual population growth rate of about 3%, this rate of increase in consultations represents some progress, if the statistics are accurate.

Table 4.10 demonstrates the inequitable distribution of Nicaragua's medical consultations. Only the Health Ministry has considerable concern with the rural population, yet the Health Ministry delivers only about 20% of the total medical consultations with approximately 5% of these representing departmental capitals. Therefore, approximately 55% of the people are receiving only 10% of the medical attention being given.

In 1974, the Health Ministry's medical consultations were divided as follows: maternal and child health: 49.3%, curative: 43.0%, tuberculosis: 5.4%, and venereal diseases: 2.4%. It is interesting to note that the rural mobile units (PUMAR) dedicated a higher percentage to curative services (55.5%). Nursing visits to homes were distributed in this manner: healthy children: 36.7%; sick children: 33.5%; pregnant women: 19.8%, and adults (communicable diseases): 10.0%. PUMAR's distribution was: healthy children: 31.4%; sick children: 24.9%; pregnant women: 23.3%; and adults (communicable diseases): 20.4%, reflecting a somewhat greater attention to curative than preventive services.

In evaluating health centers, the Practical Concepts, Inc., study examined the service distribution among curative services, preventive services, and services delivered outside the health center (Table 4.11). One important finding is that only minimal attention is given to services outside the health center (9.4% of all services). Since health needs in the rural population are not well represented by service demand, health centers should dedicate a major part of their resources to seeking out high risk persons in the community. Another notable observation is that only the small (Type III) health centers emphasized preventive services over curative services, while the large (Type I) and medium (Type II) centers divided their activities about equally between prevention and cure.

Table 4.10

Organizational Distribution of Physician Hours and Consultations, Nicaragua, 1971

Agency	Physician Hours	Physician Consultations	Consultations Hours	Cx/100 Popul.
MSP	101,360(29.6%)	360,000(19.9%)	3.6	19.2
JNAPS	76,000(22.2%)	461,403(25.5%)	6.1	24.6
INSS	155,000(45.3%)	930,738(51.4%)	6.0	738.7
NATIONAL GUARD	2,316(0.7%)	13,920(0.8%)	6.0	
PRIVATE	7,648(2.2%)	45,888(2.5%)	6.9	
Total	342,324(100%)	1,811,949(100%)	5.3	

Source: Nicaragua Ministry of Health, Health Plan. Managua: 1975, p.47

Table 4.11

Analysis of Health Services Provided in Health Centers, Nicaragua, August 1973

Type Center/ Location \ Services	Services in the Clinic: Curative #	Curative (%)	Preventive #	Preventive (%)	Services Outside the Center #	Services Outside the Center (%)	Total of Cols. 1, 2, 3 (All 100%)
Type I (large) n = 3							
Somotillo	1321	(49.5%)	1350	(50.5%)	0	(0%)	2671
Bluefields	2038	(50.5%)	1704	(42.2%)	295	(7.3%)	4037
Puerto Cabezas	598	(30.0%)	959	(48.0%)	439	(22.0%)	1996
Subtotal	3957	(45.5%)	4013	(46.1%)	734	(8.4%)	8704
Average	1319		1338				2901
Type II (Medium) n = 7							
San Lorenzo	103	(23.3%)	319	(72.2%)	20	(4.5%)	442
Teustepe	128	(23.8%)	280	(52.0%)	130	(24.2%)	538
Posoltega (Sept. 1973)	486	(31.6%)	1041	(67.7%)	10	(0.1%)	1537
Sta. Teresa	2429	(59.2%)	1154	(28.1%)	520	(12.7%)	4103
Tipitapa	584	(31.4%)	649	(34.9%)	629	(33.8%)	1862
San Rafael del Sur	870	(81.0%)	189	(17.6%)	15	(1.4%)	1074
La Concepcion	522	(22.6%)	1529	(66.2%)	258	(11.2%)	2309
Subtotal	5122	(43.1%)	5161	(43.4%)	1582	(13.5%)	11,865
Average	854		860		226		1,695
Type III (Small) n = 8							
Sto. Tomas del Norte	167	(27.2%)	447	(72.8%)	0	(0%)	614
La Conquista	149	(79.7%)	38	(20.3%)	0	(0%)	187
Telica	932	(26.9%)	2338	(67.4%)	197	(5.7%)	3467
Mateare (May 1973)	457	(27.1%)	1159	(68.7%)	71	(5.7%)	1687
San Francisco del Carnicero	48	(6.8%)	600	(85.0%)	58	(8.2%)	706
Catarina	272	(82.2%)	56	(16.9%)	3	(0.9%)	331
Tisma	250	(75.5%)	80	(24.2%)	1	(0.3%)	331
Palacaguina (Special) (July)	135	(19.7%)	539	(78.8%)	10	(1.5%)	684
Subtotal	2410	(30.1%)	5257	(65.7%)	340	(4.2%)	8007
Average	301		657		42		1001
Total all Centers	11,489	(40.2%)	14,431	(50.5%)	2,679	(9.4%)	28,599

Source: Lawrence Posner and Michael Dalmat, Evaluation of Loan to Nicaragua for Health Centers, Washington: Practical Concepts, Inc., 1973, p. 4.4

4.2 Evaluation of Service Coverage

The scarcity of personal health services in the rural areas is well demonstrated by the ratio for medical consultations to population. In Table 4.12 this ratio is compared for departmental capitals and outside these capitals. As discussed above, few Nicaraguan municipalities and towns other than the departmental capitals are truly urban areas in terms of their population and health systems. This analysis points out the concentration of medical consultations in the capitals. While Region 2 (Managua) delivered about six consultations for every 10 persons in the non-capital population, the remaining regions delivered only from 1 to 2.5 per 10 persons. Considering the prevailing pattern that about 4 of 10 consultations are repeat visits, the actual coverage is even less than the ratios cited above.

The low personal health services coverage is explicity recognized in the MOH's most recent attempt of health system diagnosis (1974 plan) which states that only about 15% of the pregnancies receive some type of care from a formal health institution, and only about 20% of the children under five receive some type of service.

The following summarizes the health education services delivered in 1974 at health centers and by PUMAR mobile units. One should recall the previous observation that health educators were concentrated in the larger health centers.

Mothers Clubs Organized	166
Mothers Participating	3,833
Other Groups Organized	537
Participants in these Groups	8,057
Courses Presented	495
Participants in Courses	8,950
Personal Interview	103,245
Presentations	22,036
Movie Projections	1,293
Persons Attending Movies	31,723
Educational Materials Supplies	3,688

By adding the participants in each of these educational services, we can estimate the number of persons reached. Obviously, this is an over estimate, since the same person quite often participates in more

Table 4.12

Coverage of Medical Consultations by Geographical Regions, Nicaragua

Area	Population	Medical Consultation (Health Ministry+JLAS)	Consultations per Year Per 100 Population
Region 1	351,974	105,052	29.8
Capitals	132,091	81,644	61.8
Rest	219,883	23,408	10.6
Region 2	787,023	553,587	70.3
Capitals	588,356	433,615	73.7
Rest	198,667	119,972	60.4
Region 3	81,002	16,296	20.1
Capitals	22,523	1,144	5.1
Rest	58,479	15,152	25.9
Region 4	130,261	34,857	26.8
Capitals	25,301	31,931	126.2
Rest	104,960	2,926	2.8
Region 5	396,279	68,323	18.5
Capitals	180,378	44,111	14.5
Rest	188,901	24,212	12.8
Region 6	174,047	41,448	23.8
Capitals	51,993	20,514	39.5
Rest	122,054	20,934	17.1
Atlantic	159,002	41,791	26.3
Capitals	28,343	19,665	69.4
Rest	130,659	22,126	16.9
Total	2,052,588	861,354	42.0
Capitals	1,028,985	632,624	61.5
Rest	1,023,603	228,730	44.7

than one service, or in the same service more than one time. Nevertheless, the estimate of 155,808 persons receiving MOH educational services in 1974 is low when one considers that the fertile age women (15-49 years) in rural areas numbered about 218,000 and a population in excess of 1,100,000. From another perspective according to this estimate of persons receiving health education services only about 4 persons receive health education services for every 10 that receive medical consultations (432,572 MOH medical consultations delivered in 1974.)

4.3 Evaluation of Effectiveness

Optimal studies of the effectiveness of the personal health services delivered to Nicaragua's rural population would link these services directly to a variety of health status measures, e.g. ability to carry out one's normal daily functions, as well as morbidity and mortality. But studies of such sophistication are scarce, and little or nothing has been done in these terms in Nicaragua. Thus, our discussion is confined to gross measures of effectiveness, particularly to age and cause-specific mortality rates.

Comparisons of Nicaragua's mortality statistics with those of other Central American countries (See Table 4.13) demonstrates that Nicaragua generally ranks better than Guatemala and Honduras but often lags behind Panama, Costa Rica, and El Salvador. Maternal and childhood mortality are usually good indicators of the availability of effective personal health care services. Other indicators include mortality rates from ineffective and parasitic diseases. High mortality rates in these groups denote problems that are characteristically concentrated in the rural and urban poor.

Although the officially reported infant mortality rate for 1969 was only 45 per 1,000 live births, special studies by CELADE of the high level of sub-registration of infant deaths result in an estimated rate of 146 per 1,000 live births, and similarly the maternal mortality rate was estimated at approximately 280 per 100,000.

Perhaps what illustrates most clearly the ineffectiveness of basic personal health services is the observation that the primary causes of death in children and at childbirth are preventible. Four of the five

Table 4.13

Comparison of Mortality Data for Central American Countries - 1969

Mortality / Country	Maternal Mortality Per 10,000 live births	Infant Mortality Per 1000 live births	Mortality per 1000 Population 1-4 Years	Selected Causes of Death Per 100,000 Population			
				Enteritis & Other Diarrheal Diseases	All Other Accidents	Mal-Nutrition	All Ineffective and parasitic diseases
El Salvador	9.0	52.4	13.1	93.2	20.4	18.4	187.1
Costa Rica	13.6	56.5	5.0	83.4	23.4	19.1	102.5
Panama	13.6	37.6	8.2	49.5	23.9	6.8	103.3
Nicaragua	16.4	45.0	8.7	144.3	38.6	5.7	232.6
Honduras	17.2	39.5	12.0	95.6	No Data	12.8	180.5
Guatemala	20.5	84.1	30.7	391.8	29.1	56.7	562.2

Source: Pan American Health Organization. Health Conditions in the Americas, 1969-1972, Washington, 1974

principal causes of infant death fall into the preventible category -- 1. enteritis and other diarrheal diseases; 3. tetanus; 4. pneumonia; and 5. other respiratory diseases (including acute bronchitis, emphysema and abscess of lung, pleuristy, pneumoconioses, etc.) For the 1-5 year old population, all five principal causes are preventable: 1. enteritis; 2. measles ; 3. other infections and parasitic diseases; 4. bronchitis, emphysema and asthma; and 5. malnutrition. While the occurrence of some of these diseases may not be preventable, certainly timely health services should avoid many deaths by these causes.

One of the few sources of morbidity data in Nicaragua is for notifiable diseases. While the quality of this data is also very poor due to gross under-reporting, the results do demonstrate unnecessarily high rates that reflect problems in the health services delivery system.

The 1970 data show morbidity rates per 100,000 population as follows:

1.	Malaria	1,348.8
2.	Amoebic Dysentery	189.8
3.	Gonococcal Infection	121.6
4.	Tuberculosis	97.5
5.	Syphilis	73.1
6.	Bacillary Dysentery	63.9
7.	Measles	60.5
8.	Whooping Cough	19.6

The subject of the quality of health services is complicated by conceptual and measurement difficulties. Preferably quality would be measured in output terms, i.e. whether the services effectively reduce the level of ill health. As already mentioned, no such effectiveness studies exist. Input evaluation, however, has been employed to estimate services quality. The assumption is that for example, better trained manpower or manpower working with better equipment produces a higher quality services. The above discussion of the equipment and supply deficiencies that characterize the MOH health centers, along with the later discussion of the inadequate training and supervision of health center personnel, points to low quality services.

4.4 Evaluation of Administrative Support

The low effectiveness and coverage of personal health services in the rural population is closely related to a series of administrative and organizational deficiencies. A fundamental problem is the lack of planning based on the identified health needs of the population. Also important are problems in financial, personnel, and physical resources management. There is little coordination between the national and local level and among organizations. Finally, the potential contribution of the community's resources is not mobilized through mechanisms of community organization.

4.4.1 Personnel Management. A characteristic of good administration is a staff performing at a high level of productivity. Table 4.14 shows the 1973 physician productivity in health centers (number of consultations per physician hour) by geographical regions. In all regions except Managua, the average productivity was less than three consultations per hour. In Regions 3, 4, and 5 the productivity was even less than two consultations per hour. These productivity levels are very low, since the usual norm is 4 to 6. The common explanation for this low productivity is that the patient demand is low. However, assuming low demand in most health systems when patients are seen quickly, inexpensively, and effectively, the demand for services is usually greater than the ability of the staff to provide them. From an organizational perspective, however, it appears that the problem is the failure of the system to require the physician to meet the community health needs in spite of low institutional demand. For example, available time could be spent in house-to-house screening campaigns. Employing a low norm of five consultations per hour the opportunity cost of the existing low productivity may be estimated at 221,506 consultations.

Another personnel problem that reflects poor management in the Health Ministry is the absence of a physician in the health center for long periods of time. During the first semester of 1975, 25 (21.7%) of 115 health centers were without a physician for at least two months. Ten (8.7%) did not have a physician during the entire six months! The Health Ministry does not employ personnel practices designed to avoid such problems, such as "floating physicians to substitute for those on vacation or authorized leave, or assignment of one physician to more than one health center and rotation between the centers or the use of qualified nurse practitioners.

Table 4.14

Physician Productivity in Health Ministry Health Centers, Nicaragua, 1973

Productivity / Region (UNASEC)	Physicians (a)	Physicians Hours Year (b)	Consultations/ Year (c)	Productivity (c)/(b) (d)	Potential cx. minus actual Consultations (Norm 5/hrs) (e)
1	30	21,708	52,515	2.61	47,985
2	59	40,200	170,012	4.23	30,988
3	11	8,576	11,308	1.45	27,552
4	15	11,524	15,840	1.91	25,700
5	23	17,152	39,853	2.81	31,167
6	19	14,740	23,097	1.66	46,583
Atlantic	11	8,040	16,609	2.95	11,531
Total	168	121,136	329,234	2.99	221,506

Source: Nicaragua Ministry of Health, Statistics

While there is little information available to estimate the productivity of other health manpower, the generally accepted evaluation is that their productivity is also low. A basic problem is the insufficient supervision. The physician should supervise the rest of the health center team but since he seldom works full-time and often is not there, there is only minimal day-to-day supervision. Furthermore, the Health Ministry supervisory program has not been well-implemented, and supervisor visits have been the exception rather than the rule.

Another problem is the inadequacy of the health center staff's training vis-a-vis the health needs of the rural population. Until recently, neither the medical nor nursing curriculum paid sufficient attention to the public health courses, and specialized training outside the country has been minimal. The rural health centers are largely staffed by recent medical graduates serving their obligatory six months social service. Yet these doctors have not had the benefit of previous training orientated to the spectrum of problems that they will encounter. This is also the case for nurses who receive training designed primarily for hospital care and with little attention.

4.4.2 Management of Physical Resources. The previously mentioned problems of poor facility maintenance, inadequate drug supply, inadequate medical supplies, inappropriate and poorly maintained equipment, and lack of transportation services point out another administrative failure -- poor physical resources management. Actually, there is no one on the health center staff to perform this function. The responsibility falls on the physician director, but typically he is neither trained nor motivated to establish and operate an efficient administrative system for physical resources. Few health centers have an administrator to perform such functions, and no training programs are available for such a personnel type. At the national level, the Health Ministry has done little to establish supply and maintenance systems for the health centers, with the notable exception of the CAM drug distribution system. CAM represents the potential to help the health centers, but the Health Ministry participation in CAM has been sporadic and low key.

4.4.3 Financial Management. Two fundamental aspects of financial management are the budgeting process and the accounting system. Budgeting is one of the weakest links in the Health Ministry chain of administrative activities. The health centers have little or no participation in formulating their budgets; instead at the national level the

Health Ministry appears to set the health center's budget using simple, "across the board" increments. In other words, the budget of the previous year is increased by a given percentage.

Basically, the problem is that the health center director has little control over the performance of his health center. He is not in a decision-making position whereby he can plan a program to attack the priority health problems in the assigned communities, because he has few resources and no real Health Ministry mechanism for increasing them. Budget preparation does not usually include the input of health center personnel or the size of the epidemiological or health problems facing one clinic versus another. This underlines the importance of the following discussion of community organization to support the health center.

The rudimentary accounting system utilized in the health centers is unsatisfactory since it results in little control. An example, which is well documented in the Practical Concepts, Inc., evaluation, is the poor accounting practice employed in the health center for recording and controlling the financial transactions concerning drug sales to patients. The result was that it was difficult, if at all possible, to account for a large percentage of the medicines supplied by AID.

4.4.4 Community Organization. In order for the community to organize to support the health center, it must perceive the services of health center as beneficial to its population. One of the first studies in Nicaragua of community attitudes towards health centers was conducted as part of the Nicaraguan Health Sector Assessment and the findings are expected to become available at a later date.

With the exception of the large health centers in urban areas, there are a few Community Boards that direct a health center. Generally, the center is seen by the community as an extention of the MOH in Managua and that the MOH maintains control from the national level. It is unfortunate that such Boards do not play a greater role because of their potential in generating community support and in managing the health center's operations.

4.5 Improving Personal Health Services in Rural Areas

The above diagnosis of the personal health services in the rural areas demonstrates problems of tremendous magnitude that can only be solved by some rather drastic changes in the existing system. The needed changes come under three headings: personnel training, community organization, and administrative support. The purpose of this section is to suggest a series of actions in each area that seem relevant to the Nicaraguan situation.

4.5.1 Personnel Training. There is growing evidence from a variety of Latin American countries that three levels of personal health services are appropriate to the personal health needs of the rural population. At the most basic level, it is necessary for a health promoter to visit homes to seek out the sick, and persons at high risk to becoming sick, and to deliver preventive services (e.g., immunizations and health education). The second level of care should be at the health center or health post that receives referrals from the health promoters, as well as attending the community's demand for services. The appropriate manpower at this level is the nurse practitioner whose duties focus on attending the most common causes of morbidity, and managing the health promoters. With this substitution of nurse practitioners for the physicians at the health center level, it becomes important that a third level -- the regional hospital -- be part of the system. Here the physicians receive the referrals from the health centers.

Health Promoters. The health promoter is the extention of the rural health team into the community. This extention is necessitated by the general failure of rural populations to demand preventive and early treatment services at health institutions. Also, information is needed on the health needs of the community, and this requires periodic home visits. The health promoter should be a respected member of the community in which he works, so that he may gain access to people. This is one advantage of employing such indigenous health practitioners as the curandero and the partera empirica.

A Rural Health Promoter is usually 18 to 50 years of age and have completed the third grade of primary school. This person must be acceptable to the community and demonstrate a capacity to learn and initiate activities.

In general the promoters' activities will center around care for children and pregnant women and basic first aid and simplified medicine. In addition, preventive care and diagnosis of communicable diseases, nutrition and health education will constitute the promoters' health center tasks.

It is estimated that one health promoter can cover a population of 1,500 persons (about 200 families at average family size of 7.4). To cover the non-departmental capital areas in Regions 2 and 5, an estimated 240 health promoters will be needed.

It is highly recommended that the health promoters be allowed to receive compensation for their services, and that they be allowed to see patients (at their request) in the health center. A small cash payment or viatico for training could provide an important additional incentive that may help minimize turnover. One must remember that these health promoters quite often are not only semi-independent and need to provide for themselves at least a part of their subsistence, but also have people (younger brothers and sisters, aging parents) who are at least partially dependent upon them. The right to see patients in the health center provides an added incentive to the curanderos and parteras empiricas.

Nurse Practitioners. The placement of nurse practitioners in health centers means that the scarce physicians may be employed more efficiently at the regional hospitals and a few large health centers. Since the nurse practitioner will refer to these facilities those patients needing physician services (estimated at 5 to 10 percent of the patients seen by the nurse practitioner), the physician will dedicate his attention to those people who most need his high-level medical knowledge and skills. In turn, the nurse will care for the bulk of the common causes of morbidity, as well as preventive services, that may be effectively attended by routine and simple services.

Two alternative strategies appear feasible for the training of these nurse practitioners. The graduate nurses presently working in health centers could be given additional training to become nurse practitioners. Or auxiliary nurses could be trained for this position. In 1971, there were 55 graduate nurses working in Ministry health centers or PUMAR mobile units; however, most were concentrated in the large health centers in urban areas. While training these graduate nurses to be nurse practitioners may well be a recommended first step, in the long term it

is doubtful that the supply of graduate nurses will be sufficient to fill the needs of the rural health centers. In contrast, nurse auxiliaries work in all of the health centers, and are usually from the area in which the health center is located. While the nurse practitioner training course using nurse auxiliaries would have to be much more extensive than for graduate nurses, the investment would probably gain higher returns in terms of coverage of more health centers and lower turnover.

Approximately thirty-five (35) nurse practitioners would be needed for the existing health centers outside of the departmental capitals in Regions 2 and 5. This number will increase once decisions are made on the need for additional health centers or for nurse auxiliaries in some of the existing health posts.

The nurse practitioner will be responsible for almost all of the basic curative care at the health center. In addition she will carry much of the management and administrative duties including pharmacy supervision and chemistry epidemiology. The nurse practitioner will coordinate all other health personnel at the center.

4.5.2 Community Organization. The selected mechanism for community organization to support health centers and health promoters and initiate health projects is the Community Health Committee (CHC). The Committee will be the basic supervisory and leadership unit for the health sector at the local level. About 39 committees will be needed in the target area. This number represents one committee per municipio; more committees will be needed in later stages to more efficiently cover the scattered villages of the larger municipios. Members of the committee will be initially chosen by local officials to include health, education, and religious leaders or by village vote. These committees will be responsible for supervising and assisting all health workers and health activities to include the initial and continuous analysis of community health problems with the assistance of the local health promoter and health educator, who will decide on feasible courses of action, and generate community resources to achieve solutions to health problems.

A major product of the community health committee's efforts will be community action projects (wells, latrines, health posts, vaccination campaigns, gardens, etc.) which enlist the active participation of a large number of citizens.

The following description of the Community Health Committee was established in 1975 as Health Ministry policy:

The Community Health Committee is a voluntary group of persons representative of the community, elected by the community, which accepts responsibility for community health care collectively developing coordinated activities with health personnel and their affiliated institutions.

Objectives.

1. Serve as a coordination mechanism and as a link between the health services and the population.
2. Determine with the represented population the real health needs and promote solutions utilizing active community participation.

Organization.

1. Community Health Committee is promoted and advised by the health personnel, especially by rural health promoters, which constitute its permanent collaboraters.
2. Constituted by five persons: president, secretary, treasurer, and two directors.
3. Usually names a subcommittee to organize and develop specific tasks.
4. The geographic and demographic radius of action is variable but there should be a committee for each locality with at least 500 inhabitants.
5. It is recommended that Departmental coordinating Committees be established with representatives from each local committee.

Project Categories for Community Health Committee.

1. Environmental control.
2. Immunizations.
3. Refer pregnancies to health center.
4. Community development.
5. Recreational activities.
6. Coordinate with other CHC.

4.5.3 Administrative Support. A well-developed planning process is essential for the success of an improved personal health services system in the target area. At the national level, a competent planning group must be formed and given the charge of developing a comprehensive plan. The members should be limited to four or five health professionals, with sufficient technical and administrative support staff. Two of these members should be the Regional Directors of Rural Health Services (discussed below). At least one of the other health professionals should be dedicated full-time to this project. The selection of those members is crucial to the success of the rural health project. All of these professionals must be given an intensive, 4 to 6 month course in health system analysis, planning, and budgeting.

This planning group's activities should commence with a detailed analysis of health status, health services and health resources, and population characteristics and attitudes of the Region 2 and 5 target population. The Nicaraguan Assessment data should provide the basis for this problem identification activity. With this baseline data, specific goals and objectives should be set with the participation of the top health policymakers from the target area and at the national level. Next is the programming activity, which should be the principal concern of this planning group. Much attention should be given to innovative programs, and support must be available for controlled field trials to test such system changes. Resource and service objectives must be set in the most disaggregated manner that is feasible. The training of personnel and the acquisition and distribution of supplies, drugs, and equipment must be programmed. Detailed program budget must also be prepared. Finally, the planning group should periodically evaluate the progress toward obtaining the expressed goals and objectives.

These planners must carry out these activities with the close participation of the health personnel and representatives of the Community Health Committees in the target area. Political and community support must be obtained at each stage of the planning process in order to promote implementation of the plan.

4.5.4 Organization. Managerial support will also be needed at the national, regional, and local level in order to overcome the serious administrative problems that have become characteristics of the Nicaraguan health sector.

At the national level, it is recommended that the Health Ministry establish a new section -- Department of Rural Health Services -- to direct the proposed programs. This department should be directly responsible to the Director General. A detailed study of the present Health Ministry organization chart should be made to determine the effects of creating this new department on the rest of the organization.

In order to promote the implementation of the changes recommended in this chapter, it will be necessary to establish a new administrative level in the Health Ministry -- the regional director. Both Regions 2 and 5 should have a Regional Office of Rural Health Services, with a Director. The full-time Director would be responsible for the planning, administration, training, supervision, and other activities necessary to establish and operate the proposed rural health services program. Although he will coordinate his activities closely with the Health Ministry Department of Rural Health Services, much of the operational responsibility of the national level will be delegated to the Regional Director. One of the primary tasks at this level will be to establish systems that will meet the resource needs of the participating hospitals, health centers, health posts, and health promoters.

Finally, at the local level administrative support mechanisms should focus on the health center. While the nurse practitioner will have the primary administrative responsibility at this level, a health center administrator is recommended to permit the delegation of such activities as information collection and compilation, inventory control (except for drugs), and accounting practices. This administrator must receive a training course to prepare him in such areas. At the national level, manuals and norms should be prepared which detail the various administrative subsystems that may be performed routinely. Hospital administration is also badly in need of improvement in a similar manner, but it is questionable whether this innovation should be included in the present rural health services delivery program.

4.5.5 Preparation of Executive Administrators. This proposal for the preparation of executive administrators for a rural health services delivery program consists of recruiting fifteen (15) health professionals and giving them a six-month intensive course in executive administration. Only about five administrators will participate directly in the proposed Health Ministry Department of Rural Health Services, but this training opportunity is taken to generate health executives to operate in other

organization and programs. Participants must be carefully recruited so that they are capable of completing the course and are motivated to accept an executive position within the public health system. The six-month educational program should consist of three eight-week sessions, and should terminate with the presentation of professional certification in executive health administration by the Government of Nicaragua.

Recruitment procedures should be of two types: (1) for the health professionals that will work in the rural health services delivery program and, (2) other health professionals that will work in other high-level positions. All candidates must be committed to working in Nicaragua's public health system for at least three years after completion of the proposed course, and have already worked at least one year in this system at a level of high responsibility. Candidates must have demonstrated above average academic competence in their previous educational programs, and must hold a professional degree in medicine, nursing, sanitary engineering, or administration. Candidates must demonstrate through their work experience and in personal interviews a strong motivation to improve the health and development of the Nicaraguan poor population; to think in innovative terms about solving their principal health problems; and, to administer complex organizations.

At least seven (7) candidates must be highly motivated to working in the MOH rural health project, and at least two (2) of these must be motivated to work at the regional level, i.e., outside of Managua. These candidates must sign a commitment to accept a position with the Health Ministry for at least three years in the rural health project. Also, these seven candidates should demonstrate sensitivity to the needs of the rural population.

The remaining candidates must have worked or be working in one of the following organizations: JNAPS, JLAS, Social Security Institute, National Medical School, or National Nursing School. Health professionals of the National Guard may also be considered.

The recommended courses are as follows:

1st Session (8 weeks)	2nd Session (8 weeks)	3rd Session (8 weeks)
Epidemiology	Health Administration I	Health Administration II
Health Systems Analysis	Health Planning	Rural Health Services

Participants would be required to dedicate one half time to this program (conversely, no participant may hold another job for more than half time).

The suggested class schedule would be as follows:

Course I	-	Monday and Wednesday	2:00	-	5:00
Course II	-	Tuesday and Thursday	2:00	-	5:00

Friday from 2:00 to 5:00 would be reserved for field work and/or special presentations curriculum.

In all courses, the emphasis should be on balancing theory with practical exercises. Homework should be extensive and focus on extensive reading lists and practical case studies. Written reports on case studies should be given considerable attention, and both individual and group reports should be utilized by the Faculty.

It is strongly suggested that the faculty consist of out-of-country advisors brought to Nicaragua to teach a given 8-week course. These advisors should have advanced academic degrees in the areas being taught and also teaching experience. They must be able to present their classes in Spanish, and also have experience in health systems in Latin America. They should be paid for a 12 - week period to allow time before the first class to prepare the curriculum, as well as time afterwards to assist in the transition to (and planning for) the next session.

Furthermore, additional advisors should be available to provide short term assistance in teaching several specialized classes; for example a maternal and child health specialist to teach classes in the Rural Health Services course.

Classrooms space, secretarial assistance, faculty office space, texts and other reading materials, transportation, and other services must be programmed for this 6-month educational program.

Some type of formal, academic recognition must be bestowed upon the graduates of this educational program. This is necessary in order to provide proper motivation. The proposed course is difficult and its successful completion will require an investment of much time and energy by the participant. Without a high level of motivation the drop out rate will be high. More important, there is no precedent in

Nicaragua for an educational program in health of such rigor, thus the potential shock must be offset by this motivating factor.

Graduates of this program should be given professional certification in executive health administration by the Government of Nicaragua. The title "Especialista en Administracion de Salud" may then be used by the graduates, since this title has gained some acceptance in other Latin American countries. An appropriate certificate should be presented at commencement ceremonies.

CHAPTER 5

MATERNAL AND CHILD HEALTH AND POPULATION

5.1 Brief Description

Nicaragua presents a typical lesser developed country population pyramid and disease pattern for infants. Projected figures for 1975 indicate approximately 47% (1.0109 million) of the population (2.1681 million) is below 15 years of age, and approximately 21% (462,900) of the population are women in the child bearing years from 14-45 years of age. 1/ Recent census data indicates that 52% (1.129,000) of the population lives in rural areas, but 51% (558.8) of the women and 52% (523.3) of the 0 to 15 age group reside in the urban areas. There are approximately 84,000 live births per year. 2/ The crude birth rate is approximately 47 per 1000 population which results in a 3.4% population growth rate for the decade and a doubling of the population in 21 years.

Infant mortality figures have been estimated at approximately 120/1000, 3/ with the relative frequency of 4.1% at 0 days, 10.7% at 1-6 days, 14.4% at 7-27 days, and 70.8% at 1-11 months. 4/ This means that this age group accounts for approximately 23% of all deaths with the leading causes being the gastroenteria, perinatal, and respiratory diseases and tetanus. 5/ The 1-4 age group accounts for approximately 9% of all deaths with enteritis, measles, infectious and parasitic diseases, bronchitis, and mainutrition being the leading cause in this cohort group. 6/ The leading causes of morbidity closely

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1/ Roger Evan Bove, Unpublished consultant report, 1975.
2/ Leo Morris, Unpublished consultant report, 1975.
3/ CELADE
4/, 5/, 6/ Health Sector Analysis, Civil Registers, Dec. 1975. The study indicates that a large percentage of the rural deaths are unregistered.

parallel the mortality patterns indicated for the respective age groups.

INCAP studies in 1969 and 1975 indicate that malnutrition is a serious problem affecting mother, fetus, infants, and young children. The following levels of malnutrition are present:

Grade I	-	42% of children less than 5 years
Grade II	-	13% of children less than 5 years
Grade III	-	2% of children less than 5 years

These deficiencies no doubt contribute to the high morbidity and mortality statistics in this age group, and to retardation of mental and physical growth. Major inadequacies exists in maternal and child diets for protein-calorie-triglycerides and vitamins-minerals with Vitamin A, riboflavin, thiamine, niacin, iron, and iodine being of special importance.

The maternal mortality rate of 137 per 100,000 live births available from 1970 hospital data, has been estimated by CELADE to reach 280 per 100,000 live births when a correction for the under-reporting of the rural areas is included. This compares with a rate of approximately 19 per 100,000 in the United States. The reported abortion rate is approximately 10% of reported maternal deaths or 26 per 100,000.

The average number of children per family is 6.1. The desired family size is slightly above 3 children per family. 7/ (Four children per family for calculations). It is predicted from available data indicating high fetal loss that the average months required for each live birth is 21.3 months in 5 to 19 year age group, 14.8 months in 20 to 29 year age group and 17.7 months in the 30 to 44 year age group. 8/ In normal populations approximately 10% of the women are infertile and 30% are not sexually active. Utilizing this data it is estimated that approximately 12.9% of the fertile women (59,714) during the year 1975 are pregnant or trying to conceive, but 46.1% (213,396) women are sexually active and not trying to conceive. With the high rate of maternal mortality this represents an important group in need of effective coverage.

7/ Central Bank of Nicaragua, Fecundidad y Fertilidad, Managua: August 1975.

8/ Leo Morris. Unpublished consultant report, 1975

All governmental health agencies in Nicaragua have programs labeled as Maternal and Child Health (MCH) according to organization charts or assigned personnel. None of the governmental health programs have line item budgets for maternal and child health which are directly under the control of the assigned program chief, nor is the budgeting for maternal and child health activities decided on a programmatic basis. Maternal and child health activities account for approximately 65% of all Ministry of Health activities and approximately 40 to 45% of all hospital admissions. 9/

The Maternal and Child Health-Family Planning Program of the Health Ministry consists of: pre and post-natal control, family planning, medical and dental preventive and curative care, immunizations, nutrional education, supplementary feedings, health education, referral for child care or delivery, and home health visits. The formal goals of the program were established in 1969 and relate specifically to identifying groups at risk. The recent Plan de Salud, 1975 sets the following goals: to increase the number of maternal visits (prenatal, postnatal, family planning, etc.) from 89,746 to 744,320 by 1980; increase the prenatal coverage from 16% to 60% by 1980 from approximately 20,000 to 89,400 (including hospitals deliveries); increase the medical consultations from 39,300 to 357,600 by 1980; increase the coverage of the fertile age women with family planning services from 5.8% to 14% (25,223 to 71,680 women); increase by 3.9 times the present consultations for children from 205,284 to 781,860; increase the coverage of the infant cohort group from 40.6% (high estimate) to 70%; increase the coverage of the pre-school group from 12.7% to 50% or an increase from 72,043 to 352,300; maintain the coverage of the school population at 10% which signifies an increase from approximately 65,100 to 77,500 by 1980. These goals have been set without a clear definition of their relationship to their effect on morbidity and mortality, or the estimation of the fiscal or human resources necessary for their achievement.

The programs of the hospital system are not defined as specifically as the Ministry Maternal and Child Health Program and are primarily dependent on the interest and enthusiasm of the individual hospital staffs. In the case of the social security system (INSS) a strong family planning program exists in cooperation with AID throughout its clinics and hospital system. Because of its stronger financial position and

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9/ Nicaraguan Health Sector Assessment, December 1975.

better personnel, social security facilities possess the best obstetrical, gynecological, and pediatric services of the hospital system. Each separate departmental hospital system (JLAS) operate pediatric, obstetric, and gynecologic services, these rural hospitals are often lacking in the equipment and trained personnel to operate effectively basic survival pediatric services. The national hospital system (JNAPS) has increasingly stressed better pediatric and obstetrical procedures but lacks the budgetary strength to implement all the needed changes. There are approximately 555 beds allocated to pediatrics (December 1975) throughout the hospital system which represents approximately 12% of available hospital beds (4800). An additional 120 beds will soon be added but this still falls far behind the percentage of children in the population, 47% and the percentage of all deaths attributable to children, 37%. A noted deficit exists in the area of rehydration and pediatric emergency intensive care. 10/

5.2 Coverage

The Health Ministry estimates that Nicaraguan health agencies presently cover approximately 23% of mothers with prenatal visits (at least one), but of that number only 33% are seen before the 5th month, and of the 23% of mothers, only 35% are from rural areas while 65% are from urban areas. Of an estimated 86,000 deliveries approximately 383 occurred in health centers and 22,000 occurred in hospitals the remainder were attended by traditional parteras (an estimated 4,000) or by family members. Using Health Ministry Statistics, the Unidad calculated that approximately 48.9% (37,420) of children less than one year were seen at least once by Nicaraguan government health agencies (60.6% urban, 39.4% rural); approximately 11.3% of preschool children were seen which represents 58% urban and 42% of rural children; and 4% of school age children were seen in 1974. Unidad figures indicate that the coverage for the 0 to 1 age group in the rural area is approximately 15%.

The Family Planning Program currently operates from approximately 80 clinics of the Health Ministry, Social Security, the Moravian Church in the Atlantic Coast, and the Demographic Association of Nicaragua. Standard contraceptive services for women and men are available, and

10/ Ibid.

some 32,000 women are enrolled in the current programs, as of January 1975. The instituto Centro Americano de Administracion de Empresas (INCAE) has indicated from import and pharmaceutical records that private use of contraceptives closely parallels the use of contraceptives in the public sector. Therefore, approximately 64,000 fertile age women are now practicing continuous birth control. This represents only 14% of the women in the fertile age group and only 30% of the women sexually active who are not trying to conceive and presumably want family planning services according to the Central Bank study. These statistics approximate the findings in two recent surveys conducted by the Unidad team in 1975 and the Central Bank in 1974. To improve its current coverage the Health Ministry has begun the planning for the eventual training of 2,000 parteras in improved delivery, family planning, pre and post-natal care and basic first aid training. This will be accompanied by the distribution of oral contraceptives, condoms and basic medicines/instruments. This should greatly increase the coverage of the population in the rural areas, towards the goals stated in the Plan de Salud, 1975.

The Health Ministry assigns some 183 physicians (one hour daily), and some 71 nurses (two hours daily) and the full time assistance of some 251 variably trained auxiliaries (six hours daily) to maternal and child health activities. 11/ This represents some 229 person years from maternal and child health activities. In total the Health Ministry has some 800 person years for all types of services pertaining to preventive and curative medicine which could be tapped for maternal and child health services.

An expert Pan American Health Association Guatemalan Planning Team established the number of hours necessary each year to provide the basic preventive and curative health services as 3,020 hours/ 1000 population. This did not include disaster relief activities which predominantly involve the health sector and should be included as an important part of planning in Central America. Of the total number of hours, approximately 2,670 hours could be assigned to maternal and child health, family planning, and gynecological activities, for example, 70% population but 88% of the hours. This figure appears applicable to other Central American countries with similar morbidity and mortality figures. Nicaragua has higher figures in several key areas;

11/ Ibid.

therefore, the figures should be comparable. 12/

These approximations (Tables 5.1 and 5.2) are evidence of the magnitude of the gap that exists in providing all types of health services, especially in the rural areas. Since maternal and child health, family planning and gynecological-pediatric services were found to consume some 88% of the hours in the Pan American Health Organization Guatemalan Study, the gap for total services approximates the gap in coverage for maternal and child health which could not be filled by either current Health Ministry personnel or by recruiting all the formally trained health workers in Nicaragua. Despite the present plans to expand the training of formal health professionals, the gap will grow greater with the increased population pressure.

A Health Ministry personnel manpower efficiency study in 1974 indicated that the average health center was operating at about 40% capacity in terms of patient visits per medical hour (standard of 6 patients per hour). These visits per hour included all administrative problems such as personnel deficiencies, etc., and nursing hours (standard is 8 patients per hour). 13/ The improvement of the administrative and patient care efficiency of the Health Ministry personnel

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12/ Calculation of the Nicaraguan health personnel needed is as follows: Assume that 3020 hours of preventive and curative health services are needed per 1000 population. Assume also that the population of Nicaragua will increase from 2,220 million (estimated) in 1975 to 2,560 million in 1980 and 3,003 million in 1985. Then, the number of health hours needed would be: 1975: 6,644,000 hours, 1980: 7,731,200 hours, 1985: 9,069,060 hours. We convert to person-years by assuming eight working hours per day and 220 working days per year. The number of person-years needed would amount to the following: 1975: 3775 person - years, 1980: 4393 person - years, 1985: 5153 person- years.

13/ Nicaragua Health Ministry- PCI Personnel study, 1974

Table 5.1

Projected Deficit in Health Workers, Nicaragua, 1975 to 1985

Health Worker Deficit / Year	Projected Population 000 (a)	Required: Total Person Years (b)	Available: Physicians (c)	Available: Nurses (d)	Available: Total Person Years (e)	Deficit of Person Years (f)
1975	2,200	3,775	1,292	544	1,836	1,939
1980	2,560	4,393	1,500	850	2,350	2,043
1985	3,003	5,153	1,850	1,150	3,000	2,153

Notes: Column (b) assumes 3020 preventive and curative hours per 1000 population and 1760 hours per year per worker. Columns (c), (d), and (e) project Inter-American Development Bank statistics, not considering administrative positions and non-practicing situations. Column (f) is the difference between columns (b) and (e) and does not include hours for administration, vacations, sickness, training, transportation, etc.

Table 5.2

Regional Deficit in Health Workers, Nicaragua, 1975

Health Worker Deficit / Area	Projected Population 000 (a)	Required: Total Person Years (b)	Available: Physicians (c)	Available: Nurses (d)	Available: Total Person Years (e)	Deficit of Person Years (f)
Pacific (Regions 1, 2 & 3)	1,310	2,248	1,086	441	1,527	721
Interior (Regions 4, 5 & 6)	720	1,235	167	60	227	1,008
Atlantic (Regions 7 & 8)	170	292	39	43	82	210
Total	2,200	3,775	1,292	544	1,836	1,939

Notes: Column (b) assumes 3020 preventive and curative hours per 1000 population and 1760 hours per year per worker. Columns (c), (d), and (e) are based on projections by UNASEC of traditional health professionals. Column (f) is the difference between columns (b) and (e) and does not consider loss of effectiveness for dispersed populations.

represents an area for immediately extending the coverage of the population. This, however, remains a short term, minor solution to the obvious personnel shortage and resultant inadequate coverage which the Health Ministry and consultant personnel from Pan American Health Organization see best solved through paramedical personnel.

5.3 Analysis of Effectiveness

The unreliability of previous data makes evaluation of program effectiveness difficult, if not impossible. In previous years, statistics were inadequately gathered and tabulated, and at times prefabricated, as can be seen in the budget requests which show predicted service outputs for the upcoming year becoming "actual" service outputs in subsequent budgets without a change in units. The present information system has improved in its methodology as a result of assistance from CELADE, Pan American Health Organization, U.S. Center for Disease Control, and the addition of a highly qualified Nicaraguan government epidemiologist, but the problems of sufficient and accurate inputs into the central system need additional attention.

The following statistics in Table 5.3 indicate the problems of trying to determine the effectiveness of the maternal and child health program in global (epidemiological) or in service output terms.

During the period 1968-1974 there was no unified system of statistics for health agencies or no continuity of epidemiological methodology within the separate health agencies. This makes objective statistical determinations of effectiveness extremely difficult.

Positive indicators of effectiveness are the mortality figures for 0-1 year which decreased by 4.7%, and the 1-4 years which decreased by 5.3% between 1969 and 1974 according to Bureau of Records Statistics. An increase by 100% of the number of family planning users between 1970-1974 gives an indirect causal relationship for effectiveness, as do recently conducted surveys (Fecundidad y Fertilidad, 1975) which indicate nearly 27% of Managua's fertile age population utilize some form of birth control.

From this imperfect data base the statistical impression is that the Nicaraguan government health agencies have not been extremely effective in providing sufficient services or in significantly reducing the epidemiological proportions of the major health problem. These

Table 5.3

Comparison of Health Statistics from Various Sources, Nicaragua, 1968 to 1974

Indicator \ Year	1968	1969	1970	1972	1973	1974
Maternal Mortality Rate			137/10,0000			280/100,000 [b]
Infant Mortality Rate	55.2/1000					+120/1000 [b]
Mortality related to Enteritis				16.2% [c]	18.68% [e]	16.5% [h]
Pre Natal "Inscritos"				15,671 [e]		19,554 [e]
Infant "Inscritos" (1)			39,613 [d]			40,672 [e]
Pre School "Inscritos" (1-4)			39,630 [d]			19,661 [e]
School "Inscritos" (5-14)			44,919 [d]			31,560 [e]
Family Planning Actives			16,448 [f]	27,737 [e]	36,065 [e]	29,055 [f]
Family Planning Actives Predicted						(46,036) [e]

Sources:

a. República de Nicaragua, Health Statistics, 1970

b. CELADE adjustment, 1970-1973.

c. República de Nicaragua, Health Statistics, 1968

d. Pan American Health Organization, Quadrennial Projections for Nicaragua, 1972.

e. Nicaragua Ministry of Health,

f. Nicaragua Ministry of Health, Yearly Family Planning Statistics, 1970.

g. Nicaragua Ministry of Health, Monthly Family Planning Statistics, January 1975.

h. Nicaraguan Health Sector Assessment, December 1975.

statistical impressions are strengthened by the subjective assessments of most Nicaraguan health officials who feel that most Nicaraguan health agencies have never fully recovered from the severe setback inflicted by the earthquake which greatly disrupted health sector services (loss of all inpatient and outpatient facilities for Managua), administrative capabilities (loss of all central facilities and most records), and financial facilities, and in addition diverted the majority of subsequent health resources toward rehabilitating the health infrastructure of Managua. It appears that in general terms the Nicaraguan health programs at best have made great strides in effectively controlling the problems and reestablishing the services related to earthquake devastated Managua but have been unable to effectively deal with the health problems to include maternal and child health for the remainder of the country.

5.4 Analysis of Infrastructure Problems

At the operational and administrative level the Nicaraguan health agencies have oriented their MCH activities along institutional lines rather than along programmatic lines. Therefore, much like the United States, maternal and child health services tend to reach their level of effectiveness more as a result of institutional emphasis (hours of clinics, personnel or service time) than as a result of some finely turned centralized program which focuses on specific maternal and child health problems. At the planning level maternal and child health activities are included in nearly every institutional budget and are part of almost every dialogue involving inter and intra-institutional allocation of resources. Thus, even in the absence of a national or institutional strategy to attack maternal and child health problems, resources are made available on the basis of "successive limited comparisons" from previous years activities. This type of planning has resulted in the allocation to maternal and child health services of approximately 65% to 70% of the preventive and curative services of the Health Ministry and 40% of the services of the hospitals.

It appears that the system of maternal and child health activities planned along institutional lines arose from the relative ease of administration/coordination and the low priority of program planning in response to epidemiological patterns.

The Health Ministry is the only Nicaraguan government health institution which specifically designates a maternal and child health section as part of its organization chart. The maternal and child health section is designated as a subprogram of "Promocion de la Salud" and is not listed under such divisions as "Proteccion de la Salud" or "Atencion Medica" which are responsible for many of the preventive and curative activities in the program. This apparent problem of institutional hierarchy is resolved at the level of the Director General and the governing "Technical Council" which integrates all "program type activities" into the institutional "outlet" units such as health centers, health posts, mobile centers, etc. The planning capability, lobbying power, institutional development capacity and resources of the maternal and child health section of the Health Ministry have a minimal effect on the ultimate structure of functioning of the maternal and child health program through the institutional outlets of the Ministry. The maternal and child health section concentrates on defining the scope of coverage and devotes little attention to resource development or allocation. This section does not receive a separate budgetary allocation for promotion of its activities nor has it benefited from a full time staff, and therefore program leadership has not been strong.

This infrastructure pattern is repeated for the hospital system in general, but the problems related to a deemphasis of central planning are aggravated by the absence of a specific maternal and child health section in the official institutional structure which is similar to many U.S. health centers and medical centers. Problems and programs of maternal and child health are elaborated through traditional departments of pediatrics, obstetrics, and gynecology. Subsequently, maternal and child health activities depend on the personal charisma of department chiefs, where they exist, and the demand patterns of the community to secure funding for operations. At present the institutional capacity and infrastructure is capable of covering only 24% of the births in Nicaragua which represents the optimum are of institutions and infrastructure capacity for maternal, child, and family planning hospital services. This coverage is not in all senses adequate for many hospitals are forced into utilizing inadequately trained nurses or auxiliaries to deliver babies or manage intensive care units.

At present some 60,000 plus births and 70% of the child care takes place outside the Nicaraguan health system. Only a small percentage of this unmet need is met through formal health professionals. In the

rural area formally trained professionals play an insignificant part in meeting these demands. Almost the entire health manpower service needs in the rural areas (see Table 5.2), approximately 80%, are met through variable skilled parteras and curanderos. Until recently there has been no attempt by the Nicaraguan health agencies to improve or incorporate this "majority body" of health care deliverers into the formal health system. Recently, through the AID sponsored Family Planning Program the Health Ministry is planning to train and assume administrative responsibility for the family planning and maternal and child care activities of some2,000 rural parteras.

The Family Planning Program represents one of the few programs with integrated activities which operates on a separate line item in the budget. This is to a large extent in response to AID Program Agreement arrangements with the Health Ministry and Social Security Institute. The programmatic approach of the Family Planning Program remains so even at the institutional "outlets" where separate family planning hours are assigned during the days. This has advantages in a health and social system which still does not fully appreciate the implications of population pressures on the country and the individual family. It also tends to limit the efficient and effective use of scarce resources, as many of the less flexible clinic and outlet personnel refuse to utilize family planning hours for sick patients or medical hours for family planning patients even though there is free time for other types of patients during scheduled clinic hours. To become more effective family planning activities must be integrated into every institutional "outlet" in the health system and become generally available to the population unreached by traditional health outlets. The Health Ministry has recognized this need and is planning to provide some 1,500-2,000 additional outlets through training parteras in the utilization of contraceptives.

To compound the problems in maternal and child health and family planning the international technical assistance from Pan American Health Organization and AID has been fragmentary. Health Ministry and hospital personnel have received a spectrum of recommendations, some building on previous analysis and suggestions, but others contradicting previous programming wisdom. For a health sector with limited institutional capacity for planning and implementation, these changes of consultant emphasis can be disrupting and difficult to readjust. Such important reemphases have occurred with the Pan American Health Organization recommendation in 1972 to drop the line item

in the budget for maternal and child health, AID recommendation in 1971 to separate hours for family planning activities and separate family planning clinics, a general lack of emphasis by Pan American Health Organization advisers toward family planning activities, and a general lack of emphasis by AID for involvement in maternal and child health activities. Recent PAHO-AID activities have been closely coordinated in health at the Mission level, but this coordination must be continued and complemented with AID and PAHO common institutional and agency policy in health to include maternal and child health and family planning at the Washington level.

5.5 Summary of Major Findings.

5.5.1 Summary Statement. High morbidity, mortality and population growth statistics, continue to exist in Nicaragua secondary to:

Poor health practices and poverty

Inadequate coverage of the population

Inadequate health manpower

Inadequate focus of maternal and child health and family planning resources.

Poor health practices, primarily poor sanitary practices of the poor urban and rural population, coupled with the myriad of social and economic problems related to poverty, primarily malnutrition, represent the core problem for the high morbidity-mortality-disease population patterns in Nicaragua. These poor health practices and their resultant diseases continue to go unchecked due to insufficient coverage of the population (no greater than 40%), especially in the rural areas (no greater than 20%). by Nicaraguan government or private formal health services. This inability of the Nicaraguan government and private sector to cover the greater majority of the population with traditional means of health care will not be resolved due to a rapid population growth, despite new plans to expand the supply of formal traditional health professionals. The lack of coverage of the rural population is further frustrated by the failure of the Nicaraguan health agencies to train and utilize paramedical people to man empty or inefficiently utilized health centers, health posts, and mobile units, or to train

or incorporate traditional rural health workers, midwives or healers, into the formal health structure. This failure to utilize and develop the maternal and child health and family planning human, material, and fiscal resources available in Nicaragua has occurred in response to a "demand pattern-successive limited comparisons" type of health planning which is allocating the resources within GON health agencies. This "demand pattern" response to perceived needs in the absence of a well informed body of health consumers traditionally emphasizes curative care (hospitals, health centers, etc.) and the design of health strategies on the basis of "successive limited comparisons" favors service development along traditional institutional lines, especially in the absence of a well developed data base and epidemiologically sensitive planners.

5.5.2 Epidemiological Summary. Epidemiological and service data indicate important problems which are unresolved in the areas of maternal and child health and family planning (see Table 5.4 for a summary of key indicators). Mortality rates are usually considered to be positive indicators of program effectiveness in maternal and child health and family planning services. Similarly, there are various indirect indicators of the effectiveness of the family planning programs, which are supported by recent surveys which indicate that approximately 27% 25/ to 34% 26/ of the fertile age women of Managua and 14% 26/ of the rural population are actively utilizing birth control methods. It should also be noted in Table 5.4 that actual numbers of personnel required for these programs will increase over the next decade although the percent of deficit declines. The data and methodology of these studies will undergo U.S. Center for Disease Control scrutiny later in 1976.

5.5.3 Summary of Infrastructure. The infrastructure and administration of maternal and child health and family planning programs present a mixed picture. These activities are limited by many of the constraints which operate throughout the health sector which in general include inadequate human and financial resources and deficiencies in the institutional capacity of the health sector to identify, plan, and fully implement programs that will have maximum impact on priority health problems. Of all "program type" activities, the maternal and

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25/ Nicaragua Central Bank, Fecundidad y Fertilidad, 1975
26/ Nicaraguan Health Sector Assessment, 1975

Table 5.4

Epidemiological Summary of Maternal and Child Health Indicators, Nicaragua, Various Years

Indicator	Year	Level
Population		
Census and Projections	1970	1.832 million
	1975	2.168 million
	1985	3.003 million
Growth Rate per Decade	1970-1980	3.420 %
	1980-1990	3.388 %
Period Population Doubles	1975-1996	20.1 Years
Predominantly Dependent Population	1975	51.1%
Less than 15 years	1975	48.1%
Greater than 65 years	1975	3.0%
Economically Active Population	1963	474,960
	1971	505,495
Increment in Economically Active Population	1963-1971	6.4%
Increment of total Population	1963-1971	22.2%
Mortality		
Infant Mortality (estimated)	1974	120+/1000 live births
Maternal Mortality (estimated)	1974	280+/100,000 live births
Mortality Indicators--Ages less than 1 year		
Portion of Total Deaths	1969	27.7% of all deaths
	1974	23% of all deaths
Causes: Enteritis, Perinatal Mortality, Tetanus, Pneumonia, Respiratory diseases other than Pneumonia		
Mortality Indicators--Ages 1 to 4 Years		
Portion of Total Deaths	1969	14.3% of all deaths
	1974	17% of all deaths
Causes: Enteritis and diarrheal diseases, measles, other infectious diseases and parasites, respiratory diseases malnutrition		
Mortality Indicators--Ages 5 to 14 Years		
Portion of Total Deaths	1974	4.5%
Causes: Accidents, anemians, enteric and diarrheal diseases, homitices, motor vehicle accidents		
Personnel Requirements		
Deficit in Personnel	1975	-1939 person-years 51%
	1985	-2153 person-years 41%
Family Planning Active Users	1970	16,448
	1974	29,055
	1976	36,300

child health and family planning area benefits the most from the "demand pattern and successive limited comparisons" type of health planning methodology operating within the Nicaraguan health sector, which presently directs approximately 60-70% of the preventive and curative services of the Health Ministry and 40% of hospital services to woman and child health type activities.

This unexplicit type of planning and allocation of resources limits the effectiveness of maternal and child health and family planning programs in dealing with major morbidity and mortality problems and passively directs an increasing proportion of resources into the heavy demand of curative types of health care. Curative types of maternal and child care, then further emphasize the traditional institutional outlets which subsequently support a non-programmatic budgeting and planning procedure. However, it must be recognized that these services have a large component (pre-natal visits, post-natal visits, delivery, well baby, immunizations, etc.) that improve most from interaction and referral with established health institutions.

Depending solely upon the personnel and services available through the formal Nicaraguan health system will leave many of the major health problems of women and children unsolved through the year 2000. If current population trends continue, the additional output of physicians and nurses projected by recent Inter-American Development Bank-Nicaraguan Government studies will leave more people uncovered by health services even though the density per 10,000 population increases. For example, in 1975 there are 1,836 physicians and nurses or 8.34 per 1000 population; in 1985 there should be 3,000 physicians and nurses or 9.9 per 10,000 population, yet the gap in the number of person years needed is greater due to the size of the population (see Table 5.1). These programs for women and children, with larger numbersof clientele and consumption of health services are most affected by these shortages in formally trained professionals, and by the lack of utilization of trained paramedical personnel within the Nicaraguan health system.

5.6 Suggested Alternative Actions

The Minister of Health, speaking at an AID sponsored seminar on strategies for the health sector on 23 January 1976, summarized the Nicaraguan government health strategies with the following priorities having particular bearing for maternal and child health and family planning

programs.

a. Direct Nicaraguan health resources at the major health problems facing the population, especially enteritis, communicable diseases, and nutritional deficiencies, through education and community health projects in addition to reinforcing activities of traditional health programs and facilities;

b. Extend the coverage of health services to groups with high morbidity-mortality rates, especially the rural poor by improving present programs and the utilization of para-professional personnel;

c. Improve the administrative, physical, and technical capacity of the health agencies to utilize more fully the available resource through administrative reform and personnel training;

d. Integrate family planning activities into the general maternal and child health activities of the Health Ministry and expand the average of both through the training and utilization of paramedical personnel.

With this as a base and utilizing recommendations from Nicaraguan Health Sector Assessment, Plan de Salud, 1976-1980, INAPS 1975 Hospital Report, 1972 Proyecciones Cuadrienales, AID consultant reports, and Syncrisis, the following alternative actions are suggested:

5.6.1 Individual and Community Education. Individual and community education should be strengthened and focused on the major morbidity and mortality problems, and feasible family level solutions. This should be done through a multi-channel approach to include the formal education system, mass media, traditional health personnel-outlets, community health committees, and incorporation and training of traditional village health workers.

The health messages to be delivered for maternal and child health should include basic sanitary food handling, first aid, and simplified medicine procedures but should stress the tenets that have emerged from the Russell-Burke study 27/ until more complete data is available.

27/ Russell & Burke, Determinants of infant-child mortality. San Juan Argentina: February 1975.

a. Breast feeding is a significant factor in reducing infant mortality. For every 11 women who breast-feed, one additional infant should survive.

b. Vaccination is a vital factor for childhood survival. For every 14 children who are vaccinated, one additional child should survive.

c. Family planning practices that extend the time between delivery and conception of the next child at least 12 months should result on the average in a child approximately 135 grams heavier than those from mothers not practicing family planning.

d. Prenatal visits before the fifth month and appropriate follow-up care should result on the average in children from 135 grams to 200 grams heavier than those not receiving care.

e. Children born to mothers younger than 17 years of age less chance of survival than those older than 17 years.

The Health Ministry Department of Health Education should be responsible for developing this program under the guidance of the maternal and child health section and should adapt successful health education delivery methodology from the Health Ministry-AID Rural Health Delivery Program Grant for utilization on a national scale.

5.6.2 Community Health Projects. Community health projects which alleviate the etiological causes of enteritis and communicable diseases should be encouraged, assisted and sponsored by Nicaraguan health agencies under the coordination of the Health Ministry. Primary delivery mechanisms are in the form of potable water; human waste elimination, immunizations; neutralization of family and communal reservoirs for pathogenic enteroviruses-enterobacteria, malaria and the communicable diseases, the development of a community response to curative-preventive care through the development and training of local personnel and basic health facilities and the development of an efficient patient referral system. These community participant programs with a heavy input of health education and improved administrative capacity for Nicaraguan health agencies should emphasize the following projects:

a. Miniaqueducts and wells for rural communities with accompanying health education program and maintainance capability.

b. Accompanying latrine construction projects with a health education component.

c. Appropriate community immunization against prevalent communicable disease patterns.

d. Active incorporation of agricultural extension agents and INVIERNO staff to increase agricultural output and improve the storage and handling of foods.

e. Training of local personnel in modern health services practices and incorporation of them into the Nicaraguan government health network.

f. Construction of communal health facilty and stockage of community health supplies, and the establishment of a rapid failsafe system for effective patient referral for entry into the nearest health station, especially for rehydration, respiratory infections, and accidents.

5.6.3 Human Resource Development. Develop an efficient and effective personnel system for coverage of the rural areas which emphasizes low cost, well trained paramedical and nurse practitioner personnel to staff full time the rural health centers, health posts and mobile units, and the extension of health care to even the remotest portion of the rural area by training and incorporating traditional health personnel into the formal system.

a. Develop a training program in preventive and curative care for nurse practitioners which will prepare them to deal with the major morbidity and mortality problems present in geographically rural areas. These practitioners should be well equipped in basic diagnostic and treatment skills, and should be capable of supervising the "health center" staff in the absence of a physician. This includes skills in community health pattern diagnosis and "health team" utilization and supervision

to implement effective programs.

b. Training and incorporation of capable, financially self sufficient parteras and "healers" into the Nicaraguan health agency should procede at once to achieve the maximum coverage possible and to influence good health practices in the rural areas. Training of these individuals should be for short time periods and should be repeated at regular intervals and should concentrate on improving delivery procedures, pre and post-natal care, family planning, education, and contraceptive use, basic infant care, basic first aid and basic simplified medicine. Referral patterns should be established for each trained partera which links them to the nearest Nicaraguan health facility. A health kit should be provided to each trained and capable partera, which at the minimum should include basic delivery equipment (scissors, clamps, sterilizing pot, and gauze), family planning contraceptives, and oral rehydration packets. This kit should be replenished through minimal possible charges to families and community, which should result in a lower cost to consumers and profit for the partera in comparison to the now high volume, expensive, illegal private sale of drugs through pulperias (general stores).

5.6.4 Institutional Capacity Development. Improvement of existing institutional capacity should take place through these priority areas:

a. Improved training for the providers of maternal and child health and family planning care. This primarily should focus on those responsible for primary curative and preventive care.... the health center nurse (recycling them into nurse practitioners), increased emphasis of woman and child care in the National Medical School, Leon, and increased training in preventive procedures for health educators. At the hospital level, pediatric intensive care for the hospital team should be stressed with rehydration of infants the major teaching point. Health Ministry and hospital administrators should receive additional management courses on health planning and resource allocation

as related to epidemiological patterns surrounding their institutions, and coordinated implementation and supervision of multi-faceted programs. These training courses should be carried out through in-country resources (National Medical University, INCAE, etc.) supplemented by foreign technical assistance. These training programs should be institutionalized as administrative requirements and annual budgetary allocations.

b. Improved facilities are an important component to the system outlined above 5.6.1 to 5.6.4a, as the new demand created by an improved outreach and reference systems is bound to strain many of the already inadequate facilities in the rural areas, especially the rural hospitals. Repair and renovation of facilities and equipment should be standardized along the already adapted procedures of JNAPS. These procedures seek to first establish basic minimum hospital services (kitchen, laundry, sterilization, etc.), second basic diagnostic services (laboratory, X-Ray, etc.), and third basic curative services (rehydration, emergency care, etc.) prior to continued sophisticated investment in already modernized hospitals.

c. Improved communications, coordination and administration between existing traditional health sector facilities should be instituted. Radio communications between hospitals, health centers and central administrative organizations would assist in patient care, patient referral, facility resupply, and maintenance, and general administrative, and overcome the near total isolation experienced by many health facilities in rural Nicaragua.

d. The maternal and child health and family planning program, because of its important epidemiological and population implications, should receive top priority within the Health Ministry and the hospital system by assigning highly qualified personnel and adequate budgetary allocation. The program director

should be of the highest technical qualifications and the most dynamic of all the program leaders. The office should be allocated a programmatic budget, which at the discretion of the program director, could supplement already existing programs or initiate needed programs depending on their possible impact in the various parts of the health system throughout the country. The responsibilities of this office should include:

(1) Responsibility for program development in coordination with other relevant Health Ministry programs.

(2) Responsibility for the supervision of all personnel working in maternal and child health and family planning services.

(3) Responsibility for performance guidelines.

(4) Responsibility for the development and implementation of refresher and in-training courses for all levels of personnel involved in the program.

(5) Central information source for women's and children's health services. Review quality, detail, and relevance of planning data.

(6) Coordinator of consultants from all sources for programs related to the program.

(7) Responsibility for the development of appropriate drug lists for MCH-FP services at health centers. Responsive to changing disease patterns with changing drug formulary.

(8) Responsibility for the development of a special disaster plan for children.

(9) Coordinator with hospital programs and other programs related to women's and children's health, such as rural health, health education, and nutrition. If

the Health Ministry program becomes regionalized to coordinate with regional directors.

(10) Develop equipment and supply priorities and be responsible for inventory of such allocated to the program.

(11) Coordinate all immunization programs for women and children.

Hospital System, JNAPS should have a full time maternal and child health and family planning specialist who would be responsible for the following duties:

(1) Review of number of beds available for adequate maternal and child health services.

(2) Outpatient and emergency department and observation room programs and inpatient maternal and child health and family planning services.

(3) Inpatient and outpatient department drug formulary.

(4) Supervisory activities and quality of care evaluation.

(5) Refresher and training courses for all program personnel and coordination of training with other services.

(6) Coordination with Health Ministry programs.

(7) Equipment and supply inventory and requisitions for units responsible for program services.

In addition to assisting in the implementation of the previous outlined alternative actions (5.6.1 to 5.6.4a), the following activities are recommended as immediate action, low resource requirement programs.

(1) Every health center and health post should be a rehydration center with the necessary materials and personnel well trained in oral rehydration techniques.

(2) The artificial division of services and clinic hours into well baby, sick baby, pre and post-natal and family planning components should be eliminated in all health centers so as to assure more ease in utilization of these services by overworked and overtired women.

(3) Health center and hospital outpatient department time scheduling should be reviewed to see if some changes could be made to better accomodate the needs of the community being served rather than that of the professional serving the community, for example, evening or weekend clinic hours.

(4) Hospitals with shortage of personnel especially in children's wards should encourage longer visiting hours by mothers. This would serve the dual purpose of having more help in feeding and cleaning children, and at the same time serve as a working classroom in the education of mothers in the care of their children and themselves.

(5) Programs which can provide supplemental feeding to children (SERN, CARITAS, PMA, OXFAM, etc.) need to be more accurately directed to those children with Grade I, II, and III malnutrition problems.

(6) Additionally, all nutritional programs should be stressed and improved, and iodized salt should be distributed at all health centers due to the high prevalence of endemic goiter.

5.6.5 Family Planning Services. Family planning services should be (a) extended to all health "outlets" for 1977, and contraceptives should be made available to the rural population through the proposed partera program, especially in light of such high maternal mortality patterns; (b) the current family planning program should retain its identity separate for maternal and child health activities unless that section obtains enlightened and dynamic leadership which emphasizes its importance; (c) the implications of population dynamics must be brought to national

leadership attention through seminars and population studies as planned by the Mission and the Asociacion Demografica Nicaraguense; (d) the rights of women to limit family size(from the current 6.1 children compared to the apparently desired 3+ children), and the obvious economic benefits to a developing nation's economy should be combined into an influencial argument to develop a national population policy and increased allocation of Nicaraguan government resources and services for family planning activities.

International training and long term technical assistance is recommended for revitalizing the Office of Maternal and Child Health and Family Planning and for further developing the above recommendations.

CHAPTER 6

COMMUNICABLE DISEASE CONTROL

Communicable diseases for which immunizations currently exist are a major cause of morbidity and mortality in Nicaragua. Low coverage by immunization services to the susceptible groups means that a significant portion of children under five years of age and pregnant women maintain high communicable disease mortality rates.

Epidemiological information available from Health Ministry sources is inaccurate and conflicting; however, it is sufficient to present the magnitude of the problem with respect to the major causes of morbidity and mortality by communicable diseases.

This chapter will discuss the epidemiological situation of the most important communicable diseases in Nicaragua and the extent to which there are effective programs. Where programs exist we have analyzed the infrastructure problems that inhibit their efficient management, design and operation.

6.1 Communicable Disease Problems

6.1.1 Poliomyelitis. Since 1951 Nicaragua has experienced polio outbreaks every two to three years. The importance of poliomyelitis lies not only in morbidity and mortality but also in the cohort of handicapped persons who will continue to need medical attention and often are unable to function as productive members of society. In 1974, 43 cases were reported to the Ministry. More than 50% of these cases were reported by Region II which undoubtedly represents a better reporting system (see Table 6.1). These figures are not a true representation, however, of the incidence of polio in the country. In the period January 1971 to February 1972, there were 249 cases reported,

probably all paralytic, with 16 deaths for an incidence of 13.2/100,000 and a case fatality ratio of 7%. Epidemics traditionally begin in the provinces along the North Pacific Coast, spreading throughout the Pacific Coast and later to the interior. Attack rates show little consistency except that the remotest areas had the lowest number of reported cases.

Programs. Public vaccination programs for paralytic poliomyelitis characteristically have been massive reflex responses to sudden outbreaks of the disease as a result of poor interepidemic maintenance programs. Routine public immunization with oral trivalent vaccine began in Nicaragua in 1965.

The main source of distribution of polio vaccine in Nicaragua is the Ministry of Health, which is without adequate resources for effective continuing immunization programs. In non-epidemic years, the Ministry supplies vaccines to its health centers and mobile teams (PUMAR), but these facilities are too few to reach much of the poor rural and urban population. During 1967, 1968 and 1971, mass campaigns were carried out not only in health centers but also in cantones electorales, local political offices. This politicization is still in effect.

The reporting system for poliomyelitis in 1971 consisted of a telegram report on each case from health centers and hospitals to the Ministry offices of Epidemics and of Statistics in Managua.

The therapy of acute cases of polio was centralized in the General Hospital of Managua and in the St. Vincent's Hospital in Leon. Presently, hospitals outside Managua now refer cases of polio to Managua. Patients who come to the city's rehabilitation clinics are not reported in the Ministry's Statistics and no listing of these patients can easily be extracted from clinic records.

Analysis of Coverage. Health Ministry goals propose to reduce both mortality and morbidity of polio by 70%. The strategy for this proposal is to increase vaccination coverage of susceptibles to 95%. Polio ranks first in priority to reduce incidence nationwide.

In 1974 a total of 200,697 doses were administered to children four years old and under (see Table 6.2). This represents 17% of the population at risk. Coverage is inhibited by too few mobile teams and

Table 6.1

Cases of Transmitable Diseases Reported to the Ministry of Public Health, by Region, Nicaragua, 1974

Causes \ Area	Total	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7 and 8
Total Cases	143,237	20,715	72,840	8,633	3,931	18,194	9,038	9,886
Diseases transmitable by water contamination Sub-total	105,384	10,595	59,785	6,314	1,951	13,258	6,202	7,279
002 Typhoid Fever	527	56	240	69	15	31	32	84
003 Paratyphoid Fever and other Salmonellosis	138	15	45	48	8	6	14	2
004 Bacillary Dysenteric and Amoebas	13,488	631	9,807	516	373	1,436	321	404
005 Enteritis and other diarrheic Diseases	27,401	4,328	13,901	1,146	853	2,843	2,557	1,773
039								
043 Intestinal Parasitosis	63,830	5,565	35,792	4,535	702	8,942	3,278	5,016
Vaccinable Diseases Sub-Total	5,398	1,346	2,196	362	133	613	407	341
006								
010 Tuberculosis	2,206	699	748	72	20	307	200	160
015 Diphteria	6	--	2	--	--	2	2	--
016 Whooping Cough	2,219	470	1,031	178	48	203	122	167
020 Tetanus	72	9	33	7	3	10	8	2
022 Polio	43	9	24	--	2	7	1	--
025 Measles	852	159	358	105	60	84	74	12
031 Malaria	5,994	1,749	1,583	493	101	1,059	309	700
Venereal Diseases - Sub-Total	4,606	1,320	1,754	271	127	461	397	276
034								
037 Syphilis	1,426	216	592	78	87	252	97	104
038 Gonococcic Infection	3,169	1,104	1,162	193	40	208	291	171
Chancre, Mixed	11	--	--	--	--	1	9	1
028 Infectious Hepatitis	664	64	383	21	5	103	70	18
Human Rabies	3	2	1	--	--	--	--	--
090 Influenza	21,188	5,639	7,138	1,172	1,614	2,700	1,653	1,272

Source: Division of Biostatistics, Nicaragua Ministry of Health, 1975

delayed supplies. The most recent epidemic began in 1971 and affected mainly unvaccinated children under three.

Analysis of Effectiveness. By 1976 the Ministry projects 601,800 doses to be administered to the susceptible population (3 months to 3 years), but this goal has little chance of being realized given the effectiveness of past programs. While the Ministry recognizes the need for 95% coverage, the present system can only support a fraction of that. Even where vaccinations are given, 32% of those receiving the first dose do not receive the second. Thus in 1971 the outbreak as in previous years was in young children who were not immunized or who were inadequately immunized.

Success in altering the course of an epidemic is difficult to judge. However, delay in starting the campaigns, the meager number vaccinated and most significantly, the similarity in shape of the epidemic curves to those in past years suggest that the effects of vaccination were minimal.

6.1.2 Measles. Measles is the second leading cause of deaths in children between one and four years of age and increases host susceptibility to other diseases. Virtually all children in Cenral America give evidence of a previous infection with measles by the age of ten years. Therefore, the true incidence of measles approaches the birthrate minus children who die before being exposed to the disease.

In Nicaragua with approximately 84,000 live births a year and about 9,000 infant deaths per year, according to CELADE there should be nearly 75,000 cases of measles reported per year.

In 1974 only 852 cases were reported to the Ministry (see Table 6.1) and only 104 deaths. It has been estimated that measles has a 6% mortality in Central America, with the median age of measles deaths at 24 months. Managua General Hospital records from 1971, the most recent data available, show that 22% of cases seen were under one year of age and 64% were under four years of age.

Programs. There is no program of immunization for measles. Any vaccinations given are sporadic and in no way programmed. Some vaccinations are carried out by the Peace Corps, Amigos de America and other Voluntary Agencies.

Table 6.2

Immunization by Age Group and Dose Administered Versus Population at Risk, Nicaragua, 1974

Required Immunization Dosage and Target Population		Immunization Administered: 1st Dose.	2nd Dose	3rd. Dose	Booster	Total Doses	Loss between 1st & 2nd Doses No.	%	With Completed Scheme	Population at Risk
DPT	1 Year	32,303	20,733	8,411	3,498	64,945	11,570	36%	8,411	76,498
3 Innoculations	1-4 Years	41,270	26,404	11,779	13,560	106,573	14,866	36%	11,779	275,633
Total		73,573	47,139	20,190	17,058	171,518	26,436	36%	20,190	352,131
Small Pox	1 Year	193	---	---	---	---	---	--	193	76,498
1 Innoculation	1-4 Years	788	---	---	18	---	---	--	806	275,633
	5-14 Years	1,333	---	---	278	---	---	--	1,611	634,243
	15+ Years	1,866	---	---	675	---	---	--	2,541	1,065,715
Total		4,180	---	---	971	---	---	--	5,151	2,052,089
Typhoid	1-4 Years	3,807	2,454	---	1,165	7,426	1,353	36%	2,454	275,633
2 Innoculations	5-14 Years	25,467	13,114	---	10,239	48,820	12,353	49%	13,114	634,243
	15 + Years	26,753	14,686	---	13,842	55,281	12,067	45%	14,686	1,065,715
Total	1 Year	56,027	30,254	---	25,246	111,527	25,773	46%	30,254	2,052,089
Polio	1 Year	39,755	26,769	---	9,667	76,191	12,986	33%	26,769	76,498
2 Doses	1-4 Years	50,589	34,441	---	39,458	124,488	16,148	32%	34,441	275,633
Total		90,344	61,210	---	49,125	200,697	29,134	32%	61,210	352,131
Rabies	1 Year	399	---	---	---	399	---	--	399	76,498
14 Innoculations	1-4 Years	3,464	---	---	---	3,464	---	--	3,464	275,633
	5-14 Years	11,749	---	---	---	11,749	---	--	11,749	634,243
	15 + Years	11,710	---	---	---	11,710	---	--	11,710	1,065,715
Total		27,322	---	---	---	27,322	---	--	27,322	2,052,089
BCG	1 Year	39,318	---	---	---	39,318	---	--	39,318	76,498
1 Innoculation	1-4 Years	17,662	---	---	---	17,662	---	--	17,662	275,633
	5-14 Years	30,719	---	---	---	30,719	---	--	30,719	634,633
	15 + Years	6,948	---	---	---	6,948	---	--	6,948	1,065,715
Total		94,647	---	---	---	94,647	---	--	94,647	2,052,089

Source: Immunization Information - MOH, Statistical reports for Health Centers and Mobile Units, 1974; Population Figures National Census 1971, adjusted figures.

Analysis of Coverage. Health Ministry goals propose to reduce mortality due to measles by 50% and morbidity by 40%. The strategy for achieving this end is by vaccinating 80% of the susceptible population (9 months to 6 years). Measles ranks third in Ministry priorities. In 1972 there were 5,046 measles vaccinations; 5,194 in 1973, and 4,450 from January to June 1974. This number for 1974 represents only 4.5% of the projected goal for that year. Without an organized measles vaccinations program, administered and supplied by the Ministry, there can be no reasonable expectation that morbidity and mortality will be reduced.

6.1.3 Diphtheria. Dipthteria is a disease infrequently diagnosed in Nicaragua. According to Ministry data, there were six cases reported in 1974.

Programs. There are no programs for diphtheria alone. Immunizations of diphtheria-tetanus to children six years and older and diphtheria-pertussis-tetanus to children two months to six years are administered through the usual health center and hospital immunization services.

Analysis of Coverage. Ministry goals for the reduction of diptheria by 1980 are to lower mortality and morbidity by 80%. Diphtheria ranks second in communicable disease priorities set by the Ministry's coverage and has been planned to extend to 80% of the population. In 1974 there were approximately 158,066 vaccinations administered to the target group, which represents about 50% of the vaccinations planned by the Ministry for that year.

6.1.4 Pertussis. Pertussis is probably an important but underdiagnosed disease in Nicaragua with 619 cases reported in 1969 and 203 deaths (5% of which were under one year of age). No statistics are available on morbidity or mortality due to pertussis in 1974.

Programs. Pertussis immunizations are administered in health centers and hospitals in combination with diptheria and tetanus.

Analysis of Coverage. The Ministry plans an 80% increase in vaccination coverage for pertussis by 1980. However, in 1974 there were 26,436 vaccinations given to children from 0 to 4 years old representing only 6% coverage of the population at risk and a loss of 36% between the first and second dose. Moreover the vaccination goals for 1975 were less than that for 1974.

In light of these ambitious goals, and given the incidence of pertussis and its attendant mortality rates, there seems little prospect of a reduction in morbidity or mortality due to this disease. Not only is there a need to extend coverage to a wider group of susceptibles, but also an intensified effort is required to insure the second dose.

6.1.5 Tetanus. Tetanus is a disease of considerable importance in Nicaragua. It ranks as a leading cause of death in children between ages one and four and fifth in children under one, plus increases host susceptibility to other diseases. Much underreporting is evident; in 1974 only 72 cases were recorded by the Ministry. Since the majority of births occur outside the hospital, most tetanus cases which result from septic conditions at birth go unreported.

In 1974, 338 hospital discharges were attributable to tetanus treatment. One hundred deaths due to tetanus occurred in hospitals. Tetanus is the seventh cause of deaths in hospitals with a fatality rate of 259.9 per 1000 discharges.

Programs. There is no tetanus toxoid immunization program for the fertile female population. Since the child will carry the mother's immunity for the first several months after birth, immunizing mothers prior to delivery would do much to lower this death rate. Tetanus toxoid can be administered safely during pregnancy at minimal cost.

Analysis of Coverage. Vaccination coverage for tetanus is the same as that recorded for diptheria and pertussis, about 6%, since there is no separate program for this disease. No vaccinations were reported by the Ministry for tetanus in 1971 - 1973. By June of 1974 slightly less than 50% of projected vaccination goals for 1974 were attained.

Theoretically the susceptible universe that the Ministry aims for is pregnant women and high risk laborers. Reduction of tetanus mortality by 50% and morbidity by 60% as the Ministry plans and increasing coverage by 80% will never occur as long as there is no tetanus immunization program. A strong outreach component is needed to interview women prenatally who give birth outside a health center or hospital.

6.1.6 Tuberculosis. Tuberculosis ranks as the most important disease economically among these preventable or significantly modified by vaccination. Its impact is apparent in morbidity and mortality as well

as costs for chronic care. Although the disease frequently develops during childhood, the major effects accrue to the working age group. In 1974, 2,206 new cases were reported (see Table 6.1). The morbidity rate calculated from notifiable disease reports is 97.5 per 100,000 while tuberculosis cases constituted 2.2% of hospital discharges and 5.4% of medical consultations.

Many factors contribute to the prevalence of the disease. Overcrowding, lack of sanitation, inadequate housing, and generally poor environmental conditions, encourage transmission of the tubercule baccillus. In addition, a poor rate of nutrition adds to the susceptibility of the host.

Programs. In order to combine the effects of early treatment and detection of tuberculosis, the government of Nicaragua has embarked on a massive detection campaign. The program functions with three mobile units and two stationary units for diagnosis and treatment. For residents of Managua these functions are carried out through the National Dispensary. In addition, health centers throughout the country refer any suspected case of tuberculosis to the program. There are 400 beds available for tuberculosis patients in the hospitals, and potential admissions must be screened by a committee on selection, which has operated since July 1970. Thirteen tuberculosis workers are budgeted in 1975 for the national program and 26 for Managua. The Health Ministry has placed its priority for this program on ambulatory care, and it is hoped that this screening procedure will reduce unnecessary hospitalizations.

Analysis of Coverage. Immunization coverage is needed to achieve the stated Ministry goal of 80% immunity for the most susceptible age group: those under six years old. Immunization statistics report 51% coverage for those under one year old, 6% coverage for ages 1 to 4, and 5% coverage in ages 5 to 14 years (see Table 6.2). In 1974, a total of 94,647 doses were administered compared to a Ministry goal of 626,747 (see Table 6.2). Thus immunization levels are well below these targets.

The Ministry goals project two years (1976 and 1977) of intensive immunization activities in order to cover the already existing pool of unimmunized persons, and thereafter declining to a steady level of about 800,000 doses annually by 1980.

Analysis of Effectiveness. Without a more complete health information system, effectiveness of the program is difficult to evaluate. In 1970 it was reported that treatment was initiated in 85% of newly detected cases, but there is no information on how many continued treatment over time. Treatment is long-term usually requiring one to two years of daily medication. It seems likely that many patients are not willing or able to continue such a protracted regimen.

For those who do receive health center treatment, Practical Concepts Inc. consultants reported that out of 24 health centers 11 were treating tuberculosis patients unsatisfactorily. However, surprisingly, 17 health centers out of 24 did have satisfactory follow-up program.

There is no information on tuberculosis treatment in hospitals. Most professional personnel in the program confine their activities to the clinical areas of the laboratory and the hospital. Therefore, most detection and treatment are conducted by auxiliary workers without adequate supervision. Lack of funds and transportation create additional problems. Most of the program's budget goes to high salaries for senior professional personnel. A recent agreement in 1975 between the Health Ministry, JNAPS and INSS established a completely integrated tuberculosis program from identification to treatment (ambulatory through chest surgery) which has not been fully activated at the time of this study, but which should develop interesting additional data on tuberculosis identification, immunization and care.

6.1.7 Yellow Fever. Nicaragua is a country which presents favorable ecological conditions for the existence of Aedes Aegypti as the vector for yellow fever. In 1974 a campaign to erradicate Aedes Aegypti was begun and in 1958 the country was declared free of the vector. In 1974 two cases were reported from the Municipio de Jinotega.

Program. In 1970 the Yellow Fever Program increased its personnel and services. Five inspectors and one chief inspected 24 locations at 3 to 6 months visit intervals. In 1974, 31,000 houses were inspected in 94 localities. Control of aerial transportation and desinfection of airplanes is an added component of the program. In the same year yellow fever control was incorporated into the national malaria program.

6.1.8 Malaria. Although malaria is not one of the leading causes of death in Nicaragua, it nevertheless continues to be one of the leading causes of morbidity.1/ All epidemiologists who have analyzed the problem agree that malaria has been the most restricting of all diseases in man's mastery of productive lands because of loss of productivity during perioids of sickness and the after effects of anemia, weakness, and mental apathy.

The incidence of malaria declined until 1974 when rates soared (see Figure 6.1). For a six month period of 1975 the Ministry reported 18,164 cases of the disease. According to the National Malaria Eradication Service (SNEM), the Pacific Coast represents the major area of malaria transmission.

Sugar and cotton represent the two agricultural crops that attract migrant workers. Both crops are grown in the west and southwest; sugar harvesting attracts approximately 5,000 migrants and cotton nearly 10,000 people. Traditionally small farmers and rural workers from the north central regions constitute the migrant group. These seasonal laborers work in the most malarious section of the country until mid-April when they return home. This movement of a significant number of people into and out of such a highly malarious zone can be presumed to aggravate the malaria problem existing throughout the country. The morbidity rate nationwide now reaches 1348.8 per 100,000.

Programs. The agency responsible for massive spraying and detection campaigns is the Malaria Service (SNEM), a division of the Ministry of Public Health which has a network of professional and voluntary personnel throughout the country. At the periphery there are about 4,000 volunteer workers responsible for casefinding and reporting. Blood smears are taken on all persons who evidence any sign of fever and presumptive treatment is administered.

Approximately 100 full-time evaluators supervise the volunteer workers, visiting detection centers to collect slides and restock supplies each month. Each evaluator reports to one of 30 sector chiefs. There are five nonmedical administrators responsible for the operations of field

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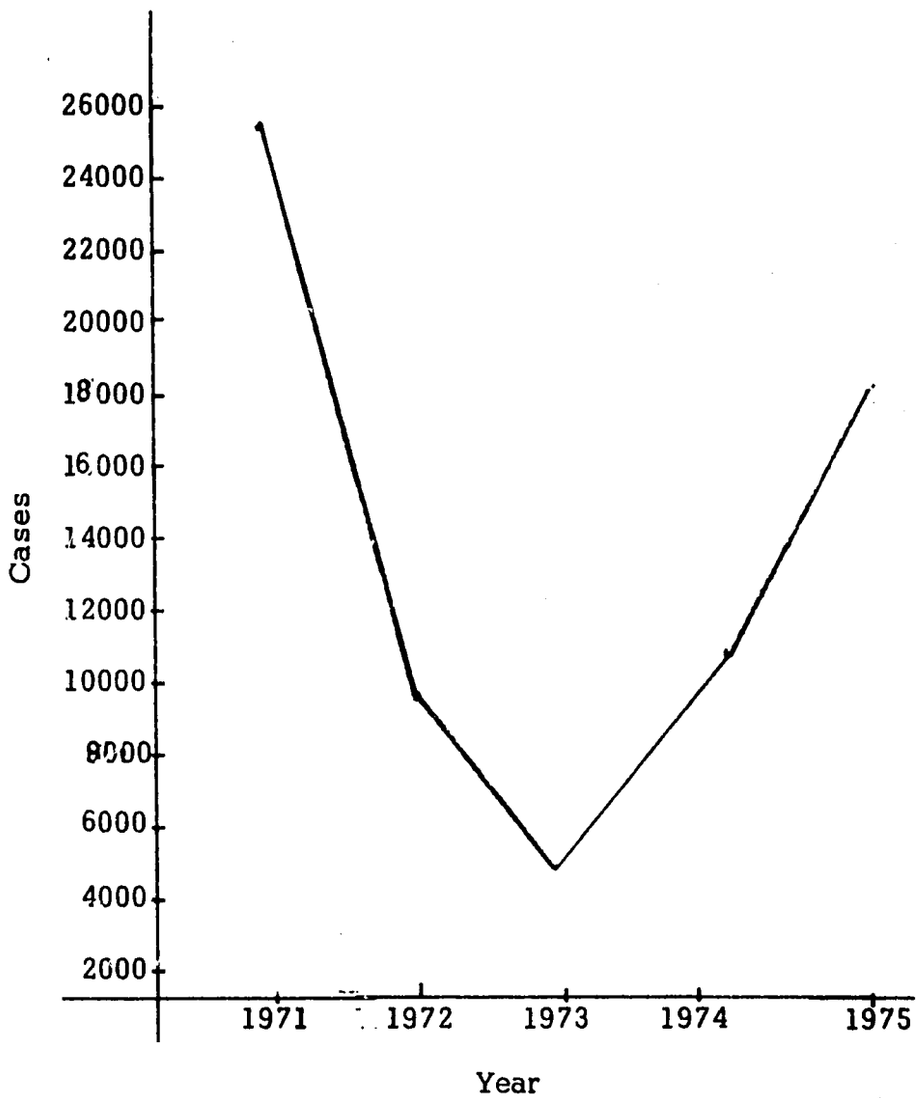
1/ Servicio Nacional de Erradicacion de la Malaria, Informe de 1975, Managua: April 1975.

Illustration 6.1

Incidence of Malaria, Nicaragua
1971 to 1975



Year	Cases
1971	25,303
1972	9,595
1973	4,246
1974	12,167
1975	18,164

Estimated

Source: Nicaragua Servicio Nacional de Erradicacion de Malaria. Informe del Grupo de Revision, Managua, 1975.

personnel and coordination with the laboratories. The director of the program is a medical officer who is assisted by a health educator and an epidemiologist. The malaria service has developed detailed maps of every geographic area showing each dwelling unit. These maps are used to plan activities of the spray teams. During each spraying cycle, usually 2 to 3 times a year, the teams make a complete numerical count of the population which some departments use as a base for assessing the accuracy of the census. A breakdown of the malaria budget for 1975 appears in Table 6.4.

Analysis of Coverage. The entire territory of Nicaragua is considered malarious, and epidemiological activities are currently in the attack phase. The country is divided into two areas, one where the vector is susceptible to DDT (Area A with 505,158 inhabitants) and the other where the vector is resistant to this insecticide (Area B, with 1,676,114 inhabitants). Due to financial resources, insecticides were applied partially in both areas.

In 1974 approximately 21,700 houses were sprayed twice with DDT in Area A constituting about 20% coverage and in Area B about 120,000 houses were treated with propoxur four times during the year, about 35% coverage (see Table 6.3). In addition three cities in Area B were protected by larvaciding, using fenthion, malathion, or diesel oil.

During the year of 1974, 233,941 blood smears were examined and 12,167 positives found while in 1973, 191,361 smears were examined with 4,246 positives.

Analysis of Effectiveness. The increase in the extension of vector resistance in Area B has been considered to be the main reason for the rise in malaria incidence. Concentrated along the Pacific Coast and the northern portion of the Central Highlands, insecticide resistance in mosquito vectors has developed mainly as a result of agricultural spraying practices. Geographic contiguity with Honduras and El Salvador which also have vector resistance, aggravates the problem further.

Since 1961 when vector resistance was observed, various experiments with alternative insecticides have been undertaken.

TABLE 6.3

NUMBER OF DWELLINGS SPRAYED, MALARIA PROGRAM,

NICARAGUA, 1974

Malaria Zone	Total Dwellings	Dwellings Sprayed	Percent Coverage
Area A	505,158	22,117	20.56
Area B	1,676,114	115,487	34.70
TOTAL:	2,181,272	137,604	31.26

Source: Nicaragua Servicio Nacional de Erradicacion de Malaria, 1975.

The MOH has budgeted $2.6 million for the malaria program, which represents 37% of the public health budget. This figure is a 61% increase in monies for malaria since 1974 and almost 100% increase since 1972.

The malaria program appears to be a well organized and vertically managed disease program with an increasing if not adequate, budget. Program effectiveness has been significantly reduced by vector resistance; however, experiments in-country and by Pan American Health Organization are underway to find alternative treatments. Recently, Pan American Health Organization malariologists have pointed towards orienting the program to eliminate insect breeding sites, such as unused, stagnant irrigation canals, or unweeded drainage sites, etc. as important areas for increased emphasis.

6.1.9 Veneral Disease. The extent of the venereal disease problem is virtually unknown. In 1974 the Health Ministry reported 4,606 cases of venereal disease; 1,426 syphilis, 3,169 gonorrhea and 11 Chancro Blando. All Health Ministry officials recognize that this represents only a minor number of actual cases.

Program. In 1971 the Ministry organized a unit to control venereal disease within the Epidemiology Division to carry out special veneriologic studies. Social Security (INSS) and the national hospital system (JNAPS) have treatment programs. The central public health laboratory has the capacity to carry out venereal disease analysis. The investigation and treatment of venereal disease havebeen hampered by a consistant lack of funds, and the low interest in implementing effective fertility control programs.

6.2 Analysis of Infrastructure Problems

The goals in the area of communicable diseases as set forth in the Ministry's five year health plan will require a substantial commitment of resources -- financial, human, physical and organization -- in order to achieve adequate levels of immunization coverage. However, given the many competing needs and services for these resources within the Ministry, a planning capability must also be developed to insure rational resource allocation and service designs and also an effective managerial and administrative corps to promote efficient operations.

6.2.1 Planning. The Ministry's planning for communicable disease control as expressed in the National Health Plan for 1976-80 appears to make an accurate evaluation of the types of global activities that need attention. Groups at risk have been determined using standard Pan American Health Organization indicators; population projections have been used to define the size of the groups at risk; immunization levels have been established, the number of doses required for immunizations was set and the total number of immunizations needed was calculated. No attempt has been made, however, to bring these projections down to the regional level in order to determine specific activities in each region and to translate these into programs at the health center. Neither is any mention made of additional personnel, equipment, and supply costs to undertake these expanded activities.

Discussion of strategies seems not to have been considered so that alternate immunization levels and mixes of immunizations producing varying outcomes and costs (immunization costs versus morbidity and mortality costs for those not immunized) could be compared to determine the optimal level and design of activity.

6.2.2 Epidemiological Information System. One of the most significant deficiencies in the planning process is the epidemiological information system. The data now available do not allow for accurate definition of the current status of these health problems, and therefore resource allocation, planning services and projections about their future impact necessarily are weak. Four distinct agencies routinely collect epidemiological information:

Ministry of Health. The Health Ministry is charged with the major preventive health measures and the control of some 116 health centers. Health centers provide only outpatient services. Each health center sends weekly disease reports to the MSP statistics office. Separate reports are submitted by the Malaria Program and other special divisions of the MSP.

Social Security Institute (INSS). Social Security is charged with providing hospital and outpatient care to members of the prepaid insurance plan. These members are usually employees or families of governmental, industrial or large agricultural concerns (about 8% of the national population). Presently INSS controls five hospitals and a number of outpatient clinics. Each INSS hospital submits monthly admission and

discharge information for hospitalized patients to the INSS central statistical office. This office represents the most competent statistical system in the health sector.

National Board for Social Assistance (JNAPS). Each of the 23 semi-autonomous social assistance hospitals submits admission and discharge information to the JNAPS central office yearly.

Ministry of Census and Statistics. Death information is forwarded from vital statistics registries throughout the country to the Ministry of Census.

System Effectiveness. Diagnostic information for outpatient visits is available only for Ministry of Health, health centers and mobile units. Noteworthy is the fact that no epidemiological information is received from most hospital outpatient departments that provide 80% of medical outpatient visits in Nicaragua. No epidemiologic information is received from the private sector. The daily registers, used to prepare weekly tabulations of notifiable disease by age and sex, are sent by telegram to the Ministry for immediate epidemiologic use. All data processing done by the Ministry is performed manually, greatly limiting the types of analysis and delaying results.

In 1975 only 42% of the health centers regularly sent the telegraphic report while 85% sent the mailed form. It is estimated that a 3 to 4 week delay occurs before mailed forms are received. No information feedback is given to the reporting centers except through the Ministry's annual summary which is usually delayed several years. No information is received from private hospitals.

The Ministry of Census tabulates the number of deaths but not the cause of death. The same lists are then sent to the Ministry of Health for tabulation by cause of death. The transmission of these lists is greatly delayed. Thus the Health Ministry to date has only received data from the first quarter of 1974 and is still processing the 1973 data.

The quality of mortality and morbidity information in Nicaragua is poor. Gross underreporting of both outpatient and death data occurs. Only limited analysis is possible because most processing is done manually. Mortality data is based on cause of death information which often is inaccurately determined by laymen. Health information and its

collection is dispersed among several agencies compounding the problems of health planning and data analysis.

For these reasons precise determinations of the health situation in Nicaragua are impossible. Only general statements on the relative importance of diseases can be made. For the same reasons, the impact of current or planned health programs over a five or ten year period will be difficult to measure unless improvements are made in the health information available. Tetanus data provide an example of the underreporting that occurs. In one year the Managua General Hospital disease records showed 100 cases while the Health Ministry reported under 20. For the infections diseases little laboratory confirmed diagnostic information is available. No systematic collection is done of results of laboratory tests for diseases of public health importance other than malaria, tuberculosis and syphilis.

6.2.3 Budget. The Ministry of Health budget for 1975 programs $18,298.00 (US$2,614,000) for the Malaria control program and $2,410.000 (US$344,285) for all other epidemiological and communicable disease programs (see Table 6.4). These two program allocations can be subdivided budgetarily under four headings: personnel services, non-personnel services, materials and supplies and machinery and equipment.

As is evident by a lack of program budgeting, funds are not earmarked for immunization activities. We assume that monies for the purchase of vaccines and equipment come out of the health centers' supply budgets rather than the supply budget of the Epidemiological and Communicable Disease Program.

Salaried positions are a fixed budget item called permanent charges, which are never reconsidered. Monthly allotments for other expenses are dispensed to the epidemiological and malaria control programs. Redistributing the budget is not uncommon when funds run low at the end of a month or a year patronage often is the strongest force influencing resource allocations.

Because health center personnel have no participation in the budgeting process and their monthly expense allowance may vary widely, program planning at the local or regional level is almost impossible. These budgeting limitations combined with a total lack of information

Table 6.4

Resources Epidemiological and Communicable Disease Program, Nicaragua, Ministry of Health, 1975

Program \ Resources	BUDGET: Personal Services	Non-Personal Services	Materials and Supplies	Machinery and Equipment	TOTALS: Budget	Personnel
Epidemiology and Communicable Diseases - Total	1,149,720	190,766	1,066,514	4,000	2,411,000	56
1. Venereal Diseases						7
2. Leprosy						6
3. Zoonosis		Not Available				4
4. Tuberculosis						13
5. Tuberculosis (Managua)						26
Malaria	8,072,232	1,045,270	8,841,498	339,000	18,298,000	78
Total	9,221,952	1,236,036	9,908,012	343,000	20,709,000	190

Source: Nicaragua National Budget, 1975 pg. 2 and 3, 206-208, 505-507

feedback guarantees an inefficient, unorganized, and ill planned delivery of health services.

6.2.4 Organization of Services. The Ministry of Health plays the major role of the public sector institutions in providing immunizations, although the local social assistance committee (JLAS), the Social Security Institute (INSS) and the Medical Services of the National Guard also provide occasional or limited services. No estimate is available on the percentage of the population which receives immunizations through the private sector.

Immunization activities are supervised by the Epidemiological and Communicable Disease Program (ECD) under the Promotion and Protection Services. Since the ECD only supervises the public immunization programs, there is little if any, coordination among the various health institutions which administer vaccinations. Mothers have an extremely poor understanding of the need for vaccination and therefore have little recollection of immunizations their children have been given. All these factors plus a fragmented record-keeping system means there is much duplication of vaccinations. Moreoever, none of the health institutions (with the exception of the malaria service) have an outreach program. Therefore, facilities and services are underutilized and immunization coverage rates for which effective vaccines exist is high.

Most national, regional, or local vaccination campaigns occur sporadically, because of the deficiencies in financial resources, personnel, supplies, etc. This has been true of the polio campaigns which have been reflex responses usually acting once the epidemic is well-developed because of poor interepidemic maintenance. Measles is another example of an immunizable disease with extremely high morbidity rates for which no program exists. Tetanus vaccinations which have covered only six per cent of the population at risk are given on an ad hoc basis to women who seek pre-natal care in health centers or hospitals.

The venereal disease, leprosy, and zoonosis activities are carried out through special mobile units which are assumed to cover the entire country. In fact, there are too few of these teams, and those that do exist run irregular circuits. Conversations with Health Ministry personnel indicate that funding for these units,specifically travel allowances and fuel, which are authorized on a quarterly basis, are inadequate and thus the personnel assigned to the program spend the majority of their time in Managua.

As this section has tried to illustrate, the present infrastructure is not capable of providing adequate immunization coverage to susceptible populations on a regular (non-epidemic) basis. This is the case because of limited financial resources, low levels of personnel, irregular delivery of supplies, and poor management of existing services.

6.2.5 Personnel. The provision of vaccination services at the health center and post levels is almost entirely the responsibility of the auxiliaries who carry out the routine health center activities under the guidance of a physician. These auxiliaries receive approximately two months formal training after finishing at least the fifth year in primary school. In providing immunization activities, the auxiliary's knowledge about adequate storage, vaccination procedures, and record-keeping is, at best, rudimentary. Thus, frequently vaccines are improperly stored, incorrect dosages are given, spacing of immunization series is improper, immunizations are wrongly applied, and a host of other problems occur.

Nursing supervisors theoretically provide periodic visits to review the auxiliaries' activities, check medical supplies and storage and help resolve some of the difficult problems. In practice one finds that the auxiliaries are poorly trained and ineffectively supervised by either the nurses or doctors. Patronage plays an important role in assigning physicians to the health centers and their activities and actual working hours are even less supervised than other health personnel. Nursing supervisors often report the physicians' absences, however, little apparent use is made of this information to improve their productivity. Table 6.4 shows the number of personnel assigned to the epidemiological and communicable disease program. These 56 employees are responsible for the programs indicated, usually in a supervisory position performed at the Ministry level.

Thus, in addition to a scarcity of personnel in absolute numbers, low productivity and low quality service plague each level of personnel from the physician to the auxiliary. Clearly, some regular pattern of supervision is needed to raise the efficiency and effectiveness of the existing manpower and also an intensive effort to recruit and train new health professionals.

6.2.6 Supplies. Many health centers have an inadequate variety and quantity of medicines. Orders may take days or weeks to arrive and health centers often find themselves with a small stock of inappropriate

medicines. The Ministry donates vaccines and medicines to the health centers for tuberculosis, parasites, and veneral disease. Observers report that the trivalent oral polio vaccine supplies distributed by the Health Ministry are sometimes out of date and supplies are consistently delayed. There is no readily available measles vaccines in the field. Tuberculosis and malaria treatment are available on a somewhat wider and more regular basis.

Central de Abastecimientos Medicos (CAM) is the national facility that orders, stores, and sells all medical supplies and equipment to the Health Ministry and JNAPS treatment facilities. In 1973, Practical Concepts Inc. evaluated the CAM operations in two regions. 2/ The evaluation found that many health centers had little or no medicines available and could not get more because their lines of credit were used up. After the earthquake of December 23, 1972, medicines had been given away instead of sold so there were no funds to buy replacements. When health centers did not have cheap medicines, many poor patients stopped coming. The problem existed despite a large stock of Ministry medicines in the CAM warehouse in Managua.

The management team determined the starting point to be (1) getting health centers to use the system properly and (2) cutting delivery time for health centers staff to use MSP procedures. An analysis of delivery by mail and truck in October 1974 suggested that mail would be dependable at no extra cost. Finally, a pilot project was initiated in nine health centers and the PUMAR unit in Matagalpa to test the new system with monitoring of the four key events (a) order mailed to Ministry, (b) receipt at Ministry, (c) receipt and dispatch from CAM warehouse (d) receipt at health centers. Refinements were subsequently made and endorsed as a model for nationwide use. A complete CAM reorganization has occurred in the past year which has vastly improved the distribution and ordering of medicines at the central level. Problems still occur in the prompt ordering of supplies and medicines at the health center level and in the management of the medicine funds.

A recent mishap was a January 1976 fire at the Central CAM store house in Managua which destroyed most of the controlled medicines and

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2/ Practical Concepts, Incorporated, Consultant Report to AID. 1973.

supplies. In spite of this setback, the CAM model appears to be one good solution to the problem of medicine distribution and delivery in Nicaragua.

6.3 Alternative Solutions

Diseases preventable by immunization are a major cause of morbidity and mortality in Nicaraguan children. Although present surveillance systems are only reporting an estimated 5 to 10 percent of cases, it is possible to identify five major causes of morbidity and mortality for which effective vaccines are available: measles, pertussis, poliomyelitis, tetanus and tuberculosis. These high rates are major factors inhibiting the improvement of the standard of living of the poorest majority of the population and are a continuing drag on national development.

AID goals aim to reduce morbidity and mortality in Nicaragua through improvement of rural health delivery systems and the concurrent Health Ministry priority of extending immunization coverage to 80% of the rural population while upgrading and broadening the health delivery system nationwide. Our analysis of the communicable disease situation in Nicaragua and the infrastructure within which control and maintenance programs operate underline three major areas for improvement: health delivery services, information systems, and medicine distribution and planning.

6.3.1 Communicable Disease Control System. In the U.S. Center for Disease Control Study, information was collected and discussions were held with Ministries of Health throughout Central America on the problem of yellow fever, rubella, mumps, cholera, typhoid fever, and influenza.3/ For yellow fever, it was determined that Ministries should be prepared with a surveillance and control response capability in the event the disease were imported but that mass immunization programs were not warranted. For rubella and mumps, it was thought that while the vaccines are considered efficacious and the diseases are present, the economic and health impact of the diseases are such that mass immunization programs do not appear warranted. While influenza was recognized as a serious

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3/ Mass Immunization Programs for Latin America, 1972 CDC.

health problem with a significant economic impact, the current state of influenza vaccine does not lend itself to a mass immunization program. For cholera, it was thought that the current vaccines were not effective and that a surveillance-control program should be substituted for mass vaccination. Typhoid fever is considered a problem but of unclear magnitude.

Epidemiology. Control of measles, poliomyelitis. diphteria, pertussis, tetanus and smallpox was considered of sufficient economic and social benefit to warrant the costs of developing and operating a nationwide vaccine maintenance and surveillance program. A brief description of the epidemiologic situation of each of these diseases is described below with some discussion of the social and financial costs of treatment. Tuberculosis and malaria will not be discussed as Nicaragua already has substantial financial commitments in well-developed programs for these diseases.

Virtually all children in Nicaragua give evidence of a previous infection with measles. Therefore, the true incidence of measles approaches the birthrate minus children who die before being exposed to measles. Measles mortality ranges from 4 to 10 percent. Direct costs of this disease accrue in hospitalization and clinic visits. Another cost incurred is the wastage of calories invested in the children who will die of measles disease. These children in the disease process consume an average of 19,328 calories per person. Studies reported recently indicate a cost of at least 4 cents per 1,000 calories for a typical Central American family. 4/ Children who suffer from measles during the year but do not die consume excess calories because of fever associated with the disease. These calories will not be available for other activities or for growth. Also, the cost of self-medication must be considered.

From 1958 to 1971 an average of 268 cases of polio has been reported for Nicaragua. Polio attacks year round and has been a disease of the very young. The average cost of acute hospital care for polio cases has ranged from $100 to $800. The average cost of delayed care is even higher.

Between 25 and 60 percent of pertussis deaths are recorded as occurring during the first year of life. A survey of cases in Central

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4/ Guatemala Indigena, Vol. 4, No.2.

America showed that 8.2 percent were hospitalized for an average stay of 12.8 days per patient. At a minimum cost of about $12.00 per day of hospitalization and $3.20 per clinic unit, the treatment of pertussis is a significant health cost. Caloric requirements must also be calculated to average age of death at 12 months.

Fifty to 75 percent of tetanus deaths are reported in children under the age of one. Tetanus can be found throughout the year. Hospitalization is the greatest direct cost with an average length of stay of 13.2 days. A program with 75 percent efficiency in children could prevent not more than 20 percent of total tetanus cases.

The average hospital stay is 10.7 days for diphteria cases. Figures from El Salvador suggest two outpatient visits for every hospitalization at about $1.50 per visit. Caloric loss can be calculated for a median age of death at four years.

There have been no cases of smallpox in the Western Hemisphere for several years. Because of the possibility that smallpox could still exist in isolated foci in South America, with subsequent exportation to Central America, most health officials in Central America suggest continued routine smallpox vaccination for the next several years. Absence of smallpox means no economic benefits are likely to be demonstrated in the next few years if smallpox vaccine is included in the program and an importation does not occur.

Proposed Plan of Operation. Immunization programs reduce morbidity and mortality in the high risk groups and thus directly contribute to the rate of population growth. This immunization program should be established as part of a total maternal and child health program which contains both mortality and fertility control procedures. The improved survival resulting from an immunization program may well be a prerequisite to the acceptance of family planning services, and therefore, from the start, should be coordinated with other such programs.

A comprehensive immunization service should be established for all children 1 to 24 months of age. The achievement of Health Ministry objectives will require a continuing annual immunization cycle in rural areas reaching 85 percent of the target population. In urban areas 6-month cycles would be appropriate.

The heaviest rains occur between May and November, and immunization during this period should be directed to the population who live in towns larger than 20,000. Large annual migrations take place in Nicaragua and workers are frequently accompanied by their families. Immunization programs must consider these migrations in planning campaigns. Immunization of the agricultural areas during the migration periods may be appropriate because of the large numbers of persons gathered together. Most of the Central American countries have weekly market days. Those children who are very young and those old enough to help are often found with relatives at markets. For this reason, markets may serve as appropriate places to immunize, as well as carry out advance publicity.

Strategy. The type of campaign proposed is a mobile maintenance campaign, utilizing a collecting point system. 5/ People collect at a central point, usually within several miles of their homes, on a specific day at a particular time of day. These could easily be organized by paraprofessionals working in cooperation with the Health Ministry. Self-contained mobile teams would administer the vaccines. Ideally, this system would set the stage for maintenance programs to be gradually transferred to the health center. The advantage of such a system includes: rapid coverage, a reduction in the number of vaccinating personnel, efficient use of jet injectors, and a reduction in the amount of supervision required. Built into the success of a collecting point system is the need for a very careful advance notification system in the defined area and the assistance of paraprofessionals.

Neither house-to-house vaccination campaigns nor at present health-center based programs, are feasible because of the limitation in funds, personnel, and equipment. Although these types of campaigns have the advantage of requiring little advance publicity, they are expensive, usually cannot use mass vaccination equipment, and require more supervisory personnel. If the Health Ministry could train a sufficient number of capable paraprofessionals, this system could be greatly expanded.

Implementation. If a national program is to be successful, central responsibility on the part of the national government for the program is essential. The headquarters staff, being responsible for the overall planning, direction, and supervision of the program should have a full

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5/ IBID.

time national program director who is a senior health official with sufficient status to obtain necessary cooperation from the government, and who has clearly the authority to make decisions in the field. This authority should be sufficiently flexible to permit guidance of the program through the intermediate administrative levels to the health workers at the peripheral level. Since the program will depend heavily on proper field execution, it is important that the director, as well as the supervisory staff, be prepared to frequently inspect the intermediate level and to insert periodically the peripheral level of operations.

The effectiveness of field supervision has principally accounted for the success or failure of immunization programs in the past. At each supervisory level, responsibility should be assigned and authority delegated to the maximum extent possible. First level supervisors responsible for a vaccination team can often be selected from among the vaccinators or other health workers assigned to the team. Supervisors should be selected and trained first, and they should participate in the selection and training of those individuals whom they will supervise. Central headquarters should include a National Program Director, Secretary, Administrative Officer, Statistician, Supply Management Coordinator, Garage Superintendent, clerks, mechanics and drivers.

Field personnel should include supervisors, (group supervisors and team leaders), vaccinators, recorders, advance men, assessors, mechanics, clerks and drivers. Other personnel (crowd controllers, laborers, community representatives, etc.) will be needed from time to time and these can be obtained from the local population.

Educational requirements should be established for selection at levels which are low enough to permit final selection of personnel from a reservoir of candidates substantially larger than the number of personnel required. This will help assure the selection of the most qualified individuals. Since techniques with respect to the program are not generally complex and can be taught in a comparatively brief period, recruitment from a broad variety of skills and competence is possible.

Possible sources of staff for vaccinators as well as first level supervisors include health auxiliaries, sanitarians, laboratory technicians, and health inspectors. Supervisors, team leaders, assessors, recorders, and storekeepers should be able to read and write Spanish. Vaccinators should be able to read in order to follow repair manuals and other

Table 6.5

Estimared Capital Costs for National Immunization Capability, Nicaragua, 1972 Prices

Vehicles	US$65,000
Motorcycles	8,000
Freezers	1,500
Refrigerators	1,500
Cold Box	1,500
Ject Injector	30,000
Boat and Motor	6,000
Vaccination Stamps	700
Total	US$114,200

Table 6.6

Estimated Annual Cost for National Immunization Capability, Nicaragua, 1972

Personnel	
Salary	US$ 95,000
Per Diem	21,000
Vaccines	
DPT 0.04 per dose at 3 per person	6,400
Polio 0.10 per dose at 3 per person	16,000
Measles 0.20 per dose at 1 per person	21,000
SP/BCG 0.02 per dose at 1 per person	2,100
Petrol (13,000 gallons)	6,500
Vehicle Spare Parts $500/vehicle	6,500
POJ Spare Parts $100/Jet Injector	3,000
Laboratory Support	6,500
Miscellaneous $400/Team	2,000
Publicity (Promotion)	12,400
Total	US$ 198,400

instructions. All supervisors, team leaders, and assessors should be able to calculate percentages.

For Nicaragua's population of approximately 2,100,000 people, five mobile maintenance teams, possibly PUMAR, are the estimated requirement (1 per 500,000 population). Projected personnel required, capital equipment, vaccines and supplies, estimated capital costs, and estimated annual costs, appears in Tables 6.5 and 6.6. 6/

6.3.2 Information Systems. Several parts of an epidemiological and management data collection system exist but are in great need of strengthening. 7/ Proposals for seven information system improvements are included here.

Outpatient Data Sources. Efforts should be made to obtain diagnosis - specific data from hospital outpatient departments. Presently the JLAS-Managua hospitals are developing a system that will provide diagnosis, age, and sex data for each outpatient seen. If the system functions well it might be applicable to other JNAPS hospitals.

Data Processing and Outpatient Information. To increase efficiency and speed as well as to allow for more detailed analysis, strong consideration should be given to the institution of electronic data processing for all health data as presently utilized by Social Security and JLAS-Managua. Manual tabulation should be limited to case counts of notifiable diseases. Data processing would be facilitated if standarized forms were developed for the JNAPS, Social Security, and the Health Ministry. The newly formed Central Coordinating Committee for Health Statistics should consider the establishment of a central office for data collection (and possibly data processing).

Notifiable Disease Reporting from Health Centers. Presently two overlapping methods are used to report notifiable diseases seen at the health centers: telegram (case count only) and mailed form (counts by age and sex). It is suggested that the telegraphic notification in the future be limited to quarantinable diseases and to any other disease

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6/ IBID.
7/ Gerald Faich. Unpublished consultant report. 1975.

apparently occurring at epidemic levels, retaining the letters reporting system as presently constituted.

Information Feedback for Notifiable Diseases. At least several times per year analysis of notifiable disease activity should be sent to reporting centers in the form of a newsletter, in addition to being informative, this method of data feedback should encourage reporting.

Hospital Discharge Information. Until now only the Social Security hospitals have routinely provided tabulations of hospital discharge diagnoses; these have not been available by age. Social Security and JNAPS hospitals should be encouraged to develop systems which will allow for analysis of discharge information by age, sex, diagnosis, and month.

Disease Information. Disease specific mortality figures by geographic areas, month and age for at least the notifiable diseases should be obtained. Ideally such analyses should be done by computer. Efforts to reduce the time lag necessary to obtain death data from the Ministry of Census should be made. Consideration should be given to the training of civil registrars in a simplified cause of death classification in order to improve the quality of disease specific mortality data. The development of a simplified system list for this purpose should be encouraged. Attempts to improve the number of deaths reported should also be made. Required registration prior to burial might be considered.

Laboratory Facility and Laboratory Information. Outpatient and death data provide at best unconfirmed diagnoses. To aid in the etiologic determination of epidemic diseases a central reference laboratory should collect and analyze specimens of epidemiologic import (e.g. polio, typhoid) and avoid routine clinical laboratory examinations. It should also be charged with the collection and analysis of diagnostic information of public health importance generated by other laboratories.

The Division of Epidemiology of the Health Ministry should be encouraged to conduct field investigations of disease outbreaks. When outbreaks are reported or detected by the ongoing surveillance system, on site investigations to confirm the diagnosis and to determine epidemiologic specifics should be made so that appropriate control and preventive measures can be instituted.

The source inputs needed to implement these recommendations could vary considerably. Where outpatient data and hospital discharge information is required, the Ministry, in cooperation with the Social Security Institute and JNAPS, could develop a new information form which would solicit diagnosis - specific data and hospital discharge statistics by diagnosis and age. Social Security Institute, JNAPS and the Ministry should be encouraged to share in the costs for the analysis of this data. JLAS-Managua hospitals are developing an outpatient information system which can be referred to for cost and manpower estimates. Since most hospitals have some form of information system already, these recommendations for additional items of data should only imply an increased quality of data collection and not necessarily a significant change in cost of personnel.

The same is true in initiating an information feedback system. One or two people with even a low level of knowledge about health or epidemiology and good writing skills could prepare a brief summary of the anlysis of notifiable disease activity in the form of a newsletter and send it to the local reporting center four to six times a year. In a financial sense this would require additional resources for part-time personnel, office space, paper and supplies, printing or mimeographing, and postage. If such a publication would encourage more accurate and complete disease reporting and engender a feeling on the part of local health personnel that they were part of a national effort, this would be an inexpensive price, indeed.

To establish a data processing capability or computer analysis implies a much greater commitment of financial resources. In addition to the cost of buying or leasing the machinery and the cost of delivery and installation, several people must be trained as programmers, operators and repairmen. If a mechanized system of data anlysis is deemed necessary, a sophisticated study of cost requirements should be undertaken.

A central office for data collection should either be placed under the Ministry of Health or act as a semi-autonomous agency jointly funded by all health institutions. Ideally, it should be staffed by one epidemiologist or statistician, several intermediate level statistician, a data processer and a writer for preparing reports.

6.3.3 Planning Capability. At the present time there is an almost total lack of skilled planners, administrators or epidemiologists at the regional or local level. Therefore, there is no planning for continuing services at the community level or anticipation of epidemics. This deficiency in turn reflects on rational budgeting and prospective planning for supplies and equipment. The result in past years has been reflex response programs begun well after an epidemic has started. Since these outbreaks have not been anticipated, local and regional centers have no money budgeted for the necessary vaccines or supplies. It is often the case that when epidemics occur the health centers and hospitals are obliged to buy vaccines and medicines from local pharmacists at prices well above cost.

Therefore, we recommend the training and hiring of epidemiologists who can anticipate disease outbreaks and help promote prospective planning in the regional and local health centers. One epidemiologist for every two or three local reporting areas with a small office and a vehicle and drivers would upgrade reporting and analysis; provide consultants for planning activities and supplies for an epidemic and allow for small scale field investigations. The training and salaries of this corps could be of considerable expense and therefore, shared costs by all the health agencies is encouraged. In the long run however, this new group would save all the health institutions money on emergency ordered (e.g. at a high cost) supplies and medicines and costs for post-epidemic hospitalization and treatment.

6.3.4 Medicine Distribution and Supply. The central drug warehousing arrangement (CAM) has served its purpose, adequately protecting the Health Ministry medicines and equipment from theft and unsuitable storage and handling prior to distribution to health centers. The central warehouse destroyed by fire in January 1976 is already underway for rebuilding within the next few months. Among its achievements the CAM system has succeeded in lowering Health Ministry medicine prices to a cost competitive with JNPAS.

The major problem still faced by this system is in encouraging the health centers and rural hospital personnel to take advantage of this new supply network instead of relying on local pharmacies. Utilization of the CAM system has been hampered for two reasons. First, because epidemiological planning is extremely weak so when an epidemic strikes doctors are reluctant to wait for medicines to come through the mail, which

admittedly can be unreliable. Local doctors are disappointed when they are unable to receive a particular brand name through the central ordering system. Second, local physicians frequently have a financial interest in the town's pharmacy and therefore find it to their benefit to buy medicines and supplies on the retail market. Observers report that the local health center doctor uses a small health supplies bank account to purchase these private sector drugs. Sometimes the patient is charged for medicines and other times he is not. In any case, it appears that the cost to the consumer to purchase his medicine varies considerably.

Several recommendations to remedy this situation and increase utilization of the CAM system have been proposed, however, all of them necessarily fall back on the adherence of local doctors to a high ethical standard.

First in a concerted educational campaign for health center personnel in the timely ordering and proper utilization of drugs and medical supplies with improved supervision and administration from the central offices of CAM and the Health Ministry, CAM should be put directly responsible for the resupply of all health institutions. Instead of maintaining a cash account for medicines and supplies at the local center, a credit arrangement with the CAM central warehouse could be established. Another possible alternative to insure availability would be to subsidize the price of certain important drugs and establish low fixed prices for pharmacy's drugs, thereby making important drugs readily available at low prices with a slip from a health center or other health facility. This, however, would have to be legislated and there does not appear to be a favorable climate among high government officials for this kind of action.

It should be pointed out that in 1975 AID commissioned Practical Concepts Inc. to study the efficiency of the CAM system from a mangement point of view. After an analysis and review of two regions, a report was issued which makes some recommendations to improve operations but effectively commends the CAM operation. After our independent inquiry and with the PCI document as a reference, it can be concluded that for those institutions and health centers that use the CAM system, it is a workable and moderately efficient method for medicine and supply distribution in Nicaragua. However, if utilization rates are going to be improved and particularly if USAID intends to invest more resources into its operation, then a utilization study emphasizing the nature of cash flows and the significant role of the local physician and pharmacist at the health center level should be undertaken.

CHAPTER 7

RURAL WATER SUPPLY AND EXCRETA DISPOSAL

The concensus of international specialists is that deficiencies in the water-to-waste cycle must now be attacked forcefully in lesser developed countries because of the close relationship between sanitation and many health, nutrition, and other social problems. Among the numerous environmental problems bearing on human health we have chosen to concentrate here on rural water supply and excreta disposal systems. Existing sanitation technologies and construction techniques are considered adequate to provide reliable water to people in most parts of the developing world. The need now is for a concerted effort by national and international agencies to improve these crucial rural services.1/

7.1 Health Problems Due to Lack of Environmental Sanitation

Enteric disease incidence continues to climb throughout Nicaragua, reaching alarmingly high levels in many areas.2/ Water supply and sewage disposal systems, along with educational programs to ensure the proper use of these facilities, could greatly reduce the problems of infectious and parasitic enteric disease. Of the 216,644 total notifiable disease cases reported for 1973 by the 116 health centers there were 45,056 parasitosis cases, 28,844 diarrhea cases and 7,422 amoebiasis cases.3/ High correlations were found between the onset of

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1/ Patricia L. Rosenfield, Robert C. Emrey and Martha Anderson, Rural Water Supply and Sanitation in Developing Countries. Washington: Office of Health, A.I.D. 1976

2/ This chapter draws heavily on the consultant report of Engineer Charles Pineo, 1975

3/ Gerald A. Faich, Unpublished consultant report, 1975

heavy rains in May and September and the sharp increase in parasitosis, diarrhea, and amoebiasis shortly thereafter (see Figure 7.1 and Table 7.1).

Rainfall can wash away excreta and other contaminants from uncontrolled dumping areas. Without benefit of sanitary disposal, these wastes will enter poorly protected water supplies. Also, in areas with poor surface drainage inadequately disposed animal and fecal excreta can contaminate surface pools or moist soil which sustain bacteria-viral growth and promote hand to mouth transfer of pathological enteroviruses or bacteria, especially in children. The following discussion, then, contains analyses of ways to provide for sanitary disposal of excreta and for protection of wells and springs from contaminated runoff.

7.2 Present Coverage

The urban and rural areas of Nicaragua lack both safe water supplies and controlled excreta disposal systems. Data for the year 1971 indicates that 8% of the people in urban areas carry their water from rivers, springs, and lakes while at least 50% of the people in rural areas use these sources and another 46% get their water from wells, many of which are doubtless poorly protected.

The same data reports that 37% of the urban population is served by sanitary sewers or septic tanks, another 54% use latrines, and the remaining 9% use the patio or open fields. In the rural areas 84% use the open field, 15% use latrines, and 1% are served by a sanitary sewer or septic tanks (see Table 7.1).

This sector is organized under the responsibility of three separate institutions, each with some overlapping areas of activity: (1) environmental sanitation division of the Health Ministry, the National Department of Water Supply and Sewers (DENACAL), and the Waterworks of Managua (EAM). In general, the Managua waterworks is responsible only for the water supply of the capitol city, not including the sewage system. The DENACAL is responsible for water and sewers throughout the rest of the country. The Ministry takes responsibility for sanitary conditions generally in all parts of the country and especially in those areas where no other active water supply and excreta disposal program is in operation.

Figure 7.1

Cases of Parasitosis, Diarrhea, Amoebiasis Reported
By 116 Health Centers
and total-rainfall at 7 gauging stations, Nicaragua, 1973

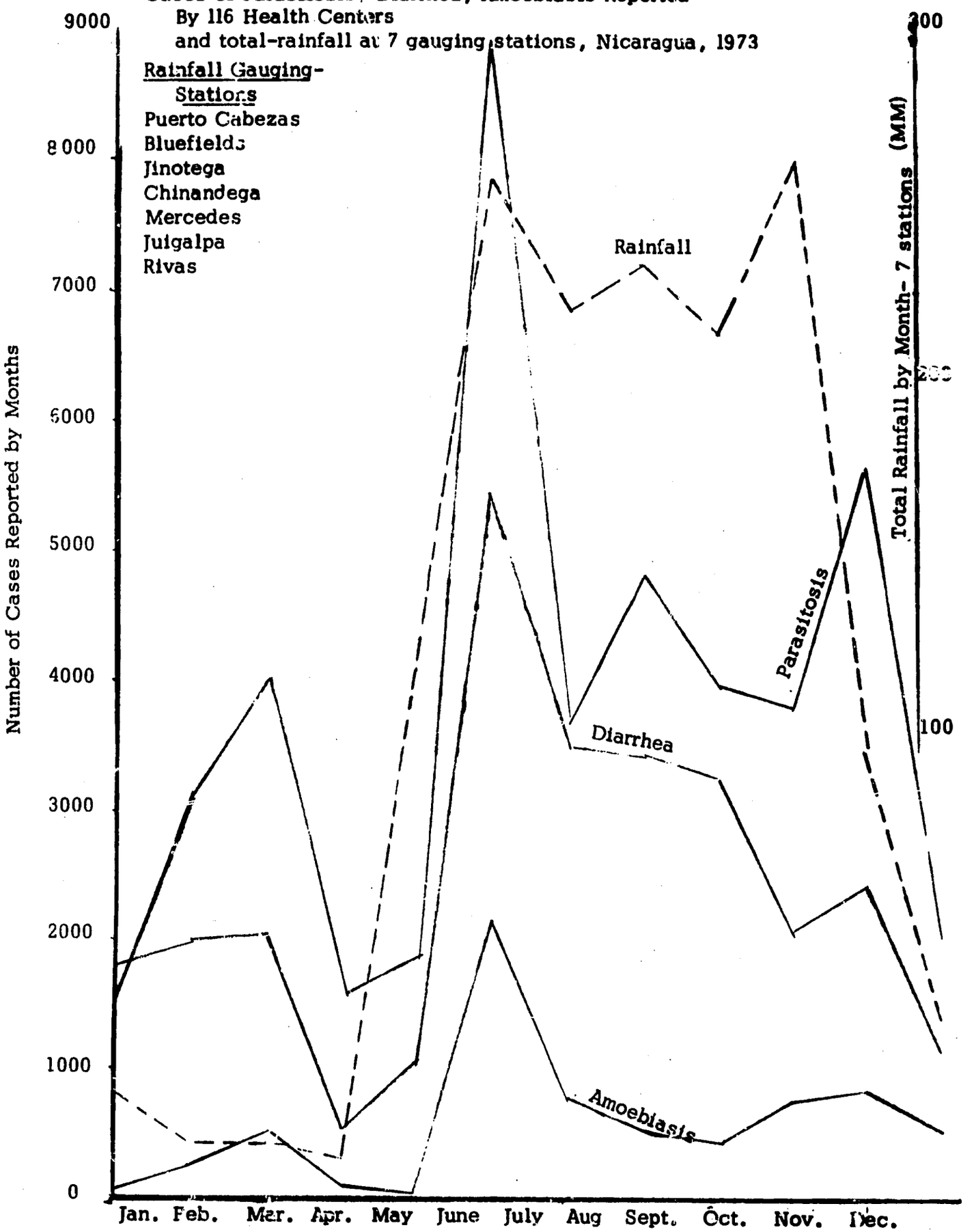

Table 7.1

Water and Excreta Disposal Service Coverage,

Nicaragua, 1971

Type of Service \ Population Served (000)	Urban	Rural
Water		
Connected to a piped distribution system	488	29
Obtained from wells	322	44 2
Carried from rivers, springs, lakes, etc.	75	489
Excreta Disposal		
Sanitary sewer or septic tank	3 26	7
Latrine	480	148
Open field or patio	79	8 05

Source: National Census of Nicaragua, 1971.

The fact that a large number of people have no sanitary means of excreta disposal and probably carry their drinking water from easily contaminated rivers, lakes, and unprotected wells bears out the conclusion drawn from Figure 7.1. It is obvious, as might be expected, that the worst problem is in the rural areas. But there are also urgent problems in the urban areas. The data indicates that there were 162,000 people in urban areas who were connected to piped water distribution systems but who were not connected to sanitary sewers or septic tanks. Moreover, of the eight cities with populations over 20,000 the percentage of coverage by some means of garbage disposal varied from a low of 9%,with two about 15%, one at 25%, three at 36%, and Managua with a coverage of 84% using a sanitary land fill.

The usual practice is to pick up the garbage in open trucks or horse-drawn carts and deposit it in an open field along the edge of the highway not too far from the town. Fly breeding and rat infestation is invited for those deposits not burned regularly.

According to the latest information, December 1974, 70% of the urban population has house connections to water supply distribution systems and only 8% of the rural population has this service. While it appears that the urban population is served either by house connections (70%) or by easy access to public hydrants (30%) the fact remains that the service in many water supply systems is deficient, is not continuous, and in some cases has to be rationed during the dry season. In the rural areas there are 891,000 people without an adequate water supply service. (see Tables 7.2 and 7.3).

Table 7.2

Water Supply Service, Nicaragua, 1974

Area \ Population (000)	Population Total	Population Served with Water: House Connections	Population Served with Water: Easy Access
Urban	989	695	294
Rural	1029	81	57
Total	2018	776	351

Source: DENACAL. 1975.

In the urban areas there are 709,000 people who are not connected to sanitary sewage disposal systems or to septic tanks, In the rural areas there are 828,000 people who do not have even latrines.

7.3 Effectiveness

While it is apparent that there are inconsistencies between the data for 1971 and for 1974, nevertheless it is evident that the following

Table 7.3

Excreta Disposal Services, Nicaragua, 1974

Area \ Population served (000)	Sanitary Sewers	Septic Tanks	Seepage Pits	Latrines	Without Sanitary Disposal
Urban	260	20	148	561	-0-
Rural	-0-	-0-	-0-	201	828
Total	260	20	148	762	828

Source: DENACAL. 1975.

action must be taken to improve the environmental sanitation conditions in Nicaragua:

a. A massive program must be set-up to provide adequate water supply and sanitary excreta disposal in the rural areas accompanied by continuing health education programs on the use and maintenance of these essential services.
b. Improvement of the urban water supply systems to provide continuous potable water with adequate operation and maintenance services.
c. Increase the number of sewage disposal service systems to cover urban areas without those services now with adequate operation and maintenance services.
d. Stimulate the improvement of existing garbage disposal services and the installation of those services in other urban areas.
e. Develop a regular program of water quality control with the necessary regional laboratories under the supervision of a central laboratory.

Where possible, existing agencies should be used to develop and carry out the programs and to prepare the people at the local level to participate in their own projects from the very beginning into the all important operations and maintenance phases.

7.4 Infrastructure

At present there are several agencies carrying out programs in the environmental sanitation field. Listed below are those agencies responsible for the more extensive programs.

7.4.1 Health Ministry, Environmental Sanitation Division. This is one of the technical divisions of the Ministry of Public Health. Among its responsibilities is: (a) the preparation of the guidelines and regulations for the adequate control of the various aspects of environmental sanitation, and (b) a continuous inspection, particularly in the urban areas, to see that those responsible comply with the regulations. This inspection is carried out through a group of 187 sanitary inspectors, headed by a chief engineer with two assistant engineers, five supervisors, and twenty-five specialized workmen, plus five administrative assistants.

A review of the reports of the sanitary inspectors by a Pan American Health Organization team led to the following comment, "the lack of supervision in public health matters pertaining to sanitation reflects the almost complete lack of interest of the sanitary inspector in doing a more or less acceptable job." Moreover, because of the lack of transportation facilities, the sanitary inspectors are not able to cover all of the towns and villages of the country.

7.4.2 Departamento Nacional de Acueductos y Alcantarillados. This department is practically autonomous. It is headed by a director named by the President of the Republic and has its own technical and administrative offices with supporting units. At the end of December 1974 its staff consisted of:

Engineers	26
Other Professionals	10
Technicians	164
Administrative Support	294
Total	668

The tabulation in Table 7.4 gives the combined budgets of the Ministry of Health Department of Environmental Sanitation and of DENACAL. It will be noted that DENACAL, through which loan funds are channeled for capital construction, also is funded from the regular budget of the Health Ministry as well as income from the water supply and sewerage systems which DENACAL operates and from minor funds from other sources. It is interesting that the DENACAL budget has

Table 7.4

Annual Budget for Environmental Sanitation, Nicaragua, 1973 to 1975
(Thousands Cordobas)

Budget / Sources of Funds	1975 Recurrent Expenses	1975 Capital Expenses	1975 Total	1974 Recurrent Expenses	1974 Capital Expenses	1974 Total	1973 Recurrent Expenses	1973 Capital Expenses	1973 Total
Ministry of Public Health Environmental Sanitation Division	2,776	11	2,787	2,758	11	2,769	2,401	0.3	2,401
Ministry of Public Health Division Transfers to DENACAL									
- For administration of construction of water supply and sewerage systems		2,099	2,099		1,991	1,991		1,778	1,778
- For construction of water supply and sewerage systems		55,183	55,183		63,311	63,311		40,174	40,174
Income for Services provided by DENACAL	18,424		18,424	13,300		13,300	11,200		11,200
Other Funds to DENACAL	18,968		18,963	466		466	218		218
Total	40,168	57,293	97,461	16,524	65,313	81,837	13,819	41,952	55,711

increased from C$ 3,370,000 in 1973 to C$53,370,000 in 1973 to C$94,674,000 in 1975 and that its income from system operations increased from C$11,200,000 to C$18,424,000 in the same period. During the same period the cost of operating and maintaining those systems has increased from C$15,916,000 to C$19,898,000 with losses decreasing from 142% to 108% for costs of operation and maintenance and projected for 93% of that cost in 1976. DENACAL estimates that it is costing C$30.76 per month per water supply connection to operate and maintain the system providing those services (including depreciation) as shown in Table 7.5. At an estimated six persons per connection, this amounts to C$0.73 per capita per month. Operation and maintenance cost for sewerage systems amounts to C$0.03 per capita per month (including depreciation). Water rates are calculated for each separate system operated by DENACAL.

DENACAL is making every effort to improve its overall administration by (a) continuous review of its procedures; (b) assistance in organization and methods furnished by the Pan American Health Organization through a complete review and analysis of the agency followed by continuing assistance of a full-time PAHO consultant; (c) more effective planning to improve the operation and maintenance procedures for the systems under DENACAL responsibility.

7.4.3 Empresa Aguadora de Managua. The Empresa Aguadora de Managua (EAM) is an autonomous agency with its own resources, attached to the Ministry of Public Works. It is directed by an administrator who is named by the President of the Republic. There is a Vice- President and technical and administrative departments with supporting sections. The Empresa has the following personnel:

Engineers	9	(4 sanitary engineers)
Technicians	25	
Other Professionals	11	
Specialized Workers	255	
Administrative Support	195	
Total	495	

The budget for the Empresa is shown in Table 7.6

Table 7.5

DENACAL Budget for Water Supply and Sewerage System Operation and Maintenance, Nicaragua 1973 to 1976
(Thousands of Cordobas)

Income and Expenses \ Year	1973	1974	1975	1976
Income				
Operation of Water Supply Systems	8,800	9,600	13,068	17,969
Sewerage Systems	2,400	4,000	5,356	6,633
Total	11,200	13,600	18,424	24,602
Expenses				
Production of Water	3,950	4,617	6,024	8,051
Distribution of Water	1,520	1,700	1,757	1,570
Sewage Collection	476	550	586	493
Cost of Billing and Collection	3,320	3,390	3,434	3,923
General Administrative Costs	1,950	1,950	2,887	4,495
Depreciation	4,700	4,780	5,210	4,495
Total	15,916	16,987	19,898	22,951
Profit or (Loss)	(4,716)	(3,387)	(1,474)	1,651

Table 7.6

Annual Budget for Empresa Aguadora de Managua
Nicaragua, 1973 to 1975 (Thousands of Cordobas)

Expenses \ Year	1975	1974	1973
Current Expenses	15.5	8.8	9.4
Capital Expenses	40.7	54.2	23.0
Total	56.2	63.0	32.4

About 310,000 people are provided with water supply services through house connections by EAM. The remaining 50,000 population in Managua have access to the water supply system. The Empresa is responsible for the administration, operation and maintenance of the water supply system for the Managua metropolitan area. The responsibility for the sewage disposal system of the Metropolitan area was transferred to DENACAL in November 1969.

Table 7.7

Cost of NIC-PMA Program, Nicaragua, Years 1973-1974
(Thousands Cordobas)

Projects \ Cost	Contribution NIC-PMA		Contribution Communities	
	1973	1974	1973	1974
Latrines	490	85	3651	1073
Other Projects	202	155	1495	1468
Total	692	240	5146	2541

7.4.4 The NIC-PMA Program. The NIC-PMA program is operated as part of the Health Ministry to install latrines in rural areas (see Table 7.7). The NIC-PMA report for 1974 estimates the installed cost of a latrine at C$348 ,($50) of which more than 90% was contributed by the community in labor and local material, the calculated cost for a latrine in 1973 was approximately C$251.20 of which more than 88% was contributed by the community. The inflation in costs are not explained. These costs do not include the considerable contribution of food rations for these programs.

7.5 Alternatives

Any plans for the future should take into consideration not only the number of people without adequate services in 1975 but the population growth projected for the period of the planned activities. Table 2.4 (Chapter 2) covers the population estimates for the immediate future. Based on the goals for the 1970's fixed by the Minister of Public Health in Santiago, Chile, the Government of Nicaragua established the following goals for 1980:

Urban areas (over 2000 population)

a. Provide 75 to 80% of the urban population (1,064,000 - 1,135,000) with water by house connections and the remainder by easy access.

b. Install sanitary sewage disposal systems to serve 45 to 55% of the urban population (638,600 to 780,500). This is supposed to provide services for all towns with more than 5,000 population each.

Rural area (less than 2000 population)

Provide 20 to 25% of the rural population (230,000-288,000) with house connections or easy access.

Goals were not set for other areas of environmental sanitation. To reach these goals the services shown in Table 7.8 must be provided between 1975 and 1980:

Table 7.8

Number of People to be Provided with Services, Nicaragua 1975 to 1980
(Population in Thousands)

Area \ Service Coverage	Water Supply				Excreta Disposal		
	House Conn.		Easy Access		Sanitary Sewers		Septic Tanks or latrines
	Low	High	Low	High	Low	High	
Urban	576.0-647.0		28.0 - 0		312.0	454.0	
Rural	-	-	265.0 - 323.0				
Total	806.0-935.0		293.0 - 323.0		312.0	454.0	

Projects are already underway to supply the following needs during the following period 1975 to 1980:

1. Program of sanitary sewers for 24 cities and potable water for seven of them. The population served by these improvements will be 216,000 people with sanitary sewers and 102,000 people with potable water.

2. Potable water supply to the rural population in the 200 to 2,000 inhabitant range. It is estimated that this will benefit a population of 35,000 people.

3. A project to supply potable water to both urban and rural areas of the zone known as Meseta Caracena in departments of Carazo, Masaya, and Granada.

Based on these goals and the status of Nicaraguan sanitary conditions, five programs are suggested for immediate implementation.

7.5.1 Rural Water to Communities of Less than 300. A study is now being completed by the Pan American Health Organization and the Health Ministry with the participation of the USAID Mission to plan water

systems for communities with less than 300 inhabitants, the lower limit of DENACAL coverage. The proposed program also covers the provision of the necessary privy slabs and guidance in the installation by the people receiving the slabs, who will have dug the pit and will build the necessary privy building. The estimated cost of a program for rural communities of less than 200 people is as shown in Table 7.9.

Funds would come from international sources and national and community contributions. The Mission has indicated interest in the supporting a portion of this joint activity.

Table 7.9

Cost of Proposed Miniaqueduct Program during Five-Year Period of Construction, Nicaragua

Year \ Cost	Total Cost	Local Contribution	National Contribution	External Funds
One	US$ 963,900	US$ 192,780	US$ 192,780	US$ 578,340
Two	768,600	153,720	153,720	461,160
Three	617,400	123,480	123,480	370,440
Four	579,600	115,920	115,920	347,760
Five	342,735	68,547	68,547	205,641
Total	US$ 3,272,235	US$ 654,447	US$ 654,447	US$ 1,963,341

Source: Nicaragua Ministry of Health, 1975

It is suggested that this program be carried out in the Ministry of Public Health under a Sanitary Engineering Division to be established specifically for the estimated five year duration of the program, with Pan American Health Organization supervision. Responsibility for the maintenance of the rudimentary water supply systems and of the sanitary

latrines would be turned over (as they are installed by the Sanitary Engineering Division) to existing Environmental Sanitation Division.

Emphasis would be placed on the full participation of the people to be benefited by the program which will require that a number of promoters must be included in the organization. The program would be preceded and paralleled by a health education program to stimulate the interest of the people in rural areas in the need for potable water and sanitary excreta disposal, as well as the formation of community health committees for installation, operation and maintaining those services in a sanitary condition at all times.

7.5.2 Strengthened Sanitation Services . Paralleling the development of the proposed Sanitary Engineering Division, it is recommended that the existing Environmental Sanitation Division be strengthened to give increased coverage for the rural areas. This will require some additional staff transportation so that the inspection can visit regularly the communities assigned to them, refresher training for present staff, completion of the partial draft of an updated sanitary code with the necessary authority to assure that the provisions of the code are met. One of the provisions of the code will be a set of standards for maintaining high level water quality. Three regional water quality laboratories should be established under the supervision and control of the central laboratory of the Ministry which should be strengthened to carry out this responsibility.

It is suggested that Pan American Health Organization might be willing to provide the refresher training for the staff of the Environmental Sanitation Division and assist in the completion of the draft of the sanitary code.

Provision should be made by AID (a) to strengthen the central water quality laboratory; (b) to establish and equip three regional water quality control laboratories; (c) for refresher training for the director of the central laboratory and training of the regional laboratory staff. Pan American Health Organization may be willing to provide technical assistance for this program through an expert on the CEPIS staff in Lima, Peru.

7.5.3 Water System Maintenance. Presently, the capital funding for water supply and sewage disposal programs for both Managua

and urban and rural towns larger than 300 which come under the responsibility of DENACAL are all with present or proposed financing by the Inter American Development Bank and the World Bank, it is felt that AID should not participate in those areas without specific invitation by the Government of Nicaragua. One area of possible assistance might be that of operation and maintenance of the urban and rural systems under DENACAL. This could be carried out through a comparatively small project involving study of the existing systems and methods of operation and maintenance, development of manuals of operation and maintenance based on actual needs and training in the procedures, and technical assistance as required.

7.5.4 Solid Waste Studies. The municipalities are responsible for providing and operating the garbage disposal activities. Because of the very low coverage by solid waste disposal facilities in the urban areas, it is recommended that technical assistance be provided to study the needs, and suggesting economical solutions to consider financial possibilities for covering the capital and operation costs of these facilities.

7.5.5 Slaughter Houses. The country wide problem of medieval practices and facilities for slaughtering cattle should be approached as recommended under 4 above. The municipalities provide the primitive slaughter house facilities but take no responsibilities beyond that. There are a few well-equipped slaughter houses but they primarily provide meat for export, while most of the meat for internal consumption is handled through the municipal slaughter houses. It is suggested that meat for local human consumption meet the higher standards for human beings in "foreign" countries.

7.6 Suggested Program Innovations.

7.6.1 Incentives for Construction Performance. The success programs for rural people, living in small towns or groups of houses, widely dispersed, is dependent on many factors. One of the most important of these is an efficient organization, motivated to carry the program to the people and to help them make it work. This requires close liaison from the national office responsible for the program, through regional offices which can maintain continuing liaison with the surrounding localities or town, (even the small Dominican Republic is divided into four zones for the rural water supply program being carried

out by INAPA). It also requires intermediate level technicians to implement the projects planned and designed at the national or regional level. These intermediate level technicians (let us call them "implementors") must be trained specifically to perform the tasks to which they are assigned. There is need to have a sanitary or a civil engineer to supervise directly the construction of a series of hand dug wells or the installation of hand pumps or wind mills. It may be that the promoter working from the regional office can carry out this responsibility, particularly in a program such as that proposed for villages below 200 populations, supervised by the implementor.

The word motivated is underlined above to emphasize the need to have an organization which is anxious to see that the program is carried out well and as planned. This motivation can be secured by an incentive program such as was initiated in the rural water supply program in Argentina several years ago.

A $5 million dollar loan was granted Argentina by the Inter-American Development Bank for the first phase of a rural water supply program Servicio Nacional de Agua Potable-Rural (SNAP). When at the end of nearly two years only a few systems had been built, the Bank was considered cancelling the loan. At that time the Pan American Health Organization engineer assigned to the project with his Argentinian counterparts developed the incentive plan to speed up the rural water supply program.

In Argentina, as in many countries, the responsibility for developing standards and programs lies at the national level, while the implementation of the programs is the responsibility of the state or provincial offices. The national office of the water service had developed the rural water supply program with the assistance of the provincial offices and had obtained the loan. However, the success of the program depended on the efforts of the individual provincial offices.

The incentive plan was developed to stimulate the provincial offices to set annual goals which, added together, would make it possible for the national program to meet the schedule required by the loan. The program was divided into its principal elements, such as organization of the community, surveys, designs, construction, use of the systems once placed in operation, collection of water rates, presentation of reports, etc.

Each province was helped by the national office to set annual goals for each of those elements, such as: 30 communities would be organized, 40 studies would be made, 30 systems would be constructed, etc. Monetary values were established for each element as an incentive to reach those goals. Progress toward meeting the goals was evaluated each three months by the provincial offices and reported to the national office which reviews the reports to be sure they are accurate. Based on the percentage of accomplishment of the goals for the various elements, the national office pays the corresponding amount of money to the provincial office, which divides the money among the various staff members who participate in the program, professionals, stenographers, chauffeurs, etc. according to a breakdowns which evaluates the contribution of each person to the program. At one time the incentives were such that a person could double his base salary by reaching the goals which had been established.

There were several results. The program was able to attract the more capable staff needed to implement it. An esprit de corp was developed as the staff worked together toward common goals so that today several years after the program was started, many of those same people are still working together. As the monitoring of the incentive program requires close contact between the national effort and the provincial offices, supervision and liaison is strengthened with the resulting benefit to the program.

The monetary values assigned to the various elements may be changed to stimulate faster progress in some element that may be falling behind schedule. For instance, if less studies are being carried out than are needed to reach the overall goals, a higher value can be assigned the studies element to stimulate development of more studies. Hence the incentive plan can be kept dynamic. In addition to changing the incentive for any element, it is possible to add, combine or drop out elements to meet the needs of the program as it develops. This has been done three times in Argentina where the project of the rural water supply program is evaluated every year and the guidelines for the incentive plan have been modified in the light of the evaluations.

It is suggested that consideration be given to establishing an incentive plan in connection with the proposed rural water supply and latrine program for villages below 300 population. With proper incentives, it should be possible to attract the personnel necessary to carry out the program and then the incentive would help to assure that the

program is implemented within the planned time schedule. In these days of spiralling inflation, when costs increase rapidly it is doubly important that a program not fall behind schedules.

7.6.2 Slugger Method. The slugger method for sinking a well casing in sandy or alluvial soil side drillings, and other simple techniques may be applicable in some areas of Nicaragua. The slugger method is described here because information concerning this approach is not generally available.

The slugger method, used successfully in Bangladesh, is simple, fast and requires no special equipment. A length of four-inch pipe (about 20 feet) is supported vertically by a framework of poles, cross-braced so that a man can climb to the top and fill the pipe with water. A level is fastened to the pipe by a rope or chain about four feet above ground level and fastened to one of the leg of the supporting framework, so that the pipe may be raised by a couple of men pumping on the lever.

The man at the top, after filling the pipe with water, places his hand over the top of the pipe so that, when the men raise the pipe with the lever, the whole column of water is raised. When the pipe is lowered, the man at the top raises his hand, some water slops out as the pipe penetrates the sandy oil on which it is standing and some of the sand goes into suspension in the water. The pumping action continues and the pipe gradually sinks into the sand. Additional lengths of pipe are added, water is also added as needed, and in a day it is possible to put down 180 to 200 feet of pipe. A smaller, perforated pump casing is inserted through the original pipe which is pulled out, the pump platform is installed to prevent infiltration from the ground surface, and the pump is mounted. Hundreds of these wells have been installed by the rural people of Bangladesh. This system might be tried with the program for villages of less than 200 people.

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Programa de Abastecimiento de Agua a Comunidades Rurales con menos de 200 habitantes. Managua, 1975

CHAPTER 8

NUTRITION

Nicaragua is a country with an agricultural based economy, a young population in the process of rapid growth, and general characteristics of all countries undergoing socio-economic development. One of the many problems that beset these developing nations is the specter of malnutrition among large segments of the population. Nicaragua is no exception with malnutrition ranking as one of the most important public health problems in the country.

8.1 The Four Nutrition Problems

The 1966 nutrition survey by the Institute for Nutrition of Central America and Panama (INCAP), which was up-dated in 1975, revealed five major nutritional problems in Nicaragua:

a) protein-calorie malnutrition
b) vitamin A deficiency
c) anemia
d) endemic goiter 1/

8.1.1 Protein-Calorie Malnutrition. Nationwide protein-calorie malnutrition (PCM) continues to be the most serious nutritional problem. The 1966 study results discovered that over 56% of all children aged 0 to 4 year suffered from some degree of protein-calorie malnutrition (see Table 8.1). Assuming the situation has not changed and thus projecting the percentages into the age groups 0 to 4 in 1975, the result would be

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1/ INCAP, Evaluacion Nutricional de la Poblacion de Centro America y Panama: Nicaragua, 1966.

that a total of 227,000 children are malnourished.

TABLE 8.1

Malnourished Children

Aged 0-4 years, Nicaragua, 1975

Population / Severity	Number Malnourished	Percent of Total Aged 0 - 4
GRADE I	168,000	41.9%
GRADE II	52,000	13.2%
GRADE III (severe)	7,000	1.5%
	227,000	56.6%

SOURCE: INCAP, 1966.

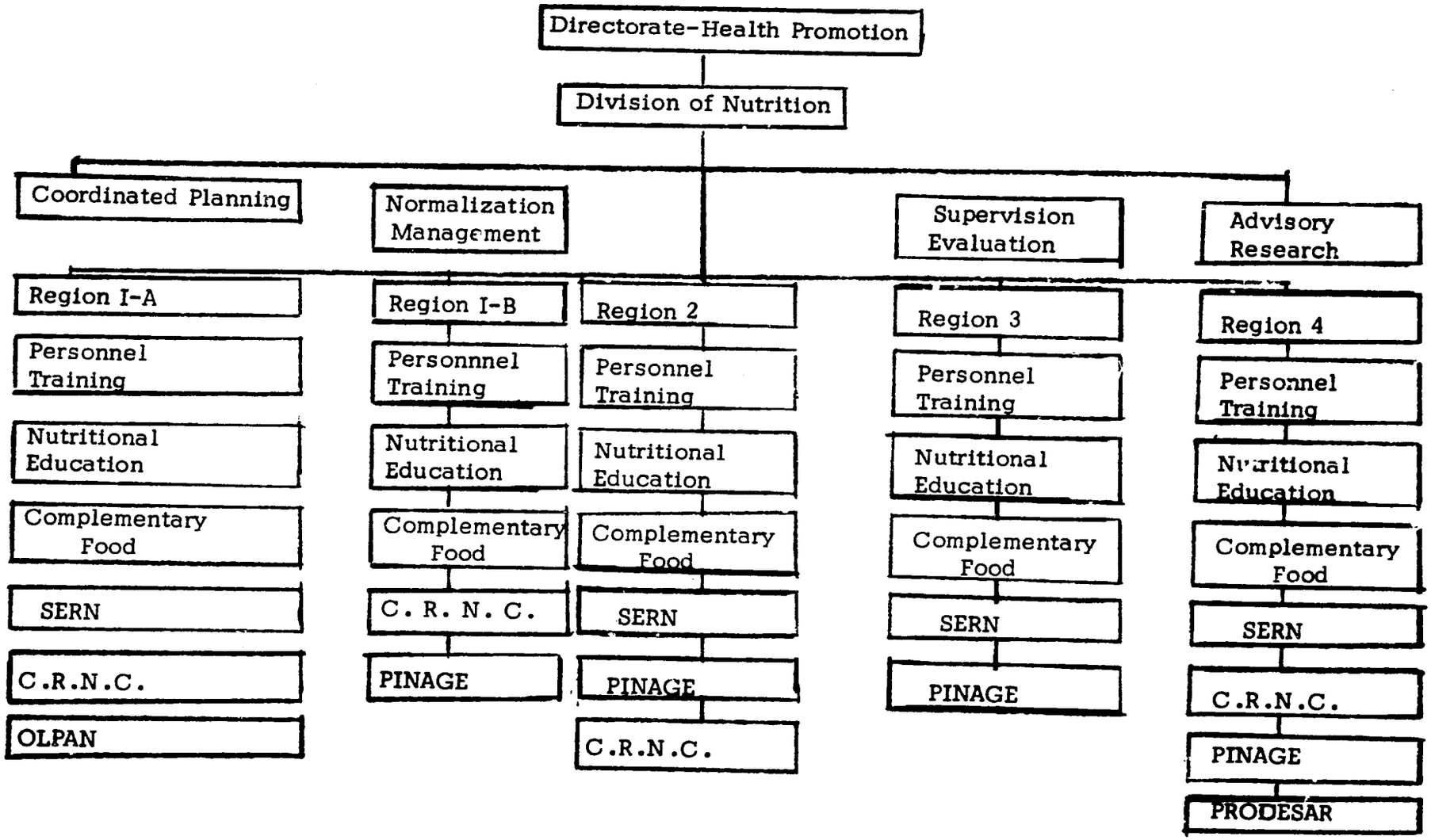
In recent studies carried out in Region 1 and 7, the results have demonstrated an increase in the level of severe malnutrition (Grade III) to be as high as 4.4% of the sampled population. Thus, there is some indication that the nutritional status of the population has worsened rather than improved since 1966.

It is somewhat difficult to measure the precise impact of protein-calorie malnutrition on mortality and morbidity because of the lack of accurate health statistics in the country. Nevertheless, it can be deducted through the use of indirect as well as direct indicators that its impact on the population, especially for those under 5-years old, is quite severe.

The Ministry of Health 1976-1980 Plan estimates that the infant mortality rate is 120 per 1000 live births. Examining the entire 0 to 4 age group, INCAP found that 32.3% of all deaths occurred within that population segment, which the Institute considered a high percentage. A recent aggregation of deaths by the UNIDAD from Nicaraguan official

Figure 8.1

ORGANIZATIONAL STRUCTURE OF THE DIVISION OF NUTRITION



census figure which relates more to urban areas indicates a 24% mortality for this age group. In order to illustrate the disparity between Nicaragua had developed countries, in 1965 in Canada children aged 0 to 4 years accounted for only 7.8% of total deaths.

Focusing regionally, INCAP discovered that based on the percentage of deaths in the 0 to 4 age group, regions 1, 2, 4, and 8 appeared to be particularly affected by malnutrition. The majority of the deaths in this age category can be attributed to a combination of malnutrition and infection. Various studies have documented the destructive effect of malnutrition on the immune response mechanism and the subsequent decrease in resistance to life threatening respiratory and intestinal infections, most of which are preventable through immunization.

Another index of the impact of malnutrition is morbidity. The six most common diagnoses of illness in the consultations of the Ministry of Health's centers and health posts in 1973 were:

1. Enteritis and diarrheal disease
2. Bronchitis
3. Influenza
4. Baccilary Dysentery
5. Anemia
6. Nutritional Deficiencies

The familiar thread of malnutrition binds all six of the major causes together into a sinister pattern.

Broken down by age groups, the nutritionally-related diagnosis accounted for 54.5% of the total for infants and for 40.5% of the total for children 1 to 4 years. These figures are consonant with the results of the INCAP studies indicating that over 50% of the 0 to 4-year old population suffered from malnutrition.

8.1.2 Vitamin A Deficiency. Vitamin A deficiencies can affect growth in general, especially cell membrane integrity. As a consequence, like protein-calorie malnutrition, Vitamin A deficiency can contribute to decreased resistance to infection. However, the most serious damage to the human is impairment of vision or complete blindness.

The 1966 INCAP study revealed a high prevalence of Vitamin A deficiency among the general population, with the greatest frequency and severity being seen in small children. The data show that nationally 19.8% of children under 5 years of age have either deficient or low levels of Vitamin A in their blood serum. Children aged 5 to 9 years are suffering almost as badly-- 18.5% have a low or deficient levels. On a regional basis, the population of Regions 2 and 5 demonstrate the highest prevalence of deficient or low levels of Vitamin A, 16.7% and 9.1% respectively. The populations in the other regions had fairly high prevalence of low levels of Vitamin A, although the rates of deficiency were not as high.

Even though sample studies by INCAP revealed no clinical signs of blindness, the fact that a fairly high percentage of the children studied has concomitant protein-calorie malnutrition, which decreases the need for Vitamin A, helps explain the scarcity of cases of blindness and ocular lesions encountered. If nutritional status is improved through increased consumption of proteins and calories without a concurrent increase in the consumption of Vitamin A, the frequency of cases of blindness will surely mount.

Universally the consumption of foods containing Vitamin A was low, with approximately 89% of rural families and 79% of urban families exhibiting poor dietary intake. By and large, the lower the socio-economic level of the family, the lower the consumption. INCAP identifies three causes to this low intake:

1. Deficient foods: Foods in which sources of Vitamin A are not available in sufficient quantities.

2. Poverty: Even when foods are available, families do not have the income with which they can be purchased.

3. Practices: Certain cultural factors mitigate against the consumption of fruits, which are prime sources of Vitamin A.

8.1.3. Nutritional Anemia. The various nutritional anemias constitute a serious public health problem for the entire Nicaraguan population. This is a result of deficiency in consumption, poor absorption and the aggravation of diseases like malaria. Overall, the problem

appears to be more severe in the urban areas. However, it should be pointed out that different population groups are affected in the urban and rural areas. In rural areas the lowest levels of iron were found in pregnant and lactating mothers, women of the reproductive age, adolescents, and children under 3 years of age. In the cities, individuals over the age of 45 demonstrated the lowest levels of iron.

Apparently, on a national scale enough iron-containing foods are being consumed. However, a significant portion is not being absorbed, either due to parasite infections or to increased loss. In the rural areas, the problem is compounded by the deficiency in consumption.

Folic acid deficiencies are as prevalent as iron deficiencies. About 38% of the rural population and 18% of the urban population have deficient serum levels of folic acid. Particularly affected are the same groups suffering from iron deficiency anemia-pregnant and lactating women, men aged 12 to 44 years, and individuals over 45 years.

The deficiencies of folic acid can be explained by three factors:

1. Low consumption of folic acid containing foods

2. Malabsorption

3. Increased metabolic loss

Once again breaking down the national figures on a regional basis, region 8 contains the population with the highest prevalence of low and deficient levels of folic acid (21.8%), followed by Region 2 (14.2%) and Region 6 (12.6%).

8.1.4 Endemic Goiter. Endemic goiter continues to present a serious problem to Nicaragua. Based upon the 1966 INCAP study and there has been no new intervention which would permit a change in the situation, the prevalence of goiter was 32% (37% for women and 25% for males). Analyzing the urinary excretion of iodine confirms the thesis that there is an insufficient consumption of this mineral. Table 8.2 illustrates the prevalencies of goiter by region.

Although the INCAP study makes no mention of clinical signs of cretinism, there is strong epidemiological evidence that cretinism,

Table 8.2

Prevalence of Endemic Goiter by Community, Nicaragua, 1966

Area	Percent of Population
REGION I	
Leon (3 communities)	32%
Chinandega	48%
REGION 2	
Managua (3 communities)	38%
Masaya (2 communities)	31%
Carazo (1 community)	42%
Granada	38%
REGION 3	
Rivas (2 communities)	45%
REGION 4	
Madriz (3 communities)	34%
Nueva Segovia (3 communities)	34%
REGION 5	
Matagalpa (2 communities)	30%
Jinotega (1 community)	22%
Esteli (1 community)	34%
REGION 6	
Chontales (2 communities)	14%
Boaco (1 community)	34%
REGIONS 7 and 8	
Zelaya	12%

Source: INCAP, 1966

mental deficiency, and dwarfism, coincides geographically with endemic goiter. 2/ Given the high prevalence of goiter, the likelihood exists that cretinism does constitute a problem in Nicaragua.

8.1.5 Others Health Problems Related to Nutrition Retardation of Growth and Development: During the first three months of life, the height and weight of Nicaraguan infants are normal when compared to the appropriate standards. However, after that age, the rhythm of growth slows. At 6 months of age they are below the standard, at 2 years of age are about one year behind, and 5 years of age, are fully a year to a year and a half retarded. No catch-up is evident during the remaining period of growth. The results, then, are adults who do not reach their genetic potential in stature because of adverse environmental effects on growth. Most important of these effects, of course, is early malnutrition. More significantly, are the possible deleterious effects on mental development. Lack of environmental stimuli and early malnutrition certainly (to some degree) contribute to the failure of many to reach their full mental potential. Whether this effect is irreversible is still questionable and remains open for further investigation.

Physical Condition. Although occasional cases of obesity are encountered, especially among women, the majority of the adults were lean and obtained good results on the exercise test -- a good indication of cardiovascular adaption to heavy, short-term exercise. However, there remains an element of doubt concerning the ability of individuals to work over prolonged periods. Further study needs to be done in that area.

Dental Caries and Periodontal Diseases. There is high percentage of dental caries and missing teeth in the Nicaraguan population. Caries appear early and by the time they age, their teeth have begun to fall out. This is an indication of a lack of dental care, lack of oral hygiene, and lack of correct nutrition. Nutritional problems in those individuals without teeth is compounded by the inability to consume solid food.

2/ Choufoer, J.C., Rhijin, M.V., and Querio A. "Endemic Goiter in Western New Guinea. II. Clinical Picture, Incidence and Pathogenesis of Endemic Cretinism"
The Journal of Clinical Endocrinology and Metabolism, March 1965

8.2 Conditioning Factors

The poor nutritional status of the Nicaraguan population is a result of a variety of factors. These factors, which are closely interrelated, can be classified into three general categories:

1. Factors related to food production, distribution, and availability.

2. Factors related to food consumption.

3. Factors which affect the utilization of those foods consumed by the population.

8.2.1 Production, Distribution, and Availability. Nicaragua has the agricultural capability to be a net exporter of basic grains during the foreseeable future. From 1971-1975 Nicaragua has been a net exporter of beans (exporting 5.5% of the total crop), rice (exporting 15.1% of the total crop), and a net imported of corn (importing 6.4% of the total crop). If market demands or controls were favorable, Nicaragua could easily place even greater emphasis on food crops without seriously damaging its export position in cotton which is the traditional cash crop.

However, despite this aggregate positive position in relationship to a surplus of basic food grains, there remains a significant portion of the population (41% below adequate protein level, and 45% below an adequate caloric level) with defficient protein-caloric consumption. The geographical distribution patterns indicate that the rural areas have the most persistent and serious pockets of malnutrition. These aberrant distribution patterns are compounded by a seasonal glut or scarcity of foods in certain areas, especially isolated rural areas. These fluctuations occur for a variety of reasons, and Nicaragua's situation is not unique. Some of these are; the small farmer's traditional reliance on seasonal one crop farming methods; lack of adequate storage facilities in the rural areas; and the inability of the marketing system to operate as a distribution-retail system during poor crop years or seasonal variations. The recent GON program action under INVIERNO indicates that the government is sensitive to these problems and intends to take broad but intensive action to alleviate these problems of production, distribution, and availability.

8.2.2 Factors related to food consumption. The problems of distribution and availability of food are further aggravated by those factors affecting food consumption patterns within various population groups. Dietary studies clearly show that a relatively small population segment consumes the most nutritious foods, while the more numerous and poorer segments often lack

the nutritional necessities. Table 8.4 vividly illustrates the disparity of consumption in socio-economic classes. Per capita consumption for the lower 50% of the population averages 1767 calories and 46.6 grams of protein per day while the upper class consumes an average of 3931 calories and 111.9 grams of protein per capita per day.

Moreover, particularly in those groups most in need, intrafamilial distribution of foods is inadequate. For example, small children receive a smaller portion of meat and beans in relation to their needs than the rest of the family. Part of this specific problem is due a lack of nutritional knowledge on the part of family members, and the large number of dependent children per damily.

8.2.3 Environmental Factors that interfere with the utilization of Nutrients. The nutritional status of population groups is not only a result of food consumption, but also how those nutrients are utilized by the human body. As mentioned above, it is well known that infections affect nutritional status, especially if consumption is already low. The INCAP study showed that the Nicaraguan population is exposed to an exceedingly high level of infections, particularly by parasitic infections which are prevalent in approximately 57% to 94% of the rural population depending on the altitude of their location. The lack of sufficiently high immunization levels in the susceptible populations and the glaring lack of potable water and excreta-disposal facilities in the rural areas continues to foster those environmental elements which affect adequate nutrient utilization.

8.3 Existing Programs

The 1975-1980 National Health Plan presents the MOH's position in terms of nutrition quite clearly. Recognizing the nutritional problems identified by the 1966 INCAP survey and the recent INCAP review 1975, the MOH has proposed to decrease the prevalence of PCM of children 0-4 years of age, endemic goiter, anemias, and Vitamin A deficiency, and to provide preventive nutritional attention and recuperation of pregnant mothers.

A summary of their strategy follows:

Incorporate activities of nutritional attention of mothers and infants into the MCH program.

Strengthen the activities of supplementation for pregnant and lactating mothers and children 0-4 years of age with mal-nutrition.

Table 8.3

Food Consumption, Nicaragua, 1966

Food Products \ Consumption Grams /Person /Day	Rural	City of Managua
Lacteous Products in terms of liquid milk	243	377
Eggs	12	21
Meats	58	90
Beans	72	50
Fresh Vegetables	27	74
Fruits	41	52
Bananas and Plaintains	72	75
Roots and tubers	33	24
Tortillas (Corn)	199	164
Rice	54	80
Bread (wheat)	28	51
Other Cereals	28	33
Sugars	58	63
Fats	19	29
Ingested Calories	1986	2108
Ingested Proteins	64.4	72.2
Ingested Retinol		
Adequateness of calories*	96	99
Adequateness of Proteins**	115	119

* Quantities expressed in net weight
** Based on requirements and recommendations

Source: INCAP, Evaluacion Nutricional de la Poblacion de Centro America y Panama, 1966

Improve the productivity of SERN and amplify its coverage.

Reinforce the contents of nutritional education through Health Centers and schools.

Promote the organization of rural nutrition centers.

Encourage the development of a low-cost vegetable mix rich in proteins.

Enforce the law concerning the iodinization of salt.

Supply pregnant mothers registered in the MCH Program regular quantities of iron sulfate for a period of not less than 3 months.

Promote the enrichment of sugar with Vitamin A and establish the correct legal regulation.

Push for the establishment of massive programs of nutritional education.

Encourage a training program in nutrition to health personnel in accordance with future needs.

Coordinate the activities in the nutrition fields with other institutions and organizations concerned with nutrition and foods.

Conceptually, the strategies are sound. The only real limitation is that it represents the public health sector's policy alone, and not a variety of sectors concerned with nutrition.

Going from policy statements to program realization is a large step, and is worth while to examine existing nutrition programs in order to obtain a better perspective on what changes may have to be made.

At the present time there exists in Nicaragua the following nutritional programs:

1. Ministry of Health's nutrition programs

1.1 Surveillance of infant/child growth and development well-baby care.

1.2 Supplementary feeding

1.3 Educational and nutritional rehabilitation services (SERN)

1.4 Regional centers of community nutrition (C.R.N.C.)

2. OXFAM project: Nutritional care for the family at risk.

3. PRODESAR-A coordinated project of the Ministry of Health, Ministry of Public Education, Ministry of Agriculture and Livestock, UNICEF, INCAP, Pan American Health Organization, and Food and Agriculture Organization.

4. Nicaraguan-World Food Program sub-project

5. Applied nutrition program of CARITAS.

In the following section, each individual program will be described briefly and analyzed for coverage, effectiveness, and infrastructure constraints.

8.4 Coverage, Effectiveness, and Infrastructure.

8.4.1 Ministry of Public Health (MSP). Within the technical-administrative structure of the MSP there exists the Direction of Health Promotion, under which the Division of Nutrition is located. The technical areas of responsibility of this Division are to:

1. Investigate the nutritional status of the population.

2. Participate in the planning of national nutritional programs.

3. Define and establish guidelines for the services of supplementation, SERN, and nutritional education.

4. Evaluate the regional nutritionists and public and private institutions that carry-out nutritional activities.

Administratively, the Division has the responsibility to:

Table 8.4

Consumption of Foods, Nicaragua, 1970

Food Products \ Consumption Grains per person per day	Lower Stratum (50%)	Middle Stratum (30%)	Upper Stratum (15%)	Very high Stratum (5%)	Total
1. Whole Milk	81	141	196	254	125
2. Skim Milk	6	8	10	13	8
3. Cheese	15	23	30	38	21
4. Meat, fish and shellfish	38	73	113	170	66
5. Eggs	6	14	29	63	15
6. Beans	57	70	82	94	66
7. Fresh Vegetables	17	45	70	96	37
8. Fruits	74	114	151	189	104
9. Bananas and plantains	122	100	80	59	106
10. Roots and tubers	89	76	65	52	80
11. Tortillas (Corn)	164	288	272	205	219
12. Rice	42	64	85	106	58
13. Bread (wheat)	14	28	53	105	28
14. Other Cereals	16	6	2	1	10
15. Sugars	66	99	129	161	89
16. Fats	14	24	41	70	24
Ingested Calories	1767	2703	3255	3931	2379
Ingested Proteins	46.6	72.5	90.3	111.9	64.2
Adequateness of calories *	84	128	154	186	113
Adequateness of Proteins **	85	132	206	255	117

* Total Population

** Based on requirements and recommendations

Source: INCAP, Unpublished data on production figures with graphic projections.

1. Develop the annual budget.

2. Inform the Direction of Health Promotion and the Regional levels of the programs and guidelines developed.

3. Coordinate nutrition activities with other state and private agencies.

In each of the four health regions a university-trained nutritionist has been assigned to direct and coordinate the regional nutrition program (Figure 8-1).

Within the Health Ministry there are 59 authorized positions with the overall responsibility of providing comprehensive nutrition care to Nicaraguan's population. Of that number only seven are trained nutritionists. The remaining personnel are either fulfilling administrative functions or are providing simple logistic support. Although the Ministry has the major portion of trained nutritionists in the health sector (total of 18), the very paucity of number mitigates against effective control of actual programs.

Examining the distribution of human resources from another viewpoint, 9 individuals are located at the Central level, 10 at the regions, and 40 at the local levels. None of the trained nutritionists are found at the local level, where the actual interface of programs and population occur.

Physical resources for care of the malnourished include 550 hospital pediatric beds, 118 health centers, 152 health posts, 11 mobile units, and 14 education and rehabilitation centers (SERN). These numbers are somewhat deceiving since the only facilities used exclusively for nutritional purposes are the SERN centers. The other items are integral parts of the health system which have multiple purposes.

As demonstrated in Table 8.5, the personnel budget of the Division of Nutrition amounted to 640,056 Cordobas (US$91,436) in 1975, representing 75% of the entire 857,000 Cordobas (US$122,428) budget for the Division. Materials and supplies amount to C$ 191,052 (US$27,293) or 22% of the budget. Specific programs such as SERN and Centers of Community Nutrition (CRNC) receive additional fi-

Table 8.5

Budget for Nutrition Division
Ministry of Health, Nicaragua, 1975

Expense	Cordobas
PERSONNEL COSTS	
1 Director	66,000
1 Central Nutritionist	26,400
1 Supply Chief	16,560
3 Nutrition Educators	37,260
1 Typist	11,040
1 Clerk	9,660
1 Doorman	4,836
9	191,756
Regional Sections	
1 Regional Nutritionist	33,000
1 Regional Nutritionist (Esteli)	33,000
1 Nutrition Educator (Granada)	16,560
1 Regional Nutritionist (Leon)	29,040
1 Typist	6,900
2 Drivers	13,800
3 Regional Nutritionists	99,000
10 SERN Chiefs	117,000
10 Child care attendant	42,000
10 Cooks	42,000
10 Domestics	36,000
50	468,300
NON-PERSONNEL	
General Funds	25,892
Travel Costs	10,690
	36,582
MATERIAL AND SUPPLIES	
General Funds	172,000
Fuel and lubricants	19,052
	191,052
Total	857,000

Source: Nicaragua National Budget 1975, Managua 1974.

nancial support from JNAPS and CARITAS respectively. However, the JNAPS contribution is only C$63,000 (US$9,000) annually and CARITAS assistance is in the form of food.

The expenditure of the vast portion of the budget on personnel costs is not necessarily a negative point. Distribution of personnel is the real key. Only 37% (C$237,000) of the personnel costs are being allocated to those individuals working at the local level. That disparity is the telling point.

With a limited amount of personnel resources available and an equal distribution of the limited budget toward the central and regional offices, the possible population coverage would be expected to be low. Exact total coverage is unknown. If the rate is similar to MCH coverage or 20% of the total population at risk, then approximately 175,000 women (aged 15 to 44 years) and children (aged 0 to 4 years) of a total universe of 876,100 were covered by some MSP nutrition programs. That figure is probably high, considering the fact that the women particularly do not seem to utilize existing programs. Nevertheless assuming that figure to be representative and calculating the total amount of the Division's budget which actually impacts on the local level, the average amount spent on each individual for nutrition care was 2.80 cordobas or 40¢:

191,052	materials and equipment
237,000	personnel costs - local
63,000	JNAPS contribution to SERN

C$ 491,052 ÷ 175,000 = C$ 2.80

If the total nutrition budget is included over the actual population covered then the figure is C$5.26 per person.

857,000
63,000
920,000 ÷ 175,000 = 5.26

If the total budget is compared to the target population of 876,100

mothers and children, the per capita average would be $1.05. A number of things are apparent. One is that current expenditures per capita are very low. Two is coverage is low. Three is that if coverage improves the amount spent per capita will decrease.

The optimal amount of expenditures per capita is difficult, if not impossible, to ascertain. Perhaps two overall financial conclusions can be derived for the Division of Nutrition:

1. The need for increased overall nutrition spending.

2. The need for a better distribution of resources from the central and regional levels to the local levels. Turning to specific subprograms within the Ministry four can be identified:

a. Program of surveillance of infant and child growth and development. This program lies within the activities and guidelines of the Division of Maternal and Child Health (MCH). Unfortunately, there does not appear to exist any stated goals or objectives nor is there even a problem identified which the program could attack. No budgetary resources are committed in either the Division of Nutrition or the Division of MCH, and the question must be asked whether a viable program exists in reality, or whether it is only an irregular activity performed by scattered health centers.

b. Supplementation. This program distributes food supplementation through the health centers to pregnant and lactating mothers and children under five years of age. Food is provided by CARITAS. The rationale for the program is based on the 1966 INCAP study results, which demonstrated a high prevalence of PCM. However, no specific objective has been stated for this program, although certain operational guidelines have been defined. Supervision of the program lies with the regional nurse supervisors, rather than with the division's regional nutritionists. This program will end in June 1976 and without these food supplements the nutrition program for the MOH without a vast increase in budget will only be capable of nutrition education to many families unable to purchase the kinds of necessary foods spoken about with nutrition education activities.

c. Nutritional Education and Recuperation Centers (SERN). This program is designed to assist in the recovery of children suffering from Grade II and III PCM and to extend nutrition education to the child's

family. The one limitation on the program is the rather limited areas they serve. There are 14 SERN centers throughout the country with space for 405 children. Regionally, they are distributed in the following manner:

Region 1	-	1
Region 2	-	7
Region 3	-	1
Region 4	-	2
Region 5	-	2
Region 6	-	1

Financial support is provided through the MSP's Division of Nutrition and JNAPS. Food is obtained from CARITAS and from local suppliers. Organizationally, the 14 SERN centers fall under the Division of Nutrition and are supervised by the regional nutritionists. In 1973 an evaluation of the SERN centers revealed an extremely low coverage with very little participation of the affected families.

d. Regional Centers of Community Nutrition (CRNC). This program distributes a daily breakfast or the equivalent to pre-school children living within the target area of the center. The object of the program is to prepare community members so that they can positively benefit from nutritional education and can better their standard of living through their own efforts. The immediate goal is to provide supplementation and education to 35,000 pre-school children and to 10,000 pregnant mothers. Administrative support is provided by CARITAS while technical supervision is the responsibility of the Division of Nutrition. Community participation plays an integral part of the program's success or failure.

No specific evaluation has been carried-out to determine if proggrammatic goals are being met. However, defined indicators do exist, so that such an evaluation could be accomplished fairly simply.

At this point it is worthwhile to draw some conclusions concerning the activities of the Division of Nutrition. The functions of the Division are clearly defined by the MSP. Unfortunately, those functions are not being implemented effectively. Part of the problem is a national deficiency of nutritionally-related resources--both personnel and physical, and the fact that those resources which do exist are not being utilized in an effective manner. There is an inordinate con-

centration of trained personnel at the central and regional levels. Consequently, actual nutrition activities are frequently the responsibility of auxiliary nurses, who have little nutrition training. With proper supervision, limited trained paramedical personnel can be used effectively, but, there are no indications that adequate supervision is not being given at the regional levels. Physically, the only facilities destined exclusively for nutrition are the SERN centers, which are reportedly severely underutilized. Even at the central administrative levels there is a shortage of equipment and materials, and what facilities do exist are concentrated in Regions 1 and 2 and in the urban areas.

Financial resources of the Division of Nutrition are diminutive in scale when compared to the total MSP budget, represent only 2% of the Ministry's budgeted expenditures (C$857,000 out of C$49,000,000.00.

However, the major problem appears to be programmatic in nature. No clearly defined or elaborated program goals have been formed which attack the nutritional problems identified by INCAP in 1966. In those programs where specific objectives exist, i.e., SERN, there is a critical lack of administrative control. Nowhere is there an organized system of evaluation, which is not too surprising the scarcity of operational goals and specific quantified nutritional indicators. In summary, the Division suffers from a deficit of total resources, of inadequate levels of nutrition training, and of management capabilities.

8.4.2 Other Nutrition Programs. OXFAM. The objective of this program is to decrease the prevalence of malnutrition, improve the nutritional status of the infant population-at-risk, and to educate the mothers of these children in basic concepts of alimentation and hygiene. The target population is limited to those children with Grade II and III malnutrition and their pregnant or lactating mothers in the Managua area. Recuperation of the malnourished is accomplished through two SERN centers with space for 60 children. Supplementation and nutrition education is extended through the health centers with locally available and CARITAS donated food and with technical assistance from the Division of Nutrition. A nutritionist is responsible for the administration of the project, although reports are sent to the MSP. Total financial expenditures come to C$165,860 (US$ 23,694), of which approximately half is spent for personnel costs. Approximately 300 families annually receive some benefit from the OXFAM program. Although measurable criteria are present, there is no information concerning program results.

PRODESAR. This project, which is being developed by the MSP, the Ministry of Agriculture and Livestock, and the Ministry of Public Education with the cooperation of FAO, WHO/PAHO, and UNICEF, is designed to reinforce the services offered to families in the rural area, and to consolidate and integrate regional systems and actions to ensure the most effective utilization of human and material resources. Specifically, in the health and nutrition sectors, the program hopes to provide 100% coverage of oral rehydration to infants suffering from diarrhea; to install 10,000 latrines, 50 wells, and improvements for 2000 homes and waste disposal systems; and to provide general overall health care to the population of 61 communities in the Departments of Masaya, Granada, and Carazo.

Resources include personnel from the three ministries and international organizations and financial support from UNICEF and the Nicaraguan Government for a 5-year period (1975-1980) amounting to C$25,840,000.00 (US$ 3,691,428.00). An executive committee oversees the project and consists of persons representing education, nutrition, sanitation, agriculture, home economics, and health. There is some community input at the local level, although, generally, direction and supervision are provided centrally. In 1973 evaluation of the project revealed a limited coverage of the designated communities and only a semi-functional administrative structure.

World Food Program/Nicaragua. The objects of the World Food Program (WFP) in Nicaragua is similar to programs elsewhere: to satisfy the nutritional needs of the project beneficiaries through supplementation and to promote community cooperative action in order to achieve improved development and higher levels of health. Organizationally, the program resides within the MSP as a separate entity with a director directly responsible to the Minister of Health. Food is distributed to the communities and to the work groups that participate in community health projects. The Division of Nutrition does not take a particularly active role in program implementation.

CARITAS. The prime objective of this program is to improve the nutritional status of pre-school children and pregnant and lactating mothers, and to obtain their active participation in continuing improvement of their standard of living. In addition to the activities described previously, CARITAS provides supplementation in the form of food for work (70,000 beneficiaries) and school lunches. Geographically,

the entire country, except the Atlantic Coast, has functioning CARITAS programs. The distribution of food is slated to end in June of 1976, although nutrition promotion will continue in the communities.

The nutrition and health section of CARITAS is responsible for the organization, coordination, and supervision of community activities, while the regional MSP supervisors retain overall responsibility for CARITAS activities carried-out in the health centers.

Nicaraguan Social Security Institute (INSS). INSS provides comprehensive nutrition care to the families of participant workers. During 1973, 17,755 children took part in the INSS supplementation program. That number represents approximately 5% of all children aged 0 to 4 years in Nicaragua. Of that number 11, 107 resided in Managua.

INAPS. The national hospital system naturally provides for treatment and recuperation of the malnourished. However, there is no specifically defined nutrition program.

8.5 Summary of Major Findings. It is evident that Nicaragua suffers from a variety of nutritional problems, of which the most critical is protein-calorie malnutrition. Other nutritional deficiencies exist, but are more directly attacked than PCM. Although the entire country is affected, certain geographic regions have been identified by INCAP as priorities for nutrition programs. They are Regions 4, 3, 1, and the Atlantic Coast.

Unfortunately, the current governmental nutrition programs in the health sector have made very little impact on the nutritional status of the population. This is due to a lack of a clearly defined nutrition policy, to a scarcity of human, physical, and financial resources, and to the absence of an adequate process of planning, administration, coordination and evaluation.

At the present time Nicaragua does not have a defined integrated policy for the solution of food and nutritional policy. Moreover, there does not exist any institution responsible for all of the programs impacting on the problem.

The actual programs which the Ministry is carrying out within its own health programs or in coordination with other institutions are

characterized by the absence of planning and administrative coordination between themselves. This lack of cooperation includes agency failure to clearly define their program objective, goals, and activities, inadequate standard operating procedures, absence of adequate support and information systems, and the absence of evaluation.

In addition, the nutritional institutions in the health sector suffer from a shortage of human, physical and financial resources. The process of planning and programming has not been sufficiently developed at the sector level, and there is a serious need for an epidemiological surveillance system which would permit improved problem recognition and evaluation.

8.6 Alternative Strategies

Both INCAP and the Government of Nicaragua have identified the following four nutrition problems as priorities:

1. Protein-calorie malnutrition

2. Vitamin A deficiency

3. Anemias

4. Endemic goiter

As described previously, these four problems are multisectorial in nature and consequently have to be attacked on a broad front. Although a number of sectors are involved, the most important are agriculture, education, and health.

Within the agricultural sector, such nutritionally related factors as increased food production, increased income, income redistribution, and land reform are being addressed by the INVIERNO program. 1/ In the education sector a mass-media communication pilot program is being undertaken which has a potential impact on nutrition. These programs will have their impact on the four specific nutrition problems over a long and mid-term period of time. No immediate effects can necessarily be expected. Unlike the other two sectors, intervention strategies within the health sector can have immediate as well as mid and long-term impacts.

1/ See Chapter 9 for discussion of INVIERNO

Within the health sector, two conceptually separate, though operationally linked, problem areas are evident: (1) The need to strengthen institutional capacity to advocate, plan, staff, administer, and evaluate specific intervention programs; (2) The choice of different alternative intervention programs directed at the four nutrition priorities.

The decisions made regarding the development and strengthening of the service delivery organization will determine which intervention programs are feasible. In a similar, but not nearly as determinate, a fashion, the intervention programs influence institutional changes. Therefore, the effect can be seen as bidirectional, with the institutional determinants having a broader influence.

8.6.1 National Food and Nutrition Policy. The over-riding force which gives direction and meaning to both the institution and the program intervention regardless of what sector they are in, is a National Food and Nutrition Policy. This multisectorial policy would provide the conceptual and philosophic framework which guides and sanctions the different implementation strategies of the sectors impacting on nutrition. Of course, how this policy can be devised is a Nicaraguan decision. However, it is probably advisable to have the input of those sectors which will have to implement policy and of those individuals and organizations with experience in the nutrition field. In order to provide a measure of continuity and an identifiable body responsible for National Food and Nutrition, it is suggested that a permanent committee be formed composed of the Ministries of Health, Agriculture, Education, the Directors of JNAPS, INSS, a representative of the President's office, and appropriate technical advisors.

8.6.2 Strengthening of Institutional Capacity Manpower. The need for a greater quantity of trained nutritionists, planners, and administrators at all levels of the health sector is obvious based on current manpower capabilities. The development of human resources will reflect the movement towards regionalization of health programs. Under this concept, the central level provides planning and coordination capability, while the Regions

1/ See Chapter 9 for discussion of INVIERNO

and local level will be responsible for the actual implementation of the intervention programs and be allocated the largest position of the nutritional budget. Therefore, to begin an adequate national nutritional program additional personnel, training and resources are needed. At the central level it will be necessary to recruit and train at least.

3 planner-analysts,
2 nutritionists
1 public health administrator

As envisioned the planner analysts would have the responsibility of developing and evaluating nutrition programs within the Ministry of Health. The Public Health Administrator serving as the Director's assistant would undertake many of the operational administrative duties that now burden the Director. The two additional nutritionists would supplement the current nutritionist role and would provide for a more comprehensive technical input to the planning and evaluation process.

The three planner analysts and the Public Health Administrator could be trained either outside of Nicaragua or in-country, for example at INCAE. Overseas training has the advantage of providing the student with a greater range of learning resources. The disadvantage is cost. For one academic year in the United States, the estimated cost of training is $70,000 (US$10,000). Therefore, to train four individuals simultaneously would require an expenditure of (C$280,000.00) (US$40,000) or about 35% of the present total budget of the Division of Nutrition.

In-country training has the advantage of costing less and of offering local examples during the educational process, the largest constraint would be the lack of competent trainers and resources material. INCAE has recently initiated a program for health administration which might be utilized.

The two nutritionists would have to be trained outside of Nicaragua, since no nutrition capability currently exists. INCAP offers the most complete program available in Central America.

Up to this point, we have mentioned only the central level. If actual program implementation is moved to the regions, then additional manpower will be needed. Assuming that the Division of Nutrition restructures its administrative organization into 8 regions, matching

the development regions, then it is proposed that each region be initially staffed with an administrator and a nutritionist. In Regions 2 and 5, where model development programs are being established, a regional nutrition educator would be added to the staff. This additional position would be needed to help coordinate the variety of projects planned for the two regions. Therefore, besides the professionals selected for the central office, 8 new administrators, 2 nutritionists, and a nutrition educator would have to be trained. The same constraints described for the central level training hold for the regional slots.

The initial expenditures for training would be substantial as would be the recurring costs for salaries. However, if a long-term planning and administrative capability is to be created, the expenditures must be made. Once these skills are available, there would be the possibility of using it in a training capacity sometime in the future.

8.6.3 Institutional Change. With increased emphasis placed on de-centralization, the movement towards regionalization appears to be underway. The key constraint is the lack of trained personnel to staff the positions created by an administrative realignment. The restructuring might, therefore, proceed in a step-wise fashion, with the regional structure being established as trained professionals became available.

The second institutional change deals with the need to provide improved intra-sectorial integration of nutrition programs. Within the Health Ministry, maternal and child health environmental sanitation, and immunization programs all have a nutritional impact. Outside of the Ministry there are JNAPS, INSS, and private groups. Logically, it seems that the Division of Nutrition provides the focal-point where all these diverse groups can come together to help coordinate or integrate their nutrition activities. The PRODESAR model could be the base for such activity.

Once the appropriate policy has been formulated, and the delivery structure strengthened, specific intervention programs aimed at the four priority nutrition problems can be instituted. Because of the variety of factors which contribute to nutritional problems, there are several possible intervention strategies. For example, environmental sanitation and communicable disease control programs certainly address themselves to nutrition, but because of their coverage elsewhere in

the assessment, they will not be described here. Rather the programs to be suggested are generally considered as nutrition-specific. Moreover, the administration of the majority would probably fall to the Division of Nutrition.

8.6.4. Iodization of Salt. Given the existence of a high prevalence of endemic goiter in Nicaragua, it is a fairly straightforward problem to direct an intervention program. Numerous countries have eliminated endemic goiter by instituting a program of iodization of salt. Therefore, the proposal is to initiate a program of iodization of salt for human consumption and to establish an effective system for control of salt iodization.

Project activities would include:

1) Study those problems which have not permitted the approval of implementation guidelines for the salt iodization law (Legislative Degree No.1542 of February 20, 1969).

2) Advocate the approval of the mentioned guidelines.

3) Initiate the enforcement of law requiring iodization of salt.

4) Develop a strategy in cooperation with the salt producers for the implementation of the law.

5) Formulate a plan for the control of the iodization of salt, which would include the training of personnel and the equipping at a minimum level a laboratory within the Health Ministry.

Based on a variety of factors affecting the level of iodine in the population, INCAP has recommended that there should be one part iodine in 20,000 - 30,000 parts salt in order to provide an adequate preventive measure for the control of endemic goiter. An effective system controlling the process of iodization of salt will be required. This regulatory authority and activity should reside exclusively within the Ministry of Health.

Once the salt iodization program is started, it is absolutely necessary to supervise and regulate the distribution of salt by collecting samples from the iodization machinery and from retail outlets. The

real concentration should not vary more than 25% of the standard. Currently, INCAP in Guatemala is acting as a reference laboratory to control salt iodization in Central America.

In order to evaluate the impact of this program, sample examinations of school children, 5 to 14 years of age, can be made 5 to 10 years after the beginning of the program. Whenever possible, biochemical tests should be done. Ideally, these examinations could be part of a general nutrition surveillance system of the community.

In order that the iodization program be effective in Nicaragua it is absolutely imperative that the price of common salt versus iodized not be different. Either the Government should absorb the initial program costs or the producers. Actually, since the cost of iodizing salt is low, there is no economic justification for fixing higher prices for iodized salt.

Suggested Resources Needed:

1. Human resources -- a technician to analyze the salt samples - annual salary.

2. Training -- one month training for technicians at INCAP- travel, room and board, and training costs.

3. Material and equipment

   a) Pre-Mix -- approximate value of $65/100 lbs.

   b) Machinery

Iodizing device	$ 2,400.00
Mixer	1,600.00
	$ 4,000.00

The number of pieces of equipment necessary will depend upon whether a central iodizing plant through which all commercially produced salt will be funneled or whether each salt producer install its own iodizing system.

   c) Laboratory Equipment

Minimum amount of equipment necessary for analysis of salt samples.

Before such a program for iodization is developed an analysis of various constraints needs to be carried out to maximize utilization of AID funds. The primary analysis must be to identify the legislative executive objections which have prevented the enactment of regulation to implement the 1969 law. The second important analysis is the determination of the percentage of salt imported for domestic use and the types of control regulations needed. The third factor is a study of salt distribution with particular emphasis on the source of the salt in the endemic goiter areas which should help to eliminate uniodized sources.

8.6.5 Fortification of Sugar with Vitamin A. The term "fortification" refers to the adding of a nutrient to a food in order to improve the diet of the population. Fortification programs should not be considered a panacea for nutritional deficiencies nor an activity independent from other nutrition activities but rather as harmonious components of measures destined to solve the same problem.

Sugar has been selected as the commodity in Nicaragua to serve as the vehicle for fortification with vitamin A for the following reasons:

1. Practically all Nicaraguans consume sugar including those population groups most affected with the problem.

2. There are only 6 sugar producers in Nicaragua

3. Technically it is feasible and desirable.

There are two ways vitamin A fortification can be controlled. One is at a central laboratory using a spectometer which would give the greatest precision. The other method is simple, cheap, and requires five minutes to determine whether a sugar sample has been fortified properly. The ease of this method means that it can be done in any public health laboratory, the sugar refinery, the location where the mix is prepared, or at distribution outlets.

In order to perform this method, a specialized technician is not needed; only individuals easily trained. The ease of the method permits a large number of tests to be done daily. INCAP can readily train personnel to perform these tests, or samples can be sent to INCAP for rapid analysis and reports.

The Division of Nutrition would probably be the most logical organization to assume responsibility for the establishment and maintenance of the control system.

Approximate resources required:

1. Initial Investment

   a) Equipment

- A variable velocity mixer with a 200 kg. capacity	$ 25,000.00
-A scale, 0-500 kg.	3,500.00
-A precision scale 20 kg.	1,200.00
-Small scale for weighing in grams	200.00
-Tackle to lift mixing tank in order to facilitate the packing of the premix	1,000.00
-Machine to bind-up sacks	150.00
	$ 31,050.00

2. Operating Costs

3. Cost of the primary material

4. Training costs for a technician

Several constraints should be answered during the planning phase for vitamin A supplementation. The degree to which high sugar content foods and beverages should include Vitamin A supplemented sugar; there have been reports in the medical literature of hypervitaminosis A attributable to excess intake in the form of vitamin pills and food supplements. A second constraint is related to the necessity for laws or regulations which might be needed to control the imports of sugars which are not fortified with Vitamin A.

8.6.6. Distribution of Iron-Sulfate Tablets. The problem of anemias can be approached in a variety of ways, including several which would have their primary impact on protein-caloric malnutrition. However, in order to address some of the immediate deficiencies, a distribution program of iron sulfate tablets to all pregnant and lactating mothers would be expedient. The maternal group appears to be suffering most significantly from anemias and is the appropriate target for a distribution system.

Ideally, this project would be integrated into a comprehensive MCH program. For example, during the regularly scheduled prenatal check-ups, the iron supplement could be given to the pregnant mothers.

Because of the constraints on manpower availability and facility distribution it is proposed that the program be initiated on a pilot basis in Regions 2 or 5. Utilizing the hospitals, health centers and mobile units, the tablets would be distributed as a regular component of the currently inadequate maternal and child health program. Without an organized approach to maternal and child health the opportunities for failure of control and administration of the tablet distribution would be too great.

Required resources would be minimal since existing facilities and manpower would be used. No additional training would be needed. The only expenditure would be for the purchase or the processing of iron sulfate tablets.

Supplementing basic grains could be instituted for processed foods especially flour based foods, which should have a significant effect on anemia within urban areas.

8.6.7. Food Supplementation. Food supplementation has been utilized widely around the world as a short-term method of preventing and alleviating the occurrence of malnutrition. As described previously, several programs in Nicaragua have distributed food in the past. There is every indication that there will be a continuing need to supplement the diets of selected population groups in Nicaragua. Based upon statistics gathered by INCAP, the most susceptible groups are children aged 0 to 4 years and pregnant and lactating women of low income families. Assuming that a decision is made to provide needy children and mothers with additional food, the question is how can those individuals be identified and given food. The alternative proposed here is

to develop a simple nutrition surveillance system and a limited food distribution system through paraprofessional health personnel.

The surveillance system would be organized through the health centers and the proposed complex of community health organizations. Because of the substantial need for adequate managment, Regions 2 and 5 would be the initial target zones. A nationwide program could not be developed at this time because of infrastructure inadequacies.

Each community health group would be responsible for the monitoring of its own community members that fall within the target groups. Anthropometric techniques can easily be taught to selected individuals, so that child nutritional status can be determined. Progressive weight gain during pregnancy would present the simplest criterion for maternal nutritional status. By involving the community in the maintenance of its health, there is a genuine opportunity to motivate them into other aspects of development. The basic assumptions are that community health committees will be developed and the health center personnel will have the capability to assist in operating of this simple community program.

Once the surveillance system is established, children suffering from Grade II or III malnutrition and pregnant women with insufficient weight gain could be identified and made eligible for receiving supplementation. On a twice weekly basis food would be distributed to the selected families through the health centers. The only pre-condition to receiving the food is that the eligible families attend a weekly community nutrition education seminar. Women would only be eligible for the food during pregnancy and four months post-partum. Individual children retain their eligibility for a maximum of one year or until their nutritional status improves to at least Grade I malnutrition.

Resources:

1. Equipment

a. Hand-held scale, 0-20 lbs	1 per community
b. Foot scale, 0-300 lbs.	1 per community
c. Flexible tape measure	2 per community

2. Supplies

Food supplementation - 10,000 individuals for 3 years.

Admittedly, there are a number of weaknesses in the proposed plan, including its dependence on an adequate institutional support and logistical system. Perhaps more important, however, is the fact that it only provides short-term relief to a selected few and does not provide any lasting solution to the protein-caloric malnutrition problem.

8.6.8 Rehabilitation of Malnourished Children. It has been pointed out that as many as 7000 Nicaraguan children are suffering from Grade III malnutrition. These children are in urgent need of medical attention and nutritional rehabilitation. A meager amount of attention is currently being offered in the hospitals and the SERN centers. This alternative calls for the training of health center personnel and para-professionals, the provision of oral rehydration supplies, and the development of special rehabilitation units in hospitals serving rural population in Regions 2 and 5. The plan is to provide a two-stage program of nutrition attention. The first stage enables the community paraprofessional or the auxiliary nurse in the health centers to recognize the malnourished status and for the health center team to give emergency treatment to severely malnourished children. The second stage provides the more long-term sophisticated care required for the vast majority of malnourished children who also have concomitant infections.

In the first stage, two inputs are needed: (1) training the community paraprofessional and the auxiliaries to recognize and treat, using oral rehydration techniques, the emergencies cases of malnutrition which arrive at the health centers and (2) the provision of the oral rehydration material. The training of the health center nurses could most easily be accomplished by having one or two physicians travel to each individual health center where they could work with the auxiliaries intensely for one or two days. In order that a standard operating procedure continue, a field manual for emergency oral rehydration would be developed and left at each health center. Initial expenditures would be for the physician-trainers salaries and for development of the field manual. The manual itself can be written in Nicaragua with outside technical assistance. Oral rehydration preparation could be either developed in-country or imported (UNICEF-CRALITE). Although importation may be the initial method, it is strongly recommended that a Nicaraguan capability be promoted. Further examination of projected needs would have to be made in order to estimate annual costs.

The second stage will require that the various hospitals in Regions 2 and 5 be studied in order to ascertain which are appropriate for development of special rehabilitation units based on these criteria:

1. Service catchment area for rural population.

2. Current clinical capabilities.

3. Efficiency of referral system from health centers to hospitals.

4. Frequency of clinical cases requiring rehydration.

Once the study is completed and a limited number of hospitals chosen, rehabilitation equipment and supplies as well as a limited amount of specialized training would be provided to the staff. Considering the low utilization of hospital beds currently there would be no new facility construction, but rather a specialization of function within existing pediatric wards.

The establishment of this two stage system could be coordinated with, and, consequently, strenghtened by the community-based nutrition surveillance system suggested above.

8.6.9. Nutrition Education. Lack of knowledge concerning the nutritional value of foods and the special requirements of growing children and mothers prohibits a more effective utilization of available food products. A two-pronged approach to this problem is recommended. First is the integration of nutrition education into the pilot mass education program currently underway, and second is the provision of nutrition education at the community level. The first is by its very nature nation-wide, while the second should be restricted to a limited area, initially Regions 2 and 5.

The mass media campaign should concentrate on a limited number of nutrition subjects, special nutrient requirements of children and mothers; which foods are most nutritionsts; and food preparation methods. If the appropriate technical and personnel capabilities are not available, then training would have to be provided in nutrition and educational methodology One possibility would be to have outside technical assistance that would help set-up the program in collaboration with the appropriate ministries and would train an individual within the Division of Nutrition to continue the program.

Although a mass media approach is efficient, if is not necessarily effective. To provide reinforcement and follow-up, a program of community level nutrition education would be developed through the proposed community as modelled in the present MOH-AID Rural Health Grant. The actual presentations of nutritional information, elaborating on the same subjects discussed in the mass communication component, would be the responsibility of the auxiliary nurse with the assistance of community health promoters. This preventive health role given to the auxiliary or health center nurse is a different orientation than previously has been emphasized. Therefore, either additional training will have to be given to the auxiliary nurse or a new class of paramedic will have to be created. Further analysis should be given this situation before a decision is made. Whether Nicaragua has the capability or the inclination to develop and maintain an entirely new type of health personnel is questionable, even if the need is present.

Nevertheless, the program would require the input of some persons connected to the health system. Once the determination is made who that person will be, training needs can be ascertained. By limiting the operation to two regions, fewer resources need be committed for training and education materials.

Specifically, short-term nutrition education training will have to be given to approximately 40 individuals with educational materials provided. The cost will be governed by the breadth of program within which the program is placed. Overall expenses should not be too great, and the only question remaining is whether the auxiliaries or present type of health center nurses are the appropriate individuals to implement the program.

8.7 Conclusions

The program alternatives suggested above do not represent a comprehensive list of all possible approaches to Nicaraguan nutrition problems. There are several additional possibilities which could not be covered. Moreover, there is an infinite variety of program combinations that could be emphasized. Without doubt a national food and nutrition policy will endeavor to incorporate many different strategies to eliminate malnutrition. Given the current situation in the country, a nutrition program package should include development, and the implementation of a limited number of specific intervention field programs which are designed

to alleviate clearly identified and limited problems. Any comprehensive program which is more general in scope and has several health implications, like the establishment of a community surveillance system, should be restricted to one or two regions of the country. Because of the Government's focus on Regions 2 and 5 and the consequent concentration of human and financial resources in those two regions, it has been suggested that broad-based nutrition interventions be limited to those same regions. Even though INCAP has designated other regions as suffering nutritional deficiencies more severely than Regions 2 and 5, malnutrition is so geographically ubiquitous that interventions in any region could be justified on the criterion of population nutritional status. Therefore, the program recommendations have been based primarily on the reality of governmental and economic priorities. If the programs are not successful in Regions 2 and 5, there is no reason to believe that they could be successful elsewhere in Nicaragua. In addition the INVIERNO program is trying to improve a basic, problem of nutrition which is the limited income of the poor farmer. If the successful outcome of this program can be blended with the inputs-outputs of the entire spectrum of problems related to malnutrition.

HAPTER 9

MISSION STRATEGY SUMMARY

The Mission health strategy is based on an extended definition of the World Health Organization statement which may be summarized as "health is a basic human right" but also that each individual and community must be led to assume a major personal responsibility for achieving an improved health status. Towards those ends the Mission strategy encourages efforts by Nicaraguans to extend the coverage of health, nutrition and family planning services to the "medically indigent", and actively seeks to support through funding and technical assistance those activities, especially in rural areas, which through practical analysis, planning and implementation appear to offer the greatest health benefits for the human and fiscal resources available. The scope of the Mission strategy is defined and limited by Agency for International Development and Congressional guidelines, by Government of Nicaragua developmental and health priorities, and by the epidemiological patterns and health resources available.

For Nicaragua the blend of definition of global strategy, Mission and Nicaraguan government guidelines, epidemiological patterns, and resources has been developed into the following working strategy:

1. To promote coordination, cooperation and joint planning and programming among both health sector agencies and organizations in other sectors impacting on health and population to assure the most efficient utilization of national personnel and facilities in carrying out health sector activities.

2. To orient the development-collection-analysis of data, planning and implementation of health services and programs toward reducing the major morbidity and mortality problems of the population with emphasis on the rural poor by supporting sound planning activities-studies and appropriate technical assistance.

3. To improve and extend rural health services (health, nutrition and family planning), primarily through the utilization and development of para professional personnel and improving existing health service effectiveness.

4. To develop more effective community participation and responsibility for the planning, development and implementation of local health activities which are oriented towards solution of health problems identified by micro epidemiological analysis.

5. To improve the administrative and technical capacity of the health sector personnel by providing appropriate technical assistance for primarily in-country, on-the-job practical training, especially in the areas of maintenance-management, standardization of services, coordinated supervision, and program evaluation-feedback adjustments.

6. To bring to the level of national consciousness the full economic, family and personal implications of uncontrolled fertility and rapid population expansion, and to make family planning methods available to all individuals in the fertile age group through traditional health institutions and trained-supervised para professional outlets.

These strategies are in the process of implementation through the means described on the following pages.

Constraints Being Addressed. Various chapters of the Health Sector Assessment, Health Ministry Plan de Salud 1976-1980, and the National Hospital System Evaluation have described the existing situation and have suggested alternative actions that might be taken to effectively deal with specific deficiencies. The descriptions and alternative solutions herein promoted rely heavily on interactions between the Mission and the various Nicaraguan agencies (especially JNAPS and Health Ministry) that have occurred and continue to occur for better than a year.

The AID Mission strategy expects to address the following constraints: (1) Lack of a coordinated national rural health program and rural health delivery system; (2) Inadequate health sector information, planning, management and evaluation systems, and lack of effective

coordination among health sector and other governmental institutions; (3) Extreme centralization of decision-making; (4) Inadequate health sector facilities; (5) Shortage of trained personnel especially in the rural areas; (5) Lack of research and innovation in the health sector; (6) The need for foreign assistance to initiate and finance a major rural health program.

It is possible to specify the conditions which an effective strategy would seek to accomplish. Among others, these conditions might include the following: (1) Declining rates of morbidity and mortality in rural areas of Nicaragua; (2) Health Sector institutions and selected facilities strengthened especially in the rural area in their capacity to service the health needs of the rural population; (3) A National Health Delivery School in operation; (4) A new community-based rural health delivery system operational in selected regions of Nicaragua; (5) A continuing program for upgrading health sector personnel being implemented; (6) Regular health sector planning and effective coordination of major health sector activities; (7) Family planning activities readily available throughout urban and rural areas with national leadership and policy recognizing the importance of effective family planning services.

Program Beneficiaries. Nicaragua's total population is approximately 2.3 million of which 1.2 million are classified as rural. Seventy seven per cent of this rural population (approximately 900,000 people) have average annual cash income of $120 per capita or less. This group is composed of small subsistence farmers, agricultural and rural laborers the rural unemployed and underemployed and their families. This rural person is characterized by low productivity and income, impoverished living conditions, low levels of education, high rates of morbidity and mortality, and at present is inadequately served by existing health sector programs. It is this poorest majority of the Nicaraguan population that will be the major beneficiary of the program proposed herein.

While the entire target population should receive some benefit from this sector program, the rural population located in the two regions selected by the Nicaraguan government or initiating its integrated rural development program (the approximately 400,000 rural poor in Regions 2 and 5) will receive principal attention during loan implementation. Within this group special emphasis will be directed to providing improved health services for those most in need of care such as infants, children, pregnant women, and rural poor.

9.1 Program Description

The Sector Program as presently conceived is composed of five basic components all interrelated and coordinated but each of which is designed to impact on a major problem area for improving and expanding health services in rural areas. Component One will support the development of a rural community-based health delivery system through the initiation of community health projects which attack major disease problems. Component Two will assist in developing and upgrading health sector personnel so as to permit the improvement and expansion of health services in rural areas. Component Three will assist Nicaraguan health sector agencies, primarily JNAPS, establish improved planning, management and operational systems so that they can more adequately provide services to the rural sector. Component Four will assist the Nicaraguan government to provide family planning services to all those who desire to control their fertility. Component Five, more in need of detailed development than the others, would assist in developing and upgrading a nutritional planning and implementation capability through INCAP and AID Nutrition Office analysis. Each Component consists of individual project activities that are further described below.

9.1.1 Expanding Health Services in Rural Areas.

a. Establishing a Community-Based Rural Health Delivery System. The high rural morbidity and mortality rates and low manpower projections indicate that a restructured rural health delivery system must be developed to complement the efforts of existing programs. Community participation in health activities and projects appears to be the most efficient and effective means of rapidly improving the health status of a given area.

This approach will mobilize community resources through the identification and training of rural community health committees (CHC) which will be a major instrument for developing community participation in health related activities. Following examples of pilot projects initiated in Nicaragua and other developing countries, and through the examples of the rural health grant AID will assist the MOH to develop capabilities in: selecting and training community health promoters in basic health and community organization skills; carrying out basic community health investigations; initiating basic planning activities that will identify community health problems, organize community

manpower to implement appropriate solutions, and mobilize the necessary technical and material assistance. A Ministry of Health system that can provide the promoter and his committee with prepackaged health improvement projects will also be developed. While the intensive review should further establish the role of the Community Health Committee, it is expected that these Committees could also play a major role in supervising Health Center operations in addition to undertaking health improvement activities within a given "catchment area".

The Community Health Committee system is now being initiated on a pilot basis primarily in the two regions selected by the Government of Nicaragua for its integrated Rural Development Program for 1975-80 and will be closely coordinated with the activities of the new Institute for Campesino Development (ICD).

The AID loan grants will provide funding for technical assistance required to develop and operate the CHC system, training of Health Ministry personnel and Rural Community Health Leaders, educational materials, equipment, vehicles and other commodities required to implement community health improvement projects. The Nicaraguan Government will provide necessary staff support and ongoing operational expenses.

b. Community Health Improvement Projects. As described above, standard prepackaged health improvement projects will be available to Community Health Committees through the Health Ministry to address basic community needs in environmental health (potable water and waste disposal), preventive medicine, health education, and for other related activities such as health post construction and maintenance. Maximum use of community participation will be promoted in undertaking these activities to generate local support, offset costs, facilitate community organization and data collection, and encourage community responsibility for maintenance. Commodities for immunization campaigns, latrine construction, well-drilling and construction of potable water systemsin small rural villages and towns, support for malaria eradication programs, health education materials, and supplies for repairing and maintaining health centers will be provided through the AID loan along with necessary technical and/or supervisory assistance. A new Nicaraguan Government nutrition program could also utilize this system for providing improved nutritional programs to needy families and segments of the populations. The health improvement potential of these projects should be analyzed in the Project Paper.

9.1.2 Developing and Upgrading Health Sector Personnel

a. National Health Delivery School. Lack of nurses and health technicians in hospitals and health centers in rural areas is a major problem for improving and expanding rural health services, as is the lack of physicians or other alternative para-professionals to assist and to extend diagnostic-therapeutic services. The institutional capacity in Nicaragua for producing trained health sector personnel is very limited, but efforts are now being initiated with Inter-American Development Bank assistance for expanding and upgrading the University Medical School and for producing additional physicians that should deal in part with this problem. However, this additional number of traditional medical professionals will not be enough, as shown previously in the maternal and child health section, Chapter 5, to close the numerical gap in this quickly expanding population or redistribute professionals from city to rural areas. The AID effort, therefore, will aim at the largest unmet need through the provision of financing for the construction, equipping and development of a National Health Delivery School. This School will expand the supply of trained nurses, rural health technicians, nurse practitioners, and other para-medical personnel, and should allow the Nicaraguan health sector to achieve minimum personnel requirements for effective utilization of rural health facilities and expanded outreach to the more isolated population.

While the National Health Delivery School will provide standard academic training for nurses and rural health technicians, a major emphasis of the school will be placed on developing nurse practitioners, other para-medical personnel such as sanitarians and health promoters-educators, and community health leaders for servicing the health needs of the rural areas. The curriculum of the nurse practitioner will be designated to produce graduates in 14 to 24 months who can assist physicians extend their limits of care in rural areas. The training of nurse-practitioners and other para-medical personnel will be a major instrument for dealing with the staffing problems that exist in rural health centers, and it is expected that the AID loan will provide technical assistance for developing the curriculum for this program.

In addition, the National Health Delivery School will also develop special courses for the training of community health leaders who will form the core of the new community-based rural health delivery system described above in Component One, Section 9.1.1.

While it is recognized that Nicaragua may need all the trained personnel referred to above, it is not clear that it needs a new facility to provide them. The Mission will explore the feasibility of locating the school in existing facilities.

b. Upgrading Health Sector Personnel. To date, the Nicaraguan health sector has not officially established what qualities a physician, nurse, dentist, laboratory technician, etc., needs to practice within a chosen profession or system. Without such professional criteria it is very difficult to determine what type of professional performance should be expected and what type of training is necessary to prepare a given professional. Thus, the health system is without a formalized method of quality control which limits evaluation of services rendered. AID loan and grant activities will stress the importance of such criteria as a basis for developing a high skilled corps of professionals. These criteria will be developed as components for the design of curricula and training activities for the nurse-practitioner and rural health workers. It is expected that these performance criteria can be developed by Nicaraguan professional committees with the assistance of AID financed technical advisors.

The Nicaraguan health system has in the past operated without a formalized residency program which lowers the standard of health care throughout the system. The rural areas, however, suffer more, since medical school graduates required by law to serve in rural areas, do so without the benefit of previous training oriented to the spectrum of problems they will encounter. Thus, the majority of rural areas in Nicaragua receive essentially untrained physicians, who receive no supervision and are forced to perform medical procedures for which they have not been adequately trained. The JNAPS-JLAS system has begun to develop the basic structure for internship/residency courses. AID loan and grant activities will assist in the technical development for establishing and operating this residency program through the procurement of some equipment, educational materials, and library improvements.

In addition, as part of the overall effort to upgrade health sector personnel, AID loan and grants will continue to support efforts to develop an effective program of continuing education for the health professions. This program will concentrate on providing current health and population information, refresher courses and seminars in basic science, preventive-curative-emergency information through the development of short courses, and publications that can be disseminated through

the UNAN Medical School. The National Health Delivery School and a series of regional seminars.

9.1.3 Establishing Improved Planning, Management and Operational Systems in the Health Sector

a. Developing a Sector Planning and Coordination Capability. As has been noted elsewhere, prior to the Health Sector Assessment and revival of the National Health Council there was virtually no established agency or procedures in Nicaragua for undertaking on a regular basis health sector planning and producing analyses that could be readily utilized for decision-making and integrated into national development planning. Lack of previous coordination among health sector institutions (Health Ministry, JNAPS, INSS, private sector) was a major problem. The situation has improved dramatically with the current group of health agency leaders. Some health sector policies and institutional objectives are still somewhat vague and diffused; and the establishment of national health priorities and coordination of complex programs are heavily dependent on inter-personal relationships and executive pressure rather than established institutional patterns. This is complicated by a lack of adequately trained personnel throughout the health sector. It is the purpose of the Rural Health Institutional Development grant and the Nutritional Sector grant to begin to develop the necessary technical, managerial and planning skills to allow the execution of complex "program" activities.

During the original AID planning stages in 1974 and 1975 for the Health Sector Assessment, it had been assumed that the Nicaraguan working group that produced the Nicaraguan Health Sector Assessment, the Unidad, would be converted into a permanent staff unit of the National Health Council (NHC) for continuing planning, policy formulation, coordination, and overall evaluation functions for the health sector.

Due to factors such as the pressure to return key members to their parent organizations, that strategy must be somewhat revised since much of the working group has disbanded. This problem is described elsewhere in this document. At present, the Nicaraguan strategy is to continue minor planning activities through the Unidad, and periodically reactivate sections of the Unidad depending on the planning requirements. The Mission's initial response to the need for improved planning and management in the sector is its proposed training and technical assistance which will be carried out through the Rural Health Institutional

Development and Nutritional sector grants. While still in formative stages, awaiting this assessment's conclusions, they will emphasize development of GON institutional capacity to more effectively plan, manage, and implement large scale programs in rural areas.

At the local level the Community Health Committees (CHC), established in the newly approved Rural Community Health Service Grant, will on a regular basis assist the MOH develop a series of coordinated health activities from the operational level in the rural area for the first time. These activities will include micro epidemiological studies, bottom-up planning and priority establishment for the design of a community health program and health projects. A logical extension of this strategy is to use the CHC to coordinate the services of whatever health agencies may be needed to provide specific integrated services to a rural community.

It is anticipated that the CHC demands based on micro epidemiological data developed in coordination with MOH personnel, when coupled with MOH planning based on macro epidemiological data, will create a more closely united and integrated health policy both at the local and at national level, than would have occurred (or could occur) if integrated policies develop at the national level first. However, it would be ill-conceived policy not to attempt to develop coordination at the national level also. The exact form and manner of this coordination should be pursued during the health loan intensive review and during the loan implementation period.

b. Upgrading the Management and Information Systems of Health Sector Institutions. While the Rural Health Institutional Development Grant will begin to improve the institutional capability of efficiently managing the health information so necessary to a sound Health Sector, the loan will be used to extend the work. A critical question to be answered during the intensive review is, "what organization will be in charge of accomplishing these ends?" The IRR message outlines what needs to be done, but now without the permanent Unidad to rely upon, it is imperative that institutional responsibility be specified. It is expected that AID loan resources could be provided for foreign technical advisors, equipment installation, and related expenses for assisting health sector institutions develop improved management and information systems. The utilization of a computerized information system that can provide GON decision-makers with pertinent, concise, accurate and timely information could be developed for health

sector institutions. The development of such a unified system is heavily dependent on the outcome of the Health Complex construction proposal which is now proposed under Loan 029 for the reconstruction of Managua. Assistance in formulating decision-making criteria will be needed along with management training in the use and maintenance of these new systems. Management assistance required in other areas important to AID sponsored activities will be identified during the preparation of the loan and grant papers. It is expected that the GON will provide the administrative, staff, and operating costs to support and assist in this training for each of these new systems.

c. Developing Institutional Performance Criteria and Upgrading Existing Health Sector Facilities. The recent JNAPS study has indicated that there are serious deviations from expected norms in almost all of Nicaragua's health facilities (hospitals, health centers, rural mobile health units, etc.). Existing facilities are poorly administered and supervised, lack supplies and basic equipment, and receive inadequate building and equipment maintenance; all of which are more serious in the rural areas of Nicaragua. In addition, prior to the JNAPS study, a lack of uniform criteria for health sector facilities meant that no objective parameters existed for measuring deviations or making cost/benefit decisions for resource allocations to health facilities. The recent JNAPS study began a process of identifying performance criteria which needs further refinement for health services and personnel. In recognition of this need all proposed health grants and loans will stress the development of standards and performance criteria for hospitals, health centers and other facilities, through bilateral planning activities, program agreements, and the appropriate mix of technical assistance. Specialized training programs will be encouraged and financed under the institutional grant for disseminating these standards and instituting the new performance criteria, along with improved supervisory systems. In addition, attention will focus on providing adequate facilities by the equipping and/or remodeling of some of the existing health facilities to bring them up to the minimum operating standards and for improving communications between hospitals, health centers and administrative units through administrative reforms, radio networks and improved transport. This will be done to meet the expected increased flow of referral patients produced by the additional paramedical activities. GON counterpart funds will provide additional financing for supplies, equipment, maintenance, training, staffing and operating costs. While further analysis is required for this project during the preparation of the loan paper, it is now anticipated that actual upgrading of facilities

will be concentrated only in the two regions selected by the GON for initiating its integrated rural development program with later expansion into other regions of the country.

9.1.4 Family Planning Strategy. The assessment has described the place of population problems and programs in an integrated maternal and child health program, as well as described a number of ways of going about implementing element number 6 of the Strategy Statement at the beginning of this chapter. In sum, the immediate Mission strategy in family planning will be to push for wider coverage of the population through "non-clinical" means, to satisfy consumer demand, and lessen the destructive economic, social, and health costs of run-away population growth. The Mission will also support the improvement of technical skills for the utilization of modern techniques and the development of modern skills that complement modern family planning procedures.

9.1.5 Nutrition. The Mission Nutrition strategy is based upon programs which resolve these problem areas identified by INCAP, TAB/N, Mission and Nicaraguan officials. These problems revolve around the epidemiological patterns of nutritional deficiencies, and the socio-economic/administrative patterns which contribute to these problems. The nutritional deficiencies are: protein-caloric deficiency; vitamin A deficiency; riboflavin deficiency; iron deficiency, iodine deficiency. In addition to the problems of malabsorption, poor health, and poor socio-economic conditions which the Mission is addressing through health loans-grants, education loans-grants and the agricultural INVIERNO program, the specific socio-economic/administrative problems to be addressed in nutritional activities are: (1) Lack of a national nutrition policy and implementing mechanism, and difficulties of coordination among government officials, have led to slow progress in undertaking urgently required nutrition improvement activities; (2) Difficulties in changing existing food and sanitation habits among the majority of Nicaraguans afflicted with malnutrition; (3) Inadequate nutrition information provided through public and private sector organizations; (4) Lack of fortification of existing food products of wide spread daily use and the need for new products and dissemination techniques; (5) The requirement that the GON develop its own feeding program to replace PL-480 Title II food; (6) Lack of sufficient GON funding to support a new National Food and Nutrition Program without external assistance due to reconstruction and other rural development demands.

The program strategy is to encourage and support the GON in the following types of activities:

a. To strengthen the national nutrition planning capability through technical assistance (Nutrition planning, food technology, agricultural economics, statistician and mass media communication), personnel training, nutrition research and special studies, appropriate equipment and reference material.

b. To implement selected nutrition improvement activities to include: Nutrition education; training of health workers in nutritional advocacy and food fortification or new product development, and dissemination for alleviating major nutritional deficiencies; credit extension to industry for fortified or new food product production, the development of an inspection and certification and certification service to insure implementation and the development of supplemental food distribution for those pockets of malnutrition which are refractory to the above.

c. To utilize AID grant-loan resources in the coordination and integration of the nutritional components of health, education and agricultural sector activities through cooperative planning-implementation activities and technical assistance.

9.2 Mission Rural Development Strategy as it Impacts on Health Sector Strategy

Any discussion of sector strategy in Nicaragua must relate to the general rural development strategy of the Mission, being implemented through a $14 million rural development loan initiated in June, 1975. It is designed to improve the general living standard of the rural population, with priorities being:

a. To improve rural income distribution and bring the benefits of the Nation's economy to the rural masses of the population.

b. To create new productive rural employment opportunities as the basic means for improving income and participation in development.

c. To stimulate the growth of agricultural production of small farmers as a form of ensuring greater availability of goods

and services to the rural population and greater growth of the economy in general.

Out of the new Agricultural Strategy and Loan came a new institution, Instituto de Bienestar Campesino which has come to be called INVIERNO. The Institute, a new autonomous agency of the GON is charged with developing and carrying out new and innovative rural development programs for small farmers, agricultural workers and the rural poor in general. It will have responsibility for the organization, development and training of the rural poor and will provide to all of these as appropriate, agricultural information and education, credit, marketing services, provision of agricultural production commodities and technical assistance. The Institute will be responsible for rural job creation and land tenure programs and will, in general, assure in rural Nicaragua that all those services are provided that are necessary to improve production and the conditions of rural life.

In brief, INVIERNO is in charge of the total integrated development of the rural poor through the more macro, or income, side of the health equation, than is the Health Loan.

In order to concentrate its efforts and not over extend its capabilities, INVIERNO has been mandated to work first in Regions 2 and 5 in a pilot-like manner.

With the GON's interest in presenting an integrated developmental package to the rural sector, the inclusion of those regionalized health interventions envisioned under the health loan within the same delivery system, INVIERNO, is logically appealing.

Hence, those health projects included under the Health Sector Loan capable of regionalization <u>might</u> or <u>could</u> be concentrated in Regions 2 and 5 to coincide with INVIERNO.

Whatever the final Mission strategy decision is, the exact agency responsibility and the mode of delivery for specific health programs and interventions will require extensive investigation.

The critical issues are:

a. The extent to which the health interventions and additional resources are needed in Regions 2 and 5.

b. The extent to which the Health Programs might be subordinated to the agricultural emphasis of INVIERNO.

c. The extent to which INVIERNO believes it should or in fact could supervise or coordinate all GON activities in Regions 2 and 5.

d. The extent to which certain health interventions should be considered of a pilot nature.

The above issues imply that the Mission needs to ascertain during the Health Loan Intensive Review, which programs ought to be separate from INVIERNO and at what level they should be separate, and which programs might be conducted through INVIERNO.

Since INVIERNO is only in Regions 2 and 5 presently, and for the next year at least will concentrate in Region 5, the Mission may find that those programs which lend themselves to national coverage, ought to be autonomous even in Regions 2 and 5.

APPENDIX A

ANALYSIS OF THE NICARAGUAN ASSESSMENT

Clearly one cannot evaluate this assessment, which is still in process, in any technically adequate or convincing way at this time. The two model health planning evaluation projects in Latin America[1] both required years to accomplish and were based on data from a five-year implementation interval. Nonetheless the assessment has been monitored closely, and it is possible to comment on its quality and expected impact. Moreover the experience of the assessment is one further element for use by AID in the development of a long-term strategy for health assistance in Nicaragua. Thus, this assessment of the assessment is offered.

The accomplishments of this assessment must also be forged in terms of Nicaraguan experience and social systems. One must expect neither the technical sophistication of a Scandinavian plan growing out of decades of planning experience nor the impact of a Soviet plan with its subsequent regimented program development.

Overall it appears that the assessment, while falling terribly short of the ideal, has been successful in attaining the objectives described on page 1 of the Introduction.

Structure. The Nicaraguan Assessment Unidad working group established to conduct this study was created in 1974 as the initial staff for the inter-agency National Health Council. It appears now that there is a reasonable possibility that it may be maintained as a permanent institution. Such a step would be quite possible. It is demonstrated in an earlier chapter that the public health sector suffers due to the atomization of institutional responsibility for health. The creation of a permanent body with independent means outside of

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[1] Plansan and Colinplas Projects of WHO/PAHO in Colombia.

any of the program based agencies, which would assess the needs for alternative programs and the degree of coordination achieved, should greatly assist the government over the long-term in achieving institutional reform and reallocating resources to achieve a balanced mix of programs. The Unidad professionals form a multidisciplinary team, and this team currently has both the independently developed data base for the study of health programs and the experience and training necessary to continue data collection and analysis at the community, facility, and agency levels. Similarly, the legal basis for the unit is established.

Communication between the planning group and decision makers in the public health field appears to have developed with exceptional rapidity. The Unidad reports now to the Secretary of the President and appears thus to have a potential for rapid and effective communication of policy recommendations to the chief executive. The meeting of the ministerial level health committee, held at Chinandega January 23, 1976, to review the findings of the assessment illustrates these strengths. There was both a serious attempt to co-schedule intra-agency planning activities with the assessment and a willingness of top officials from every major public health agency[2/] to meet publicly to review frankly an independent assessment of the health sector and to discuss strategies to improve the situation. The impact of the assessment in achieving this level of communication between top decision-makers--on the subject of public health reforms and initiatives--is probably its single greatest achievement.

One must not overstress the point, however. Disestablishment of the assessment group and a major cabinet change which replaced the current health officials, who appear unusually talented and professional in their approach to public health, could restore the prior unsatisfactory status-quo.

Even cursory examination of the history of the assessment over the past year shows great weakness in structure. No stability was achieved in staffing of the Unidad and most serious was the rapid turnover in technical directors, which resulted in continued flux in the technical orientation of the assessment and a damaging lack of continuity in the design, implementation and analysis of the results of specific studies.

2/ With the important exception of the School of Health Science of the National University.

The Unidad changed offices three times during the year and during the period was usually poorly provided with office space, equipment, and supplies. These problems interferred with the analytic work.

While such difficulties can be overcome to a certain extent in the short run and are to some extent inescapably a part of beginning such analysis in a poor country, they must be avoided in the long run if sector planning is to be institutionalized. Improved stability, staffing, housing, and supplies for sector assessment activities must be sought if such a program is to be institutionalized.

The basic information in Nicaragua proved to be sorely lacking, a fact which also interferred with the process of the assessment. Thus the great problem of under-registration of vital events, poor registry of hospital services, and poor information on communicable diseases seriously limited the profundity of the analysis. On the other hand, as a result of the assessment and parallel JNAPS activities, serious surveys research was initiated in the public health sector in Nicaragua and the resulting information will no doubt enrich planning and evaluation work in the future.

Process. The assessment process over the past year, although it shows significant achievement in some areas must be criticized in terms of lack of balance and especially in terms of the deficiencies in the phase of comparison and selection of alternative strategies.

It appears now that the Government of Nicaragua may be moving towards a planning process in which institutional planning in the Health Ministry, JNAPS, JLAS and INSS are carried out in synchronization and within the context of sectoral planning, as initiated in the sector assessment. For that reason the evaluation of the health sector assessment process cannot be done in isolation from the evaluation of the process of intrainstitutional planning.

Since the Five Year Plan (1976 - 1980) of the Ministry of Health and the complementary Five Year Plan of JNAPS were in fact produced synchronously to the health sector assessment, they will be used as indicators of the intrainstitutional planning process.

The diagnostic phase of the planning was the most successful,

and also the phase in which most improvement occurred. Particularly significant is the fact that epidemiological analysis of health needs (and their relation to health services) was attempted on a far more extensive scale than ever before in Nicaragua. The fact that for the first time an attempt was made to analyze the mortality in the country by region, age and cause, (and to use the data in planning) illustrate the degree of technical progress. The Unidad hospital morbidity study was also the first of its kind in Nicaragua.

Attempts were made by both Unidad and JNAPS to use survey research to identify and describe problems in the administration and physical infrastructure of the medical services system. These studies were the first such attempted by the public health sector. They were large in scope, opportune, had expectations of implementation, and were frank and apparently accurate in the diagnosis of serious system problems of the health sector. Thus these studies, too, represented a very major accomplishment.

In setting objectives for the health system the assessment has been less successful to date. At the above mentioned meeting a verbal presentation was made presenting numerous "ideas" of major problems encountered by the assessment. While work on definition and objectives continues, this presentation is the current base output of the Unidad. Among the problems identified (and in order that is not one of priority) were:

1. Diseases prevalent due to poor control of the environment, especially those reduced through the provision of water and sewerage services.

2. Communicable disease preventable by vaccination.

3. Malnutrition.

4. Renewed high incidence of malaria.

5. An excessively youthful and rapidly growing population.

6. Inadequate rural health services.

7. Inadequate infrastructure for rural health services.

8. Poor conservation of natural resources resulting in deterioration of the human ecology.

9. Poor and inadequate health information, vital records and statistics.

10. Inadequate supply systems, especially for vaccines.

11. Human resources inadequate in number and training in many of the health occupations, especially on the intermediate or technician level (nursing, laboratory technicians, statistical personnel are critically lacking).

12. Inadequate coverage of innoculation.

13. Widespread deficiencies in the completness of attention, especially in terms of the lack of attention to nutritional status, parasites and other problems requiring laboratory tests and other taking of medical histories.

14. Inadequate equipment in medical facilities.

15. Under-utilization of medical facilities.

16. A lack of a unified sanitary code, implying duplication in legislated functions and inadequacies in the legal coverage.

17. Excessive centralization of authority in the health system.

18. Inadequate administrative system and inadequate communication within health agencies.

19. Inadequate coordination between health agencies.

20. The lack of a budgetary system adequate to allow financial control as a strong management tool. The Ministry of Health Five Year Plan initially appears to have developed an extraordinarily complete and accurate set of priorities. Closer examination suggests that there remain internal inconsistencies in the objectives of the plan, however.

The major problem of the objective setting activities in the sector appears to be one relating to priorities within the sector. It is certainly the case that for years to come the health status of the Nicaraguan people will be inadequate compared with both the aspiration of the people and medical criteria of the government health agencies. This will be true even with the most successful of health programs in action. This resource will be scarce compared with both popular and professional concepts of service needs. Thus one needs not only to say what needs to be done, but what needs to be done first and how quickly the alternative objective should be sought. None of the planning documents ventures into this area with serious analysis or proposals.

Definition; comparison and selection of alternative strategies or programs to achieve objectives represent a planning phase completely lacking in the assessment per se, and sadly lacking in the agency plans.

In the above mentioned presentation of January 23, the following major activities for the reform of the health sector were identified as responsive to the diagnosis in the health sector assessment.

1. Promulgation of a new organic law for the health sector, establishing a single institution combining the functions of the major existing public health agencies.

2. Creation of a single Sectorial Planning and Programming Unit within the sector.

3. Reform of the health information system.

4. The creation of an Institute of Health Technology to study and promulgate technologies appropriate to the Nicaraguan situation.

5. The creation of two supply units one to organize the production or acquisition of health supplies and the other to organize and implement the distribution of supplies.

6. The implementation of effective pyramidal organization structure and function in the health sector, relating a wide-

spread system of community outreach activities to increasingly more scarce and expensive primary, secondary, and tertiary medical services, paralleling a pyramidal hierarchization of administrative responsibility.

7. Development of an agency-wide system adequate for the transport of patients, personnel, and materials of the system between locations as required for optimal system operation.

8. Development of an adequate material infrastructure, and of administrative and maintenance capabilities necessary to conserve that structure.

9. Increasing allocations of funds to preventive health care activities while maintaining current levels of financing of curative services.

10. A moratorium on investment in new facilities, limiting construction to that required for the renovation or remodeling of existing buildings.

11. The development of a modern and effective personnel management system, including all of the standardization and technification of personnel practices required to operate a complex health system at high efficiency.

12. Decentralization of authority, allowing planning and control to function more fully at a local and regional level.

Many of the points are included in the (already approved and underway) program of JNAPS. All appears consistent with overall policy objectives of the health sector.

Such policies, together with projects for new departures in health and nutrition program activities, do not seem to be fleshed out in terms of budgets, critical path activities charts, personnel requirements, or expected impact as correlated with input levels. Similarly, there does not seem to be any normal activity of presenting alternative project designs to achieve the same goals, nor alternative levels of program development. This decision-making

is done with very incomplete information depending on planning and administration during the programming and implementation stage.

The Health Sector Assessment appears not to have improved this situation. The INCAP component to the Assessment, which studies the nutrition problem in Nicaragua, apparently did take the analysis to the point of preproject design for four priority nutrition projects within the competence of the health sector.

Impact. The evaluation of the impact of the health sector assessment on the health sector cannot be done at this time. It seems probable that the Five Year Plan of the Ministry of Health and the complementary Plan of JNAPS will significantly improve the balance of efficiency of the programs in the health sector. The impact of the health sector assessment per se will not importantly depend on the degree of institutionalization achieved to date, and on subsequent decisions on the organization and operation of the sector.

To a lesser degree the impact of the assessment will depend on its intellectual authority--the degree to which the analysis is convincing--and the intellectual impact it delivers. At this time, especially without the formal authority of institutional changes, this informal intellectual authority is critically important. Unfortunately, the current document does not carry the desired intellectual strength. Data remain weak, the intrasectoral analysis partial, and the identification of socio-economic gains to be attained through health is almost non-existent. Thus in this area of technical quality, the assessment may be a significant advance in many ways for Nicaragua, but still short of standards desired by AID.

APPENDIX B

COMPARISON OF NICARAGUAN GOVERNMENT AND AID HEALTH SECTOR STRATEGY

Looking at the preliminary recommendations of the Nicaraguan assessment of the sector and the elaboration of goals and general priorities by individuals and institutions in written and oral statements at the Chinandega Seminar, it seems clear that the general lines of the emerging Nicaraguan health strategy are in harmony with those of AID/Nicaragua. These include:

1. Improving and extending rural health services.

2. Development of more effective community health programs.

3. Training and upgrading of health manpower appropriate to the needs of rural areas.

4. Development of a sector planning and management capability.

A detailed look at AID's strategy as it has developed through loans and grants of recent years is covered in Appendix D. Issues have also been raised as to the need for reconsidering various elements of the program directions outlined in the IRR, or at least refining them given the more extensive information base now available as the result of the assessment. Perhaps the most important strategy issue of all, however, is the degree of conformity of Mission priorities and those of the Government of Nicaragua - in particular its health sector institutions. It is thus significant that a growing convergence in the Mission and Nicaraguan strategies is emerging along the four general lines cited above.

While AID's mandate to give priority to the rural poor majority has been long developing, the Nicaraguan Government committment to extending rural health services is more recent in origin. We have

seen the emergence of rural development as a priority in the 1974 Presidential campaign in Nicaragua, with further elaboration of the health component of this in the 1975 Health Ministry Plan. The recently approved Rural Community Health Services Grant (December, 1975) goes a step further to carry out this policy at the community level. For the first time, a project with sufficient resources to develop a feasible model of an integrated rural health delivery system by the Nicaraguan Government is emerging. Some elements of all four strategies listed above are found in this project.

Another concrete example of the similarity in thrusts of the Nicaraguan Government and AID is the output of the high level seminar held in Chinandega, January 23, 2976. Particularly important was the process of this meeting since it brought together all major sector institutions and agency chiefs in an attempt to produce a commonly accepted strategy. This was a uniquely successful intrasectoral planning and policy-making session. The impact on changing health problems in Nicaragua or even institutionalizing sector coordination activity remains to be seen. But since many of the approaches to solving problems analyzed in this assessment cite improved planning and coordination as critical, the Mission would do well to monitor and stimulate where possible continued progress in this direction.

Where Mission and Nicaraguan strategies most obviously will begin to diverge will be along the lines of curative, urban-based programs. Expenditures for such activities inevitably take up a large piece of the sector budget. Both the JLAS-Managua and INSS are especially well off financially, and getting them to change emphasis and directions will be most difficult. But as the chapter on health planning points out, these agencies are largely devoid of planning at present.

If the Government of Nicaragua is truly committed to the strategy of rural health services one obvious indicator that will emerge is changes in budget allocation. Data cited in Chapter 4 point out the skewing in the Health Ministry budget toward the Urban Managua area, where 75% of the budget went, but only 25% of the population reside. Meanwhile, provinces generally contiguous with Regions II and V having 30% of the population, received 7.5% of the budget

expenditures.[1] With several million dollars in additional funds going into the sector due to the proposed health loan, we should see changes in the distribution of the pie toward currently deficient rural areas, if indeed the Nicaraguan Government is committed to this strategy.

The geographic regions for investing in health seem to be well agreed upon by both the Mission and Nicaraguan Government--namely Regions 2 and 5. While the INVIERNO program may be justified in those regions, health problems may not be the same. Indeed, an unofficial recommendation of the sector analysis Unidad is that Regions 4 and 5 be the priority areas. The merits of these two, and other alternative regions must be carefully weighted by the Mission, since what may be most convenient politically for the Nicaraguan Government, may not necessarily fit with AID's strategy, indeed mandate, to serve the poor majority most efficiently and effectively as possible.

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[1] Rossman, Consultant report. 1972.

APPENDIX C

NEXT STEPS IN ANALYSIS AND PROGRAM IMPLEMENTATION

To successfully utilize the additional resources which proposed health and nutrition loans and grants for Nicaragua would make available over the next 3 to 5 years, a series of important steps complementary to this assessment need to be completed. Some are primarily Nicaraguan agency activities, others are for AID, but others are joint tasks that should be accomplished.

Steps to be Taken by Nicaraguan Agencies. First and foremost should be the completion by the Unidad de Analisis del Sector Salud of all elements of its analysis of the sector. This should not preclude the analysis of the sector on an ongoing basis, since truly effective planning is an iterative process over time which continued adjustments being made as new data, or techniques, or policy changes indicate appropriate. More useful to Nicaraguan policymakers would be analyses explaining the problems and their causes, identifying priority order of problems to be attacked and by what criteria, and finally offering programmatic alternatives that assist decision-makers in weighing the problem costs and outcomes of such programs. The large scale household and health facility surveys the Unidad has carried out could provide the basis for some of these necessary decisions, but until further analysis is completed the mass of data is of much less use to either Nicaraguan agencies or AID. There is particularly a need to complete the human resources study initiated as part of the assessment, since personnel requirements are the key ingredient (and cost) in all existing or proposed programs.

The Nicaraguan Government will soon decide whether to institutionalize the existing Unidad as a permanent planning and analysis group for the sector. Its present weakness leaves much doubt as to the success of such an institution, unless it can be strengthened significantly through additions and training of health analysis, planners, economists, and administrators. The future of the Unidad

should be related to ways that analytical expertise could be tapped from the Schools of Health Science at the National University. Thus far the university's input into health planning and management for either the Unidad or other Ministries has been almost non-existent.

Finally, it must be reaffirmed by the Nicaraguan Government that it sincerely is committed at the highest levels to developing improved rural health services and infrastructures for their delivery. The experience of the health sector assessment has been clearly less than acceptable in obtaining existing data from the Unidad, due particularly to the mandates of its coordinator. Basic information and cooperation required by AID has often not been forthcoming, until approval for release is obtained from Presidential level.

USAID Nicaragua Mission. The Mission is faced with numerous decisions and studies during the ensuing months if an improved health program for Nicaragua is to develop. Cooperative possibilities for developing a rural health delivery school should be explored with the Inter-American Bank, for example. Within the year, lessons from the Project in Esteli should provide input into redesigning programs for training promoters, establishing health committees, and using radio health education.

Health Sector Program Strategy Development. There is no simple formula for divising the Health Sector Program most appropriate for any country. However, there are some guidelines which may prove useful in molding existing host country situations with AID exigencies so that a coherent and efficient plan is begun, and from which an increasingly more coherent and more efficient Health Strategy evolves, which the GON can independently maintain in the future.

The Health Sector is at a crossroad in its future development; baseline data across a wider spectrum are now available for the first time or will soon be available. If AID can help develop the proper use of these data in the decision making process, it will have indeed participated in one type of meaningful relationship with the Nicaraguan Government.

To determine the specific management improvements, institutional building, etc., that are needed in a country's health sector, one should analyze the various interventions which are currently being

provided to the populace by the various health agencies. If other interventions are thought necessary, but have been excluded previously, then they too should be examined.

The general strategy of the Mission should be to translate intervention needs into needed institutional, management, personnel, etc. changes or programs. The following sections provide some guidelines toward that end for the Mission as it helps the Nicaraguan Government develop its health sector.

Procedure for Establishing Projects Priorities. There obviously is no set formula for easily determining what form or direction of Health Sector Program should follow. Any specific guidance or model will be biased and by its very nature will omit items thought important by others. But this very shortcoming of a model becomes its virtue because it does set forth a specific plan and it provides the basis for further refinement as more information becomes available, and most importantly forces those in charge of implementing a plan to submit their program development to a more thorough analytical test than might otherwise occur.

For an economist, the preferred way to choose among various health interventions is to add up the benefits and the costs of each intervention, obtain a benefit/cost ratio, and compare ratios. Within the health field, however, the difficulty of quantifying benefits usually precludes such analysis, and so the economist relies on another technique, cost effective analysis. This analysis allows a cost comparison of the delivery of the same intervention by two or more different methods. Its shortcoming is that it does not easily allow a cross-interventions-comparison unless a common end-result can be identified. Nevertheless, the cost effective approach can within a given intervention category determine the least cost approach which when properly interfaced with other techniques, provides the basis for decision making.

Interventions and Alternative Actions. Chapters 2 through 8 discuss the current situation of specific interventions, and provide alternative methods of achieving these specific interventions. Where cost effective studies have not been done, they should be (assuming data availability of course) so that for each specific intervention the least cost approach can be selected. It will be necessary to consider the agency involved and the delivery system for each alternative in order to obtain total costs.

After cost effectiveness studies have been completed, the following analysis might be followed.

a. Try to compare the value of each intervention so that at least a priority list can be made.

b. Determine the priority of the interventions within GON.

c. Collect interventions by executing agency to determine manpower, training, materials, etc. costs.

d. Make a determination of capability of a given agency to execute a total set of interventions if they seem excessive.

e. If economics or diseconomics of scale become apparent after the intervention list is put together, i.e. it may be that agency A becomes overstaffed because it would now have fewer programs, some juggling may obviously have to be done for political reasons, unless new work can be assigned to that institution.

f. Within AID's mandates and funding levels determine in concert with GON which projects will be funded.

By applying the above methods, or some facsimile thereof, the most cost/effective approach to programming should be ascertainable and AID should have good reason to believe it is pursuing the proper strategy.

Economic and financial analysis of alternatives proposed in this assessment should be carried out so that planning for temporary consultant assistance from outside the Mission could begin immediately. The long-term impact of programs on GON budget; economic and social-political feasibility of iodization of salt; fortification of sugar; and health delivery school financing, are examples of studies needed. A special study of the pharmaceutical situation as proposed in Chapter 3 might also be considered, since according to the Nicaraguan Assessment a phenomenal 200,000,000 cordobas (US$28,570,000) of medicine were

consumed in 1974. It is wise, however, that no more than the minimal amount of new data be collected. Studies and data abound already, but analysis and program development is often lacking.

Perhaps the most significant AID task in the immediate future is to decide on a nutrition strategy and how that will relate to health. With a nutrition grant and loan potentially available within another year, it is rational that the link of these funds be made to health program needs where possible, since we have clearly identified malnutrition as a priority health problem in Nicaragua. It is recognized also that nutrition is much more than just a health problem but is multi-faceted.

Given these facts, it would seem that at least three alternative courses of action should be considered:

1. Nutrition funds could be totally devoted to health needs identified by this assessment, such as protein-calorie malnutrition, enteritis, and poor nutrition knowledge.

2. Nutrition is a multi-sectoral problem and therefore, should be attacked on more than just one front. In particular a nutrition strategy could involve some degree of additional assessment activity involving agriculture, education, and health programs. A full scale nutrition assessment could be made jointly by Nicaraguan agencies and AID with some full-time organization of an analysis group similar to UNASEC or the Health Sector Assessment Unit. This course of action seems ill-advised at this time, given the lack of a Nicaraguan nutritional planning capability and the admitted lack of interest by Nicaraguan agencies in such an undertaking.

3. A nutrition assessment looking at all the effects on nutrition such as food production, marketing, income, education, and malnutrition could be carried out by the USAID Mission. The soundness of a multi-sector approach to nutrition can be satisfied and a minimum of time and effort is required.

Such a course of action would further insure that AID is indeed concerned about an integrated approach to problems of health, nutrition and population.

APPENDIX D

PREVIOUS AND ON-GOING AID EXPERIENCE IN HEALTH IN NICARAGUA

Health Centers Loan. Major AID efforts in the Nicaraguan health sector date from grant funded activities initiated in the early 1960's to assist the Nicaraguan government in establishing rural mobile health units (the PUMAR Program) and, to eradicate malaria. These initial grant activities were later expanded with AID loan financing that provided $3.9 million for malaria eradication from 1965 to 1970.

During the early 1960's the GON's basic rural health strategy came to be a combination of health centers and PUMARs with the goal of establishing 128 rural health centers by 1974; an increase of 68 from the 60 existing in 1967.

Toward that end, in 1965 the GON and USAID/N entered into a $2.2 million three year loan agreement (with GON counterpart funds estimated at $1.8 million). According to the loan document, Health Centers - Rural Mobile Health, 524-L-023:

> "The Project will bring medical services preventive and curative, to a much larger percentage of the population of Nicaragua than is presently being served, especially in rural areas. The Project will consist of:
>
> (a) the construction, staffing, equipping, and providing with medicines of 56 new health centers and the improving of existing health centers;
>
> (b) the continuation and strengthening of the Rural Mobile Health Program (PUMAR) by providing necessary new vehicles, equipment and medicines;
>
> (c) the incorporation, as an integral part of the project of newly graduated physicians and other university trained medical personnel under the obligatory Social

Service Law of Nicaragua.

"Another important purpose of the Project is to achieve better coordination and integration of health activities carried out by the various public health agencies by strengthening existing coordination mechanisms and implementing already existing legislation which provides for coordination at both national and local levels."

During the period 1963-68, AID was not the only international organization involved in the general area of attempting to upgrade the Nicaraguan health sector capability, nor was loan 023 the only AID program. As a consequence a great deal of pressure was placed on the host country capability to manage these programs well.

The overextension of the Nicaraguan capability and/or AID's inadequate planning soon became evident with Loan 023. The result was several separate evaluations of the difficulties, culminating in an evaluation report in 1974 that led to a brief program directed at establishing a capability to overcome obvious Nicaraguan management difficulties. The evaluation carried out by Practical Concepts Incorporated with full participation of the Ministry of Public Health and the USAID/N came to the following conclusions:

1. USAID management of the Loan has been effective when focused on the construction and procurement aspects of the project but ineffective in getting GON to provide money and management talent sufficient to administer the Project successfully.1/

2. "The Health Center System was not functioning well. There were management problems in virtually all the support systems necessary to support the Health Centers: medicine, equipment, vehicles, facilities, staffing, supervision, etc." 2/

1/ PCI Evaluation, Pg. 1-5

2/ The Management Improvement Program, Page 11-2

3. Nevertheless, patients did benefit from medicines that were made available in the Health Center which otherwise would have only been available commercially at a higher cost. In addition, though severely handicapped as pointed out in 2 above, the medical services provided by the centers did resolve many health problems, both curative and preventive.

4. By the early 1970's it became very clear that the MOH had lost control of the rural health delivery system, that management of the system simply did not exist. Not only was AID concerned with the difficulties, but so also was the Ministry of Public Health. The Ministry realized that it could not manage the existing health delivery system under Loan 023, additional activities would become even more burdensome. And since it was contemplating new and expanded responsibilities possibly to be funded by a new Health Sector Loan from AID, it began a Special Management Improvement Program (MIP) in September 1974 with technical advisors provided by USAID/N from PCI to assist it in overcoming its management difficulties.

The Management Improvement Program carried out over some eight months by PCI has undoubtedly had a positive impact, though many problems remain. However, it does appear that a beginning has been made and that further work in the management improvement field is justified.

More importantly, it is unequivocally clear that more improvement is essential if the Ministry is to increase its involvement in the Health Sector referred to earlier, and to be able to manage any future AID loan funds. The 023 experience was dealt with here in some detail because it highlights the difficulties further sizeable loan activities might encounter with the Ministry of Health and related agencies.

Current AID Health Grant Activities. Two current AID grants were specifically designed to increase the Nicaraguan Ministry of Health's management capability to provide health services to rural communities:

(1) Rural Community Health Services, 524-15-530-110

(2) Rural Health Institutional Development, 524-11-530-114

The Rural Community Health Services Grant, approved in December, 1975 has as its purpose:

> "To stimulate participation of the population in the development and implementation of health programs through the formation of village health committees to oversee the delivery of health information, health services, and simplified medicine to the rural, isolated population through the development of an effective and efficient cadre of community level health workers and through the integration of health related governmental and voluntary agency activities at the community level."

For many years the MOH has been involved in various short term efforts to develop integrated community health programs. This project represents the first time sufficient resources, energy and planning have been concentrated to develop a feasible model. As a result, "this project is a vital step for synthesizing an integrated rural health delivery system by the GON." Priority has previously been given to rural health development without developing a community level policy. This grant will provide guidance in that development strategy.

The new project is an attempt by the MOH to develop and refine an extended rural health delivery system through the use of paramedical personnel, village health committees, and mass media instructional assistance in coordination with existing health sector and other community resources. This project will be carried out north of Managua in the mountaneous, densely populated, but geographically small, department of Esteli which is within the rural area of concentration of the Mission and, the newly initiated AID financed INVIERNO program (Agriculture Sector Development Loan 524-031).

An extremely successful community health committee model was recently generated as a spin-off from an AID sponsored Management Improvement Program (the PCI program earlier discussed). This project demonstrated the ability of the MOH to operate successfully in the rural areas, and to motivate the local populous to support and even initiate health programs. This model will be utilized as a basic framework for the operation of the community health committees. Technical and administrative support will be supplemented (promoter, health educator, local consultants, mass media education, and

inter-agency coordination) to provide a more dynamic program.

The new project intends to utilize in its design the successful results of other voluntary health related programs undertaken in Nicaragua and Central America. The project will be managed by a project director from the health education office of the MOH with a regional office in Esteli.

A major product of the efforts of the community health committee will be community action projects (wells, latrines, health posts, vaccination campaigns, gardens, etc.) which enlist the active participation of a large number of citizens. A program of adequate maintenance for these projects will also be stressed to insure continued utilization and health impact.

The basic human element of the extended health system will be the "promotor rural de salud" who will serve in communities below 1,500 people. The promoter will be selected by the local village health committee to attend a two month course in basic medicine and community organization. The promoter will then assist the committee in detecting its health problems and initiating collective solutions, coordinating actions of health or health related agencies, and providing basic preventive and curative health services. The model curriculum and text will be adopted from the excellent course now in process in-country under the sponsorship of CEPAD, a PVO organization which is part of Church World Services, and is staffed by highly qualified educational and medical personnel. The basic supervisory and leadership unit is the community health committee, a representative and responsible health body. Members of the committee will be initially chosen by local officials to include health, education, and religious leaders or by village vote. These committees will be responsible for supervising and assisting all health workers and health activities to include the initial and continuous analysis of community health problems with the assistance of the local promoter and health educator, who will decide on feasible courses of action, and generate community resources to achieve solutions to the health problems.

The basic coordinating elements for the MOH will be rural health educators who will be retrained or trained under the project to activate and supervise the community health committees, promoters, and community projects within their areas. An important portion of their work will be the community health diagnosis which will assess the

major health problems, community economic/physical resources and health manpower resources and establish base line statistics. The initial formation of the village health committees, the collective establishment of a community health plan, the liaison to bring adequate technical and economic resources to the assistance of the health committee, and the health education activities through the village health committees to include mass media education program will be additional responsibilities of the health educator.

The mass media health education program is designed, utilizing as its model, the successful Acción Cultural Popular (Radio Sutatenza) in Colombia and will utilize the experience of the recently successful agricultural program in Guatemala. Additionally, the project will utilize the mass media expertise that has been developing in Nicaragua under the present AID sponsored standard mathematical education program and the soon to be initiated Manoff nutrition program. The 1/4 to 1/2 hour regularly scheduled a.m. broadcasts from a local Esteli station will be received in organized classes with accompanying visual aids and texts. Formal class participants will be initially supervised under the leadership of the village promoter, health educator, or interested citizen. These classes will complement the village based health education efforts. Informal listening will also be encouraged in the target area. Additionally, a short local health news bulletin will provide motivational messages by acknowledging the accomplishments of various committees or health personnel.

The prior improved capacity or con-commitant development of an improved rural capacity to deliver health interventions will greatly facilitate the delivery of specific interventions contemplated under any program.

Rural Health Institutional Development. This grant proposal is to be presented for AID/W approval once the Health Sector Assessment is completed.

The several audits, and especially the PCI evaluation of Loan 023 enumerated several essential institutional improvements needed within the present Nicaraguan Health agencies if the health system is to become capable of operating efficiently and capable of solving health problems in outlying rural areas. It is the purpose of this grant to address these management problems so that the health system

will be prepared or on its way to being prepared, to handle expanded health activities in the future.

It is not yet complete, because it must first await the results of the Health Sector Assessment before specific programs aimed at institutional improvement can be developed. As currently anticipated the grant will assist in the development of a public institutional capacity to support greatly expanded health services in rural areas. Primary emphasis will be on developing performance criteria and skills for health professionals. Additional emphasis will be placed on developing an information system which will allow decision makers to more effectively identify priority areas for the allocation of scarce sector resources. The project will focus on the improvement of administration, maintenance and support services in the present health agencies. It will also train faculty and develop a curriculum for a health delivery school focusing on nurse practitioners, health promoters, midwives, rural laboratory technicians, and supervisory personnel. This project will begin the process of developing GON institutional capacity to effectively manage and implement large scale programs to deliver more adequate health services to rural areas.

The Ministry of Health (MOH) and the National Social Assistance Board (JNAPS) have presented preliminary studies on the training needs in 1976. The Health Sector Assessment has also focused on the need to improve the health infrastructure. Consultants are scheduled in early 1976 to assist the Mission, MOH and JNAPS in formulating a training plan consistent with the recommendations from the Health Sector Assessment.

The Health Sector Assessment will provide a fuller definition of health problems areas and propose alternate strategies for improvements. The Institutional Development Project will complement the sector assessment and other health programs of the GON, AID and other international programs by strengthening the health manpower base common to all programs. The international advisor teams of the Pan American Health Organization, Inter-American Development Bank and the UNDP are providing technical assistance in the design of this program.

Family Planning Grants. The Family Planning program in Nicara-

gua was begun without fanfare in 1967. Until the past year the initial program philosophy has determined the structure and operating pace of family planning activities.

The family planning program has traditionally operated through the formalized "outlets" of the MOH and the outpatient clinics of the INSS. Services were initially provided only through the sponsoring of medical family planning hours which were distinct from other clinic activities. This was designed to provide necessary visibility for an "unrecognized" family planning need. Recently, family planning activities have been integrated with other clinic activities in approximately half of the 62 MOH clinics. This trend will be completed by 1979. This dependence on traditional medical outlets was also followed by INSS, the Moravian Mission Group and the Demographic Association in establishing their programs around medical facilities and with separate medical hours.

With the assistance of two recently completed studies showing the economic benefits of family planning and the personal desire for lower fertility, the Mission has been able to convince Family Planning and MOH personnel of the need for extending contraceptive coverage by means of paramedical personnel. The initial target is to involve some 2,000 rural parteras in the extension of family planning services. This will be done by providing repeated short course training and village health kits with basic delivery-emergency equipment and family planning supplies. ADN will also participate in this activity through rural market place distribution, and by holding a series of high level seminars for cabinet level and congressional leadership to influence passive attitudes towards the implications of rapid population growth even in such a relatively sparsely populated country.

Additional Health Related Activities. Reconstruction of Managua: Loan 029 has $6,000,000 authorized for health type activities for directly benefiting the poor majority. This program will place its main thrust in the construction of water and sewer extensions from existing water mains and sewer lines to low income families with low interest, long term (80 month) loans which will be repaid through additional charges on normal water bills. The repayments will be placed into a rotating fund which will reinvest the funds to satisfy new demands for extension of water and hooks-up to low income areas.

Other activities to be included are the construction of clinics and day care centers in low income areas, and the improvement of laboratory facilities and maintenance activities in support of the health institutions and water-sewage systems.

The Mission is currently supporting a plan for the construction of an administrative health complex to be built with non-health 029 Loan funds. The health complex will feature the integration of compatible sections of all major health agencies, such as planning, statistics, epidemiology, health education, maternal and child health, maintenance, library-reference system, and other minor activities. The construction of this complex will be accompanied by appropriate technical assistance to assist in the integration of health activities.

Health Library and Reference System. The Mission has recently supported activities for the initiation of a health library and reference center. This took place through the donation of some 800 volumes of modern texts in the fields of basic science, simple curative medicine, preventive medicine, nutrition, environmental engineering, public health, administration-management training skills, audio visual aide production and use, and related rural development skills. After the library is fully functioning the program agreement with the MOH specifies that monthly presentations by MOH personnel will be prepared in important subject areas for presentation to the central staff, and for distribution to the rural clinics to establish a numbered series of reference documents for continuing education activities. This activity which should assist in broadening terms of reference, developing a scientific-technical approach, and increasing the communication of technical ideas is viewed as a priority area of interest by the Mission and the continual strengthening of this program will be carried out through all loans and grants.

APPENDIX E

IMPACT ON WOMEN

An integral part of Mission strategy is the concern for the role of women in Nicaraguan development. An extensive study of women's role was sponsored recently by USAID/Nicaragua.[1] Its conclusions as to the health problems of women and recommendations for their amelioration, closely parallel those which have been pointed to in this assessment.

Women in particular are adversely affected by problems of nutritional deficiencies and the associated infant mortality. Pregnant and lactating women are especially in need of adequate diets, and this in turn can improve the infant mortality associated with poor health of the mother. The higher risks of frequent child births and early and late-life pregnancies add to the hazards for women and point to the need for improved family planning, education, and availability of services.

The programs which the Mission proposes to carry out with impending rural health loans and grants will directly address the problems stated above. As beneficiaries of the services of rural health centers, women and children clearly predominate. The improvement sought in the management, personnel and facilities in the rural areas will thus benefit this group. In particular, the improved system of MCH and family planning will benefit women. An example of one such program is the training of rural midwives, parteras.

1/ Paula Diebold de Cruz and Mayra Pasos de Rappaccioli "Report on the Role of Women in the Economic Development of Nicaragua" USAID/Nicaragua, Nov. 5, 1975.

The midwife is considered as a community leader and well respected for providing emergency health care, attention in deliveries, and general medical advice, but nearly 80% have had no formal education 2/. Using this existing base of experience and community prestige, Mission is planning a large scale partera training program, that will teach them basic simplified medicine and provide them family planning information and devices.

Since a recent study on fertility in Nicaragua shows a large percentage of women desiring family planning, AID strategy will be to promote both traditional institutional programs such as that of the Ministry of Health, as well as community based paraprofessional personnel such as parteras.

Upgrading the role of women as leaders as well as participants and beneficiaries of the health delivery system is also part of the Mission's goal. Pilot efforts in organizing community health committees have indicated that women play an active role in these groups. On this basis we expect the Community Health Committee portion of this sector program to provide women with significant participation in community leadership. Employment and training opportunities for women will also be significantly increased by the proposed program, since women form the majority of nurses, health educators, lab technicians and auxiliaries. The planned training of these and newly developed promoters will be financed by expanded training facilities (e.g., rural health delivery school) and educational opportunities for these professions.

The Mission will also encourage the GON in its efforts to improve the status of women in Nicaragua's health sector. While women seem to be participating effectively at the local level, all major national level administrative and decision-making posts are held by men, except for the President of the Board of JNAPS who has final jurisdictional authority, Mrs. Somoza. She is an intelligent and concerned individual, who has recently revitalized the health sector through a series of high level appointments in early 1975. The GON has exhibited an interest in improving women's affairs, however, in October, 1975, an Office of Women was created as a part of the Ministry of Labor with the purpose of improving the position of women in all aspects of Nicaraguan society.

2/ Ibid., p.25.

APPENDIX F

ATTENDANCE AT HEALTH SEMINAR IN CHINANDEGA, NICARAGUA

23 January, 1976

Dr. Aldo Aguero
Health Sector Analysis Unit

Mr. Bruce Blackman
Loan Officer
USAID/Nicaragua

Ing. Adan Cajina
Minister of Public Health

Dr. Carlos H. Canales
Director General
Ministry of Public Health

Dr. Julio I. Cardoze
Minister of Labor

Mr. Robert E. Culbertson
Director
USAID/Nicaragua

Dr. John A. Daly
Public Health Advisor
Office of International Health
U.S. Dept. of Health, Education and Welfare

Dr. Carlos Dubon
Secretary of the President

Dr. Kenneth Farr
Office of International Health
U.S. Dept. of Health, Education and Welfare

Dr. Jose Gonzalez
Director
American Hospital Association

Lic. Felix Hernandez
Director General
Nicaragua Social Security Institute

Dr. Lee Howard
Director, Office of Health
USAID/Washington

Dr. Carlos Jiron
Director
National Board of
Assistance and Welfare

Ing. Oscar Larrea
Representative
Pan American Health Organization

Srita. Melba Lau
Consultant, Office of the
President of the Republic of
Nicaragua and Health

Dr. Luis Carlos Ochoa
Representative
Pan American Health Organization

Lic. Ricardo Parrales
Director General
National Planning Office

Dr. Gilberto Perezalonso
Director, National Board of
Assistance and Social Welfare

Lic. Henry Perez
Department of Planning
National Board of Assistance and
Social Welfare

Dr. James E. Sarn
Public Health Advisor

Lic. Antonio de J. Villalta
Director of Administrative
Services

Lic. Enrique Zamora
National Planning Office

APPENDIX G

NICARAGUA MINISTRY OF HEALTH POLICY

1. All of the health actions to be developed through MSP programs will be executed considering Man in interaction with his environment through integrated medicine, in which the community and the health multi-professional team will be participating.

2. Integrated health actions include preventive measures, health development, recuperation, and rehabilitation realized at all levels by the health team formed of professionals, auxiliaries, administrative and community personnel in which all of them will have a mission to comply with in the process of health services delivery. Such a health policy will result in programs considering primary and secondary prevention levels as priorities. It will develop extension of services coverage principally to rural areas and marginal urban areas, preferentially attending vulnerable groups constituted by mothers and children under six.

3. It will orient programs to preferentially reduce the magnitude of the most important health problems; among others those of communicable diseases preventable through vaccination techniques, malnutrition of children under five, malaria, especially in high transmission rural areas, and tuberculosis in high prevalence sectors.

4. This policy will impulse actions tending towards betterment of environmental ecological conditions, modification of excreta disposal systems, water supplies, sewage disposal, food control especially in high concentrated rural areas, factors responsible for the high incidence of the country's enteric mortality of children under five.

5. It will emphasize in all its health programs the communal active participation as a potential resource, bound to raise health levels using appropriately trained personnel in simplified medicine, communal development, and Health Education.

6. It will fortify the infrastructure organization responsible for operative capacity of resources, to improve their productivity through supervision techniques, organization and methods, communication, information and evaluation.

7. It will promote adequate coordination of all sector organizations, through a gradual and rational process to permit increase of technical efficiency and utilization of all different health program resources for the benefit of the people.

8. It will impulse development of necessary human resources for program execution adapting their academic content to the country's health problem necessities, especially personnel: nurses, auxiliaries health inspectors, communal promoters, etc.

9. It will perfect the University's graduates "Social Service" educational assistance and evaluation system, with the participation of all different faculties, with the objective of integrating health human resources with assistance services especially in areas without permanent resources for the attention of its population, thus stimulating social and epidemiological research in order to have a better knowledge of the country's health situation.

10. It will review and update current laws, regulations and provisions harmonically unifying them in the Health Code, in order to normalize all health sector juridical relationships, to strengthen service program activities.

SOURCE: Republica de Nicaragua, Ministerio de Salud Publica, Plan Nacional de Salud, 1976-1980. Managua: Direccion de Planificacion, 1975.

APPENDIX H

PROGRAMA QUINQUENAL DE LA JUNTA NACIONAL DE ASISTENCIA Y PREVISION SOCIAL: PROGRAMA MEDICO ADMINISTRATIVO DE LA JNAPS

El Programa de la Junta Nacional de Asistencia y Previsión Social se encuentra completando el Plan Nacional de Salud 1976-1980 del Ministerio de Salud Pública.

Al efecto, el Plan Nacional de Salud, en su componente de Políticas y Estrategias en la acción de Salubridad pretende, en general, producir modificaciones en el proceso de interrelación que existe entre la comunidad humana y el medio en que vive. Anuncia como postulado de política, que estos cambios cumplan con ciertos requisitos.

(a) Establecerlos en el más corto tiempo

(b) Que sean tan estables como sea posible

(c) Que se obtengan en la mayor cantidad

(d) Que sean de la mejor calidad

(e) Que se logren con el menor esfuerzo

(f) Que se produzcan a los más bajos costos

Resumiendo estos requisitos que no es más que el aumento de cobertura entendiendo por ello la extensión de los servicios en cantidad y calidad, orientados especialmente a los grupos más vulnerables en la comunidad, como es el Binomio Madre-Niño, especialmente en el área rural.

El Programa dentro de la Política de aumento de cobertura, está dirigida a mejorar la de servicios de salud, a preparar los recursos humanos necesarios, a elevar y estandarizar el nivel administrativo de los hospitales de la República.

La unidad ejecutora del Programa serán la Dirección de Asistencia Social, la Dirección de Asistencia Médica y la Jefatura de Programación Técnica de la Junta Nacional de Asistencia y Previsión Social, siguiendo los lineamientos de su Presidenta, la Excma. Señora Doña Hope Portocarrero de Somoza y a la política de salud del Excmo. Señor Presidente de la República, General Anastasio Somoza D.

Se procederá a la regionalización de los servicios de salud, de acuerdo a limitación geográfica, política, social, económica e histórica. Se definirán dentro de cada región la calidad de servicios de acuerdo a los Niveles de Atención Médica que se describen en el Anexo Número 1.

Para llevar a efecto la regionalización, se programarán los siguientes proyectos:

A. Proyecto de Construcción

Se construirán Hospitales Regionales en las siguientes cabeceras Departamentales:

Bluefields, Departamento de Zelaya
Matagalpa, Departamento de Matagalpa
Juigalpa, Departamento de Chontales

Los otros Hospitales Regionales son los de la ciudad de Jinotepe y León, el primero ya construído y el segundo, que se mejorará por medio de un préstamo que el Banco Interamericano de Desarrollo concedió a la Universidad Nacional Autónoma de Nicaragua.

(1) Se construirán y reconstruirán, dotando a los Hospitales Departamentales y Municipales, de las áreas de servicios mínimos, de los recursos humanos necesarios, así como de equipo e instrumental médico quirúrgico, recomendados en los Niveles de Atención Médica.

(2) Se trabajará conjuntamente con el Ministerio de Salud Pública, a fin de mejorar los servicios en los Centros de Salud.

(3) Se llevará la salud al sector campesino por medio de construcción de puestos de salud, con servicios de medicina simplificada, atendidos por Comités de Salud, promotores de salud y líderes comunales adiestrados.

B. Estandarización de los Servicios de Atención Médico y Administrativo.

Esto se llevará a cabo por medio de los siguientes proyectos:

(1) Equipamiento con equipo mínimo de acuerdo a los Niveles de Atención Médica.

(2) Estandarización de todos los equipos fijos para facilitar su mantenimiento preventivo y correctivo.

(3) Proveyendo a todos los Centros que prestan atención médica, de los instrumentos, equipos y materiales, racionalizando su mantenimiento y reposición.

C. Sistema de Mantenimiento.

A fin de evitar gastos que repercutan en los Presupuestos de las Juntas Locales de Asistencia Social y de la Junta Nacional de Asistencia y Previsión Social y que permitan el servicio continuo, seguro y confiable, de todos aquellos elementos que auxilian a todo el personal empeñado en las acciones de salud, prolongando la vida útil de los equipos.

Para cubrir los objetivos anteriores, se contempla la organización de una Oficina Central de Mantenimiento que estará a cargo del entrenamiento del personal necesario en los Hospitales Departamentales y del mantenimiento primario y secundario.

D. Mejoramiento y Estandarización de los Servicios Administrativos en todos los Centros que prestan Asistencia Médica

Para lograr lo anterior, con financiamiento propio y del Banco

Central de Nicaragua, se contratará una compañía especializada, quien uniformará todos los sistemas y servicios de los Hospitales, Centros y Puestos de Salud; se prepararán Administradores de Hospitales y se nombrarán en cada Hospital. 1/

E. Entrenamiento de Personal

Se fomentará la preparación del personal profesional, técnico y auxiliar necesario, para llevar a cabo las labores en todos los campos de salud, utilizando los planteles o instituciones existentes reforzándolos; haciendo uso de becas en el territorio nacional o en el extranjero y enfatizando en centros de adiestramiento rural.

F. Sistema de Transporte

El aumento de cobertura de los servicios de salud y las proyecciones del área rural con establecimientos en comunidades más alejadas, obligará un incremento en la referencia y contra-referencia de consultas de los Niveles de Atención periféricas, a los niveles más centrales y de las más simples a las más complejas.

La utilización de personal auxiliar y técnico en el primero y segundo nivel de atención de salud del sistema, obliga al mejoramiento de un sub-sistema de supervisión, que hacen indispensables considerar tener dentro del Programa, un proyecto de ambulancias y de transporte necesarios para dotar a la red de servicios médicos, de los vehículos necesarios para un buen servicio.

G. Sistema de Comunicación

Se deberá establecer un sistema de telecomunicaciones, a fin de establecer un intercambio de atención médica y sanitaria en toda la República, con el objeto de proveer información médica a los hos-

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1/ El Banco Central de Nicaragua ha concedido ya, beca para que realicen estudios de post-graduado en Administración de Hospitales en los Estados Unidos. Asímismo, el Centro Interamericano de Estudios de Seguridad Social, CIESS, de México, ha otorgado seis becas para post-graduado en Administración de Hospitales en la República Mexicana.

pitales, centros de salud más distantes y para poder impartir adiestramiento uniforme y en forma simultánea a todas las comunidades donde existan servicios públicos de salud.

H. Sistema de Estadística

Crear una Unidad Central de Estadística de las Instituciones vinculadas a la Junta Nacional de Asistencia y Previsión Social, para unificar la producción de Estadística relacionadas con salud.

TABLE H.1

NIVELES DE LA ATENCION DE SALUD

NIVELES	MINISTERIO DE SALUD PUBLICA	Junta Nacional de Asist. y Prev. Soc.
Nivel 1	Puesto de Salud (Rural)	Consultorio Accion Social Comunitaria (Urbana-Marginal)
Nivel 2	Centro de Salud 2 (Municipio) u Hospital Elemental	Consultorio Médico u Hospital Elemental
Nivel 3	Centro de Salud 1 (Departamento)	Hospital Departamental
Nivel 4	Central Regional	Hospital Regional
Nivel 5	Nivel Normativo (M. S. P.)	Hospital Nacional Normativo (J.N.A.P.S.)

APPENDIX I

EXTRACT OF PROGRAM OBJECTIVES FROM PLAN NACIONAL DE SALUD NACIONAL, 1976-1980

Enfermedades Transmisibles

Vacunables

Proposito:

Reducir la mortalidad y morbilidad de polio (70%/70%), Sarampion (50% / 40%), Tosferina (80% / 60%), Difteria (80% / 80%), Tetanos (50% / 60%) para el final del decenio.

Enfermedades Entericas y Parasitarias

Proposito:

Reducir la mortalidad por infecciones entericas en un 50% y promover medidas adecuadas para reducir los niveles de morbilidad.

Tuberculosis

Proposito:

Reducir la mortalidad por tuberculosis en 60% y la morbilidad en 30%.

Malaria

Propósito:

Reducir la mortalidad en un 50% y la morbilidad en un 30% si las condiciones epidemiologicas y tecnicas actuales persisten.

Erradicación del Aedes Aegypti

Propósito:

Eliminar el riesgo de adquirir la Fiebre Amarilla urbana, dengue y otras virosis transmitidas por este vector.

Venéreas

Propósito:

Reducir la morbilidad por enfermedades venéreas (sífilis, gonorrea, chancro blando, etc.) en grupos de población de alto riesgo epidemiológico de la tasa actual, un 50%.

Lepra

Propósito:

Reducir la incidencia y prevalencia de la lepra, interrumpiendo la cadena de transmisión mediante el tratamiento de los casos abiertos especialmente, hasta obtener su negativación.

Salud Mental

Propósito:

Disminuir el riesgo de adquirir enfermedades mentales, mediante el establecimiento de servicios de prevención primarios en poblaciones debidamente seleccionadas.

Salud Dental

Propósito:

Disminuir la incidencia de enfermedades buco-dentales en la población, con prioridad al grupo menor de 15 años, gestante y adultos, mediante acciones de promoción, prevención y restauración básica de la salud bucal.

Prevención de Accidentes

Propósito:

Disminuir la mortalidad y la invalidez ocasionada por accidentes, envenenamiento y violencia.

Enfermedades Crónicas

Propósito:

Propiciar medidas tendientes a mejorar el conocimiento de este grupo de enfermedades.

Estimular la creación de servicios especializados para su atención.

PROGRAMAS DE SANEAMIENTO DEL MEDIO

Servicios de Agua y Disposición de Excretas

Servicio de Agua Potable

Propósito

Dar una mayor protección a la salud de los habitantes del área urbana y rural, disminuyendo los índices de morbilidad-mortalidad por enfermedades de origen hídrico.

Disposición de Excreta

Propósito:

Reducir las enfermedades ocasionadas por la contaminación del medio, debido a la inadecuada disposición de excretas.

Desechos Sólidos

Propósito:

Disminuir el riesgo de las enfermedades debido a la contaminación del medio ambiente por los desechos sólidos.

Contaminación Ambiental

Propósito:

Preservar el ambiente reduciendo los riesgos de contaminación del aire, agua y suelo.

Control de los Alimentos

Propósito:

Reducir las enfermedades ocasionadas por la contaminación de los alimentos y de otros productos alimenticios.

Salud Ocupacional e Higiene Industrial

Propósito:

Proteger la salud del 50% de los trabajadores expuestos a riesgos profesionales.

Control de Plaguicidas

Propósito:

Elaborar normas y reglamentos que permitan el control en el uso de plaguicidas y otros productos químicos nocivos para la salud y que ocasionan la contaminación de los cuerpos de agua y el suelo.

Control de Medicamentos

Propósito:

Desarrollar el Programa de Control de la Calidad de los Medicamentos, Drogas y Estupefacientes de consumo humano, a fin de asegurar que su uso no implique riesgos para la salud de la población.

Salud Veterinaria

Propósito:

Reducir laincidencia de las zoonosis especialmente de la rabia canina con miras a erradicar la rabia humana.

Estrategia:

AUMENTAR la cobertura del Programa de Control de la Rabia, manteniendo los niveles útiles de vacunación a la población canina susceptible.

INCORPORAR en el Laboratorio Nacional de Salud la Sección de Diagnóstico de Rabia, con los métodos y técnicas modernas; equiándolos con los elementos necesarios

OBTENER el financiamiento adecuado, especialmente en la adquisición de vacunas, viáticos de personal y materiales, etc.

ADIESTRAR al personal auxiliar de laboratorio sobre técnicas de diagnóstico de la rabia.

PERFECCIONAR el sistema de Vigilancia Epidemiológica de la Rabia, integrándolo al Sistema de Vigilancia Epidemiológica del Ministerio de Salud Pública.

COORDINAR actividades con las otras instituciones sobre la zoonosis de importancia en nuestro medio (Brucelosis, Tuberculosis Bovina, Cisticercosis, Encefalitis Equina).

SERVICIOS COMPLEMENTARIOS

Enfermería

Propósito:

Desarrollar el sistema de enfermería del Ministerio de Salud Pública para adecuarlo a las necesidades de los diferentes programas de salud.

LABORATORIO DE SALUD PUBLICA

Propósito:

Establecer un Sistema de Laboratorio que colabore al diagnóstico de las enfermedades, para mejorar la salud de la población y sirva de orientación y guía para la programación de las actividades de salud.

SISTEMA DE VIGILANCIA EPIDEMIOLOGICA

Propósito:

Diseñar un sistema de vigilancia epidemiológica, para la detección precoz de la incidencia de las principales enfermedades y el análisis de su comportamiento.

EDUCACION PARA LA SALUD

Propósito:

Incorporar el componente educativo en todos los programas de salud para lograr la participación consciente y organizada de la comunidad, ante la problemática de salud del país.

DESARROLLO DE LA INFRAESTRUCTURA

Desarrollo Institucional

Propósito:

El Programa busca una ecuación de eficiencia y eficacia que supone la creación de un marco institucional donde se maximice la obtención, mantenimiento y utilización de los recursos para producir servicios compatibles, en cobertura, calidad y costo, con las necesidades y realidades nacionales.

Tal figura institucinnal importa una adecuada coordinación de las actividades en los planes intra e intersectoriales y el apoyo oportuno a los órganos ejecutores, tanto en los aspectos logísticos, como en los procesos de dirección, planificación, control, supervisión y evaluación de la organización, para cuyo

efecto es preciso realizar y adecuar estructuras, normas, proceso gerencial y sistemas de información, así como la totalidad de las áreas consignadas en el capítulo sobre Reforma Administrativa.

SISTEMAS DE INFORMACION

Propósito:

Procesar, analizar y difundir la información estadística necesaria para fortalecer la programación de los Servicios de Salud y el análisis epidemiológico de los principales problemas de salud del país.

PLANIFICACION

Propósito:

Fortalecer el proceso de planificación en el Ministerio de Salud Pública, a objeto de lograr la formulación programática de acuerdo a la política de salud del país.

DESARROLLO DE RECURSOS HUMANOS

Propósito:

Capacitar y formar los recursos humanos para el desarrollo de los programas de salud del Ministerio de Salud Pública.

DESARROLLO DE LA INFRAESTRUCTURA FISICA

Propósito:

Adecuar la infraestructura física a las necesidades de los programas de salud, especialmente en relación a la extensión de la cobertura de los servicios, tanto urbana como rural.

SISTEMAS DE FINANCIAMIENTO

Propósito:

Es propósito del Programa, el Desarrollo Financiero de los Servicios como medio para expandir las coberturas y mejorar la ca-

lidad de su producción.

El enfoque no sólo comprende la expansión de las actuales fuentes y la apertura de otras, sino también procurar una racionalización del gasto y la inversión que logre máximos niveles de rendimiento y productividad.

DESARROLLO LEGAL

Propósito:

Se aspira a desarrollar un régimen legal para los servicios, que reuna cualidades de dinamismo, consistencia con políticas y clara delimitación de poderes, atribuciones y responsabilidades de cada uno de los componentes institucionales y de la comunidad con respecto a ellos. Además, el desarrollo del régimen legal se ha de complementar, con los campos del reglamento y norma interna, en términos de alcanzar el esquema de un sistema normativo integral, que va desde la ley general hasta los instructivos de procedimientos.

DESARROLLO DE ASISTENCIA TECNICA E INVESTIGACION

Propósito:

Establecer un Sistema de Asistencia Técnica con todos los Organismos y Agencias Internacionales para lograr la capacitación del personal, la asesoría en campos y áreas específicas y el desarrollo de investigaciones que impulsen el fortalecimiento operativo de los programas de salud.

APPENDIX J

COMMON ABREVIATIONS USED IN NICARAGUAN HEALTH SECTOR

AID	Agency for International Development Agencia Internacional para Desarrollo
CAM	Centro de Abastecimientos Medicos Medical Supply Center
CELADE	Centro Latinoamericano de Estadistica Latin American Statistics Center
DENACAL	Departamento Nacional de Acueductos y Alcantarillados Water Works
IAN	Instituto Agrario Nicaraguense Nicaraguan Agrarian Institute
INCAE	Instituto Centro Americano de Administracion de Empresas Central American Institute for Business Administration
INCEI	Instituto Nicaraguense de Comercio Exterior e Interior The Price Stabilization Agency
INSS	Instituto Nicaraguense de Seguridad Social Nicaraguan National Institute of Social Security
INVIERNO	Instituto Nicaraguense de Bienestar Rural Rural Development Institute
JLAS	Junta Local de Asistencia Social Local Board of Welfare
JNAPS	Junta Nacional de Asistencia y Prevision Social National Board of Welfare
MSP	Ministerio de Salud Public Ministry of Public Health

OMS	Organizacion Mundial de la Salud WHO- World Health Organization
OPS	Organizacion Panamericana de Salud Pan American Health Organization
PIB	Producto Interno Bruto Gross Domestic Product
PRODESAR	Programa de Desarrollo de Areas Rurales Development of Rural Areas Program
PUMAR	Programa de Unidades Moviles a Areas Rurales Rural Area Mobile Health Units
SERN	Servicio de Educacion y Recuperacion Nutricional Education and Nutritional Recuperation Center
SNEM	Servicio Nacional de Erradicacion de la Malaria Malaria Eradication National Service
UASS	Unidad Analisis del Sector Salud Nicaraguan Health Sector Assessment Unit
UNAN	Universidad Nacional Autonomo de Nicaragua National Autonomous University of Nicaragua
UNASEC	Unidad de Analisis Sectorial (Agricola) Agricultural Sector Assessment