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HEALTH SYSTEMS SUPPORT PROJECT

APSISA "A"/USAID/MSCI

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MEDICAL SERVICE CORPORATION INTERNATIONAL (MSCI)

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1. EXECUTIVE SUMMARY

1.1 Project Objectives

The Health Systems Support Project (APSISA) was organized to provide technical assistance to/and strengthen the technical, administrative, and financial capabilities of the Ministry of Public Health and Social Assistance (MOH) to upgrade and develop primary attention preventive health care, important elements for the reinforcement of the Child Survival and Community Health Programs. Cooperation, likewise, was oriented toward the strengthening of the MOH managerial infrastructure for a better use of human and material resources and to promote, at long term, the financial and technical self-sufficiency of the health sector.

1.2 Project Development

Two USAID contractors participated in the APSISA Project development: Medical Service Corporation International (MSCI), responsible for the development of the subcomponents grouped under APSISA "A" (004) and Clapp and Mayne, Inc., responsible for the development of the subcomponents grouped under APSISA "B" (005).

The technical assistance under APSISA "A" covered the following subcomponents:

- * Organization and development of the Supply System (drugs and medical supplies).
- * Selection, acquisition, distribution, and management of drugs and medical supplies.
- * Drug Quality Control.
- * Biomedical and hospital equipment maintenance.
- * Upgrading of clinical laboratories and improvement of Potable Water and Sewage Systems in Health Units and Posts.
- * Vehicle management and maintenance, spare parts procurement and warehousing.
- * Development of the Management Information System in the drug and medical supplies area, transportation, and biomedical and hospital equipment maintenance.
- * Malaria control.

1.3 Important Achievements

Through the APSISA "A" Project, the MOH significantly improved their capability for logistical support to strengthen and develop basic health care delivery. The most important achievements as measured by the goal indicators defined by the Project (End of Project Status - EOPS) are summarized below:

Goal: That minimum levels of drugs and medical supplies be available to 90% of the MOH health facilities (adequate to the health care delivery level of each facility).

Results: At Regional level, 100% primary care health facilities have an average availability of 54 to 71% of 30 basic drugs, distributed quarterly (Monitorial Report, MSCI/April 1991).

The drug and medical supplies acquisition process was reduced from 24-27 months to an acceptable minimum of 6-8 months.

Goal: That 90% of biomedical and laboratory equipment be functioning in primary health care facilities.

Results: 80% of biomedical and laboratory equipment is functioning in Health Units and Posts (Corrective Maintenance). However, it was not possible to establish a Preventive Maintenance Program (PMP) due to lack of human and material resources and infrastructure.

Goal: 20% increment in the MOH operative budget allotted to regional health services (that is, facilities other than hospitals).

Results: From 1989 to 1991, the budget was increased in 13% for the acquisition of 60 basic drugs with PL-480 funds and through imports. From 1992 onward, a 50% budget increment is planned for the acquisition of 30 essential drugs.

Goal: Improvement of MOH Health Policies, Program Planning and Management capability.

Results: - Improved the MOH management capability for the adequate acquisition and administration of supplies at Central and Regional levels, as well as for the administration and use of malaria and transport resources.

- The MOH approved in February 1991 the policies and strategies of the 1991-1994 National Health Plan.

Goal: Reduce to 0.5 (500 cases per 100,000 inhabitants) the Annual Parasitic Index (API) for Malaria.

Results: The API was reduced to 1.7 in 1990 (170 Malaria cases per 100,000 inhabitants).

Goal: Introduction of a Preventive Maintenance Program (PMP) for the MOH vehicles.

Results: The MOH Transport Department PMP maintains a monthly average of 75% to 80% effectiveness.

The goals and results are summarized in Annex 1 according to the indicators established by the APSISA Project. We present in more detail form the progress of the APSISA "A" technical cooperation in Section 3.

1.4 Conclusions

A summary of the more important conclusions is submitted below:

- 1) Despite the fact that technical assistance and the financing were approved in 1986, the contract with Medical Service Corporation International (MSCI) was only effective on September 30, 1987. In general, the technical cooperation was more effective since June 1989 with the arrival of the new health authorities who approved concrete development proposals.
- 2) The strategy adopted by the Project to ensure the effectiveness and continuity of technical cooperation was oriented toward the establishment of an effective coordination among the members of the MOH Technical Units and USAID and Technical Assistance representatives. The joint elaboration of Action Plans, their quarterly evaluation, the Project coordination through the Steering Committee chaired by the Vice-Minister of Health, and the weekly coordination meetings among USAID, APSISA/MOH members, and the Project Chiefs of Party, facilitated the participative approach of the Project development.
- 3) The MOH Supply Administration diagnosis was found conceptually and technologically delayed, therefore, a proposal for its modernization was elaborated. The proposal included the development of the Direction, Procurement, Warehousing, Distribution, and Information Subsystems. The Supply System is operating at present to the entire satisfaction of three MOH dependencies: The Drug and Medical Supplies Technical Unit (UTMIM), in

charge of selection, programming and distribution and use of drugs and medical supplies; the Non-Medical Supplies Technical Unit (UTSNOM), in charge of non-medical supplies selection, programming, and allotment; and the Procurement Division, in charge of product procurement, warehousing and distribution. The organization of the UTSNOM Supply System is still pending completion.

- 4) Progress was made in the development of the techno-scientific component of the Drug and Medical Supplies Technical Unit (UTMIM) and in the introduction of the MOH drug policy. The selection, pharmacovigilance, education for rational drug use, and quality control (technical function) activities are well defined at UTMIM, as is its technical assistance to the operative component (drug programming, procurement, warehousing, and distribution) assigned to the Procurement Division.
- 5) The availability of funds for drug acquisition is still limited (C\$54,797,890/GOES-SETEFE and USAID funds in 1990). Annual requirements are estimated in C\$97,016,530, meaning that the funds were only enough to cover approximately 56.5% of the MOH drug requirements. It is foreseen that in 1992 the acquisition of the 30 essential drugs is going to be incremented, which will ensure greater availability at local level.
- (6) The installation of the Drug Quality Control Laboratory was completed. Its operation is still limited due to the lack of laboratory reagents, culture media, and chemical reference substances. The acquisition of this products improved during 1991. It is expected that in 1992 there will be income for more than half a million colones for cost recovery through the "Special Activities Fund of the Quality Control Laboratory," approved by the Ministry of Finance and the Court of Accounts.
- (7) The APSISA "A" Project support to the MOH Transportation System has been productive, if measured by the introduction of an increasingly efficient preventive maintenance program and the modernization of the vehicle fleet, and the establishment of cost controls.
- (8) The impact of the Project collaboration in Malaria control has been also successful. The number of Malaria cases was reduced from 23,953 in 1986 (Annual Parasitic Incidence - API of 5.0) to 9,269 cases in 1990 (API 1.7).
- (9) The APSISA "A" Project strengthened development of the Information Systems in the supply area (Central and Regional levels), transport (Central level), and Malaria (Central level). Manuals were prepared and actively

participated in the training of personnel at Central and Regional levels. At present, MOH lacks a defined policy for Information Systems development and coordination. The Data Processing Unit should be provided with the physical (equipment) and human resources necessary to support the development and maintenance of these systems.

- (10) The Potable Water and Sewage systems in 15 Health Units and Posts were upgraded through a tender/bidding process and the contracting of private construction enterprises. This activity is very important at present in view of the expansion of the Cholera epidemic.
- (11) The computerized inventory of biomedical and laboratory equipment in Health Units and Posts was completed. A study was carried out and a proposal elaborated for the development of a preventive maintenance program for biomedic and laboratory equipment in the Eastern and Western Regions. The technical assistance progress in biomedical equipment maintenance was limited, basically due to the lack of a physical infrastructure, human resources, and adequate logistical support from the Central Maintenance Department. In the future, MOH should review in depth the comprehensive development of this subcomponent, which is crucial for the efficient performance of health care services.
- (12) Laboratory equipment for \$406,000 was acquired to strengthen the laboratories at Health Units and Centers. The latter act as reference centers at Local level.
- (13) Financed the contracting of private firms for the maintenance of MOH specialized equipment: X-Ray, Vaporizers for anesthesia equipment, and hardware. MOH has to identify own funds for this service starting 1992. The efficiency of the private enterprise services in this area and the cost of the equipment justify the effort to continue it.

1.5 Recommendations

- 1) UTMIM has to make an effort to review and periodically complete the Drug, Medical Supplies, Odontology, Clinical Laboratory, and Quality Control Laboratory Basic Lists. If this process is not carried out, the Basic Lists will stop being an effective planning instrument for resource acquisition, management, and use.
- 2) The Administrative Direction should complete the Basic Lists for Non-Medical Supplies. In this way, with all the Basic Lists MOH will, for the first time, be able to

have a comprehensive Supply Catalogue.

- 3) UTMIM and the Data Processing Unit should support the use of the Supply Management Information System installed at Central (UTMIM) and at Regional levels. It is an effective instrument for the acquisition, management, and rational use of drugs.
- 4) Consolidation of the MOH procurement subsystem to maintain its effectiveness within the procurement process. All MOH users should utilize the Basic Lists whose products have been codified to support the procurement, warehousing, and distribution processes.
- 5) The budget for the acquisition of basic drugs should be increased, either through MOH budgetary income or through own income generated by cost recovery mechanisms.
- 6) There should be special supervision of the computerized Inventory Control System introduced at the Central Warehouse. It should be ensured that the Multiuser System is installed in the Central Warehouse, providing it with the Local Network Area foreseen.
- 7) Support the modernization of the Paracentral, Central, and Western Regions Warehouses.
- 8) Define MOH transportation requirements for the period 1992-1995 and identify funds or technical cooperation to cover said requirements.
- 9) Support and develop the Regional Workshops for a biomedical and laboratory equipment Preventive Maintenance Program (PMP). The PMP can be carried out in the Eastern Region in 1992.
- 10) Support the Central Laboratory in the modernization of its supplies reception, warehousing, and distribution processes in accordance with the Supply System prepared for MOH. The laboratories at Health Units need modern equipment to replace the obsolete equipment. MOH has to review the organization and operation of the National Laboratories Network. The construction of a new building for the Central Laboratory is an urgent matter.
- 11) The upgrading of the Potable Water and Sewage Systems in Health Units and Posts should be continued. There were multiple deficiencies found.
- 12) Initiate cost-effectiveness studies on vector control measures, diagnosis, treatment, and Malaria epidemiologic vigilance, as a previous step to the operative

decentralization and control measures integration into General Medical Services.

- 13) The MOH has to quite clearly define the functions and responsibilities of an Information Systems Planning Commission, that will depend from the Planning Division. The Data Processing Unit has to be provided with the physical and human resources necessary to support the development and institutionalization of the Information Systems.
- 14) The Project has to assist the MOH capability in the elaboration of effective health plans and timely decision-making. Local priority requirements have to be very well-defined for an effective planning process.
- 15) The training of management level personnel as well as the training of intermediate level technicians have to be emphasized. One of the main restrictions at the initiation of the APSISA "A" Project was the absence of duly trained personnel. The need for this training will always be present as long as MOH does not approve a promotion list for salary, promotion, and recruitment of personnel.
- 16) APSISA "A" achieved specifically good development at Central level in the supply, procurement, warehousing, and distribution areas for drugs and medical supplies, including transportation and Malaria. This development has to be rapidly expanded at Regional and Local levels to expedite an operative decentralization process. The regionalization process will have to be checked and adapted to the decentralization strategy.

2. BACKGROUND AND DEVELOPMENT OF THE APSISA PROJECT

2.1 Background

The Governments of El Salvador (GOES) and of the United States of America, through the Ministry of Planning and Coordination of Social and Economic Development (MIPLAN), and the Agency for International Development USAID/El Salvador, respectively, signed Project Grant Agreement No. 519-0308 on August 29, 1986, for the "Health Systems Support Project" (APSISA) with a five-year period duration. The Project initiated activities on October 1, 1987.

The APSISA Project is a continuation of the "Health Services Vitalization Project" (VISISA), developed by USAID in El Salvador from 1983 to 1986. The goals and purposes of the VISISA Project were oriented toward the provision of material resources (drugs and medical supplies), to the strengthening of the Transport System, and the restoration and construction of physical facilities of the Ministry of Public Health and Social Assistance (MOH), to face the political and economical crisis of the country during this period and avoiding the deterioration of health services delivery.

On the other hand, the APSISA Project was organized in order to support and strengthen the MOH technical, administrative, and financial capabilities to improve and develop preventive and primary health care services, important for the strengthening of the Child Survival and Community Health Programs. Likewise, the objective of the technical assistance cooperation was to upgrade the MOH management infrastructure for a better utilization of human and material resources and promote, at long term, the financial and technical self-sufficiency of the health sector.

The funds allotted for the development of the APSISA Project were originally seventy nine million five hundred eighty-five thousand dollars (\$79,585,000), from which forty-eight million dollars (\$48,000,000) corresponded to the USAID contribution, and thirty one million five hundred eighty five thousand dollars (\$31,585,000) to the Government of El Salvador's contribution in local currency, PL-480 funds.

The following three components were developed during the APSISA "A" Project:

Component "A": Logistical Support: Acquisition,
Distribution, and Management of Drugs, Medical Supplies,
Equipment and Facilities.

The objectives of this component were the development of a Supply System to ensure, through technical and financial assistance, the availability of drugs and medical supplies at health facilities in the primary attention level; the installation and maintenance of biomedical and laboratory equipment; improvement of Potable Water and Sewage Systems in Health Units and Posts, and the adequate operation of the Transportation System.

Component "B": Improvement of Basic Health Services Delivery.

The objective of the technical assistance in this component was the improvement of primary health attention services delivery (Health Units and Posts) through training actions, health education, and the availability of material and financial resources. The activities included technical and financial support for the Malaria and Community Health Programs.

Component "C": Strengthening Policy and Program Planning and Management.

The objective was to establish a Management Information System to permit a better strategic planning of health services in order to increase MOH capacity in the establishment of health priorities, policies, and programs and a rational use of resources.

Two USAID contractors participated in the APSISA Project: Medical Service Corporation International (MSCI), responsible for the development of the subcomponents grouped under APSISA "A" (004) and Clapp and Mayne, Inc., responsible for the development of the subcomponents grouped under APSISA "B" (005).

The technical assistance under APSISA "A" covered the following subcomponents:

- * Organization and development of the Supply System (drugs and medical supplies).
- * Selection, acquisition, distribution, and management of drugs and medical supplies.
- * Drug Quality Control.
- * Biomedical and hospital equipment maintenance.
- * Upgrading of clinical laboratory facilities and improvement of Potable Water and Sewage Systems in Health Units and Posts.

- * Development of the Management Information System in the drug and medical supplies area, transportation, and biomedical and hospital equipment maintenance.
- * Malaria control.

Despite the fact that the technical assistance and the financing were approved in 1986, the contract with Medical Service Corporation International (MSCI) was only effective on September 30, 1987. The Project began implementation on October 5, 1987 and the first technical advisor arrived in country on October 25, 1987.

2.2 Factors Influencing Project Development

Different factors contributed to the satisfactory results obtained by APSISA "A". Among them are:

- a) The selection and integration of an advisory team with experience and the capabilities to approach the solution of problems in the different Project subcomponents.
- b) Effective communication and coordination among the members of the MOH Technical Units, the representatives of the USAID and MOH management group, and the MSCI technical advisors team, through a series of periodic meetings with the Steering Committee coordinated by the Viceminister of Health.
- c) Weekly coordination meetings between the USAID and MOH management group and the Chiefs of Party of APSISA "A" and "B".
- d) In collaboration with MOH personnel, development of a work strategy oriented toward the elaboration of concrete proposals for the solution of technical problems.
- e) Quarterly evaluation of the Annual Action Plan to measure the progress of goals and activities, and to identify the changes necessary to adjust their development to available resources.

The participative approach of the Project development was more effective with the arrival of the new Health authorities in June 1989.

For example, the progress in the development of the Supply System was facilitated by the joint elaboration of a proposal in close coordination with MOH personnel. Its

institutionalization is developing the managerial structure necessary to improve the drug and medical supplies selection, acquisition, warehousing and distribution process at national level. The Supply Management Information System (SMIS) was developed as an integral part of this subcomponent, and it is a tool for the processing of individual and consolidated information on stocks, consumption, and despatch of drugs and medical supplies to orient decision-making at Central, Regional, and Local levels.

2.3 Restrictions and/or Limitations

The Project development was limited, especially at the beginning, due to multiple factors. Among those, the following can be mentioned:

- * Not enough financing of the Health sector and/or inadequate distribution of budget funds due to several reasons:
 - * Insufficient budget, adjusted to cover salaries more than services; or oriented toward the second and third health care levels instead of the first one.
 - * Lack of an organizational unit responsible of the development and supervision of the elaboration of the Ministry's operative budget (this action is fragmented into multiple units).
 - * Complete separation between the MOH investment and planning units (Example: the Engineering Division; Planning Division and Financial-Accounting Division operate with none or very little coordination).
 - * Frequent priority changes.
 - * Lack of foresight for the financing of recurrent costs in different projects carried out by the Ministry and/or External Agencies.
 - * Inflation.
- * Absence of a well-structured Health Plan.
- * Scant functional administrative structure, with a centralized tendency and little intrainstitutional coordination.
- * Multiple logistic type problems (Transport, Maintenance, Supplies).

- * Lack of assistance to the Data Processing Unit to coordinate and support the development of the Management Information Subsystems.
- * Restricted access to high-risk areas (civil conflict).
- * Lack of a supervision and follow-up program due to the absence of a priority-based programming and well-defined activities as well as development measuring indicators.

However, with the APSISA Project support many of these factors have been or are being improved.

2.4 Relations with Other Donors/Programs

There was close collaboration between the Project and the Pan-American Health Organization (PAHO) in the strengthening of the Drug and Medical Supplies Technical Unit (UTMIM) and in the elaboration of health strategies for the MOH National Health Plan 1991-1994.

The cooperation was oriented toward the development of the techno-scientific component of UTMIM through activities leading to the upgrading of drug selection, use, education, and information. This component includes four areas: Pharmacotherapy, Pharmaco-vigilance, Drug Information Center (CINMED), and Hospital Pharmacy. PAHO collaborates in the CINMED and the Hospital Pharmacy development.

In July 1991, with PAHO collaboration UTMIM initiated a systematic program of Continuous Therapeutic Education to promote the rational use of drugs. Dr. Albin Chaves Matamoros, who was then a PAHO Advisor, trained general practitioners and specialists in the methodology for the elaboration of teaching modules. These modules were especially designed, tested, and used by the Pharmacotherapy Department of the "Caja Costarricense del Seguro Social" since 1985. (*) This methodology permits the participants to become instructors capable of applying and transferring the general and specific concepts for a correct diagnosis and adequate prescription and utilization of drugs.

In August 1991, Dr. Albin Chaves Matamoros, now an APSISA Project Advisor, collaborated with UTMIM and PAHO in the development of the first participative course in "Rational Use of Non-steroid Anti-inflammatory Drugs," with the

*) Caja Costarricense del Seguro Social, 1990. Diseño, Implantación y Difusión de un Programa de Educación Continua en Farmacoterapia y Prescripción Racional de Medicamentos. Pan-American Health Office, PNSP/90-28.

participation of UTMIM personnel and doctors previously trained in the above-mentioned teaching methodology. The course was a success. Five more courses, coordinated by UTMIM, are to be carried out in 1992. The educational process is multiplying and should be supported by both Agencies to complement the MOH drug policy.

Part of the success of interagency cooperation between the APSISA "A" Project and PAHO is due to the precise delimitation of the technical assistance areas and the use of Dr. Albin Chaves Matamoros as Pharmacology Advisor by both Agencies having thus obtained continuity in technical cooperation and avoided duplication of efforts.

2.5 APSISA Previous Evaluation

The APSISA Project was evaluated in July 1990 by USAID through Cambridge Consulting Corporation. In general terms, the conclusion of the evaluating group was that the activities programmed were being developed as planned, except in the Biomedical Equipment Maintenance, Health Education, Training, and Health Planning components.

Based on the progress made, the evaluating group recommended to continue USAID support to consolidate achievements in the Supply, Rational Use of Drugs, Malaria Control, Information Systems, Operational Research, Community Health, Family Planning, and Health Education areas. Special emphasis was given to the need to plan the Project's future assistance toward Child Survival/Maternal Care, strategic planning to define health care policies and priorities, and human resource development to promote the MOH functional decentralization process.

The convenience to establish better coordination with other donor Agencies was also emphasized, particularly with the Pan-American Health Organization (PAHO) and Private Voluntary Organizations (PVO), and the need to promote actions for MOH to overcome budgetary limitations and be able to absorb and maintain the products obtained by the Project expanding health program coverage.

3. PROJECT ACCOMPLISHMENTS

COMPONENT "A": LOGISTICAL SUPPORT: SELECTION, ACQUISITION, WAREHOUSING, AND DISTRIBUTION OF DRUGS AND MEDICAL SUPPLIES, EQUIPMENT, AND FACILITIES.

This Component has five Subcomponents:

3.1 SUPPLY SYSTEM ORGANIZATION

3.1.1 DRUG ACQUISITION, DISTRIBUTION, AND MANAGEMENT

3.1.2 PROCUREMENT SUBSYSTEM

3.1.3 WAREHOUSING SUBSYSTEM

3.1.4 DRUG MONITORING

3.1.5 TECHNO-SCIENTIFIC DEVELOPMENT OF UTMIM

3.1.6 DRUG QUALITY CONTROL LABORATORY

3.2 TRANSPORTATION SYSTEM

3.3 BIOMEDICAL EQUIPMENT MAINTENANCE

3.4 UPGRADING THE CLINICAL LABORATORIES

3.5 IMPROVEMENT OF THE POTABLE WATER AND SEWAGE SYSTEMS IN HEALTH UNITS AND POSTS

A review of the technical cooperation performed to develop each component is presented through the following sections:

1. Background
2. Development
3. Problems and Restrictions
4. Recommendations

3.1 SUPPLY SYSTEM ORGANIZATION

3.1.1 DRUG ACQUISITION, DISTRIBUTION, AND MANAGEMENT

1. BACKGROUND

The Management of Supplies within Health Services presents special characteristics given the different items used to carry out their actions which, at the same time, every day become more diversified, complex, and expensive. This is evidenced in the use of drugs, medical supplies, laboratory and odontological items, medical equipment, office stationery, cleaning supplies, construction materials, spare parts, food, clothing, etc., that also difficults selection, programming, acquisition, warehousing, distribution, and control activities which integrate supply administration.

This diversification of products, equipment, spare parts, and other elements necessary for the execution of different health actions, requires the use of technical teams in charge of their analysis, definition, and updating to guarantee the facility that the products being utilized are the most adequate from the therapeutic, technical, or economic point of view of inputs and processes.

In the organizational aspect it is advisable to establish a dependency to concentrate the mentioned selection (with the assistance of the technical bodies pointed out), programming, acquisition, warehousing, and distribution activities under one command, with the participation of capable personnel in each specialized area and with the support of an adequate information system, that would effectively collaborate in expediting actions and decision-making.

In this order of ideas it is also necessary that the different users know the products offered by the system, the financial capacity to request them, and the autonomy of request with concurrence of its financial capacity, this way decentralizing responsibility for the request, consumption, and administration of supplies at operative level.

Having only one line of command in the institutional Supply System, which is practiced in different countries of the Region, permits a better flow of the technical and administrative processes and more expeditiousness in decision-making which, at the same time, represents time and costs reduction. Likewise, a distribution system based on free demand, supported by a pre-established financial backing, leads to a noticeable improvement in supply administration at operative level and, at the same time, the central level can improve its programming and procurement process knowing the true preferences of user levels.

The above-mentioned concepts were used for a diagnosis of the MOH Supply Administration, emphasizing on organizational aspects and operative processes, which was carried out in March 1989 and included an analysis of the Supply System and its Direction, Acquisition, Warehousing, Distribution, and Information Subsystems; an organization proposal and proposals for specific changes in the Acquisition and Distribution Subsystems. (See document APSISA "A" Report No. 7). The diagnosis concludes that the MOH Supply System did not present an organization as stated but that it was dispersed, that is, several dependencies of the Institution carried out activities related with the system. These dependencies are: the Drug and Medical Supplies Technical Unit (UTMIM), depending from the Direction-General of Health (DGS), in charge of drug and medical supplies selection, programming, and assignment; the Non-Medical Supplies Technical Unit (UTSNOM), depending from the Administrative Direction, in charge of selection, programming, and assignment of non-medical supplies; the Procurement Office, in charge of acquisition, warehousing, and distribution of goods.

It was determined that the procurement administrative processes were predominantly manual ones, slow and inconvenient, and that the distribution subsystem was unidirectional, that is the user did not have any participation in the definition of the quantities assigned nor transference and/or return mechanisms in case of having surpluses that would not be used, causing great losses due to expiration and damages.

This diagnosis indicated that the MOH Supply System was conceptually and technologically underdeveloped and that, consequently, activities were circumscribed to promote its modernization and development.

2. DEVELOPMENT

We will present in this chapter the activities carried out for the improvement of the organization, processes, and operative instruments of the Supply Administration, emphasizing on drugs and medical supplies.

2.1 Proposal for the Strengthening of the Supply System Organization

The above-mentioned diagnosis led to the submission of a proposal (among others) for the creation of the Programming, Control, Evaluation, and Information Department (PCEID) located in the Procurement Office to strengthen the Direction Subsystem through the development of a Management Information System that would permit knowledge of consumption of the different products acquired by MOH, improve procurement programming making it comprehensive and using inventory

techniques for the replacement of stocks, and the evaluation of the system's performance in general.

The proposal was analyzed by MOH who agreed to promote the proposed change, therefore, issued Resolution No. 572 of August 17, 1989, which created the PCEID as a dependency of the Procurement Office. Subsequently, the terms of reference corresponding to the Department Head, Programmer, and Analyst posts were prepared for recruitment, selection, and appointment of the personnel mentioned. At the same time, a document entitled "Conceptualization of the Supply System" was prepared (See document APSISA "A" Report No. 9), containing the Objectives, Functions, Policies, and Strategies of the System, its components, operative profile for its subsystems, and the organic structure of the system at central, regional, and local levels, which was developed according to the proposal guidelines. The evolution of this proposal is analyzed in 3.1.

2.2 Supply Catalog/Basic Lists

In Supply Administration, the Catalog constitutes a basic and fundamental tool to guide all the System's processes, such as programming, procurement, reception, warehousing, requisition, and distribution of goods.

The Ministry of Health and Public Assistance did not have the Supply Catalog, only the Drug Basic List.

One of the first activities was to develop the structure of the Supply Catalog, an essential phase before its development. This task was carried out in cooperation with officers from the MOH Institutional Development Unit (IDU) and UTMIM personnel.

A structure of ten classes of products was decided, arranged as follows:

- Class 0 Drugs
- Class 1 Medical-Surgical Supplies
- Class 2 Odontology
- Class 3 Laboratory - Clinical Laboratory
- Quality Control Laboratory
- Class 4 Special Programs
- Class 5 Food
- Class 6 Transport
- Class 7 Construction
- Class 8 Office and Data Processing
- Class 9 Complementary

A code of eight digits was established based on the Drug Basic List, which had seven, plus the eighth digit for Class identification, that would be added to differentiate products.

Then it was necessary to establish the field coverage of every letter of the alphabet within each group or subgroup, to subsequently assign the final codes to the different items alphabetically arranged within each defined Class, Group, and Subgroup.

A data base internal structure for product description was defined afterwards, which presents the following form:

-	Code	8 positions
-	Description	2 lines of 50 positions each
-	Unit of Measure	3 positions
-	Use Level	1 position
-	Priority	1 position
-	Unit Price	9 positions
-	Basic Product	1 position

Then it was necessary to adapt the exit format of the Drug Basic List to the design, to publish Class 0, which originally had 540 items (See document APSISA "A" Report 18); subsequent and successive revisions of the Drug Basic List have left it in its fifth revision with 318 items. The Basic Lists falling under UTMIM responsibility were then prepared. They are:

- Class 1 Medical-Surgical Supplies
 315 items (see document APSISA "A" Report 24),
- Class 2 Odontology, 210 items
 (see document APSISA "A" Report 21),
- Class 3 Laboratory
 - Clinical, 857 items (see document APSISA "A" Report 27)
 - Quality Control, 869 items (see document APSISA "A" Report 84).

The General Drug Listing was prepared afterward. This list contains the Basic List drugs plus those being used in the different MOH facilities, but that are not procured regularly by the Ministry being, therefore, necessary to codify them to enter them in the stock kardex of said facilities (See document APSISA "A" Reports 49 and 49A). At present, the General Drug Listing includes 1030 items.

The different Medical Supplies, Odontology, and Laboratory (Clinical and Quality Control) Basic Lists include items

incorporated in the General Listing and these are available for publication when required, using the corresponding program installed at UTMIM, for example, Medical Supplies (See document APSISA "A" Report 58).

Furthermore, in collaboration with the MOH Institutional Development Unit and the Nutrition Department prepared the Food Basic List corresponding to Class 5 of the Supplies Catalog, which includes 339 items (See document APSISA "A" Report 85).

Also collaborated with the Transport Department in the structuration and coding of the spare parts used in vehicle repair, Class 6 of the General Catalog. The structuration and codification was carried out in order that the Procurement Office would be able to incorporate the mentioned products into the new computer process routine and expedite the steps for spare part procurement, which represent around 20% of the universe of products handled by the Procurement Office annually. This meant the processing and revision of 4,700 computer entries.

Subsequently, assistance was given to the Administrative Direction in the preparation of the Office and Data Processing Basic Lists (Class 8 of the Catalog), and Cleaning and Materials Basic Lists (Class 9 of the Catalog), that were elaborated in a preliminary version under review and adjustment at the Administrative Direction.

Finally, norms and forms were established to request and carry out modifications, deletions, or incorporations to the different Basic Lists. These norms and forms were prepared for the use of UTMIM (See document APSISA "A" Report 39) as well as for the use of UTSNOM (See document APSISA "A" Report 86). MSCI technical assistance in computer systems prepared a program that is already installed at UTMIM and the Procurement Office, which permits to carry out the necessary modifications in the Basic Lists. Once the Office and Data Processing, and Cleaning Supplies and Materials Basic Lists are completed, the program will be installed at UTSNOM for its permanent updating.

2.3 Supply Management Information System

An adequate information system is essential to orient the correct decision-making on the subject.

The Supply Management Information System (SMIS) consolidates and relates at national level information coming from the local, regional, and central levels. (See documents APSISA "A" Reports 43, 43A, and 43B). This information refers to:

- Inventories,

- Consumption,
- Shipments,
- Stock balances, and
- Pending Reception.

The inventories are carried out every six months (July and December) at the Central and Regional Warehouses, Hospitals, and Health Centers. The Health Units and Posts do it once a year, on December 31; the routine of an annual inventory was adopted with the Project and is in force since 1989 in the case of Health Units and Posts. The data are taken from the specially designed forms and are then input into the Inventory computer program.

In the case of consumption, at the beginning of the Project there was a Daily Consumption Tabulator that was completed at the different health facilities. The information in said tabulator was not processed as there was no ad hoc software to record it, therefore, the information was lost. During the Project period the Daily Consumption Tabulator (DCT) was redesigned, a Monthly Consumption Summary (MCS) was designed, and software was prepared to capture consumption data from 14 Hospitals, 15 Health Centers, 119 Health Units, and 181 Health Posts, that is, around 330 health facilities in the country.

The availability of this consumption data in a more comprehensive and reliable form, has permitted improvement in forecasting future procurement requirements and the percentual assignment of distribution at national level.

Regarding shipments from the Central Warehouse to the Regional Warehouses, Hospitals and Health Centers, and from the Regional Warehouses to Health Units and Posts, their registry is imperative to know current reception from which consumption will be deducted, as if they are not processed the result is a negative number, that is, consumption exists but against a zero (0) inventory. The existing interrelation among the above mentioned information (inventories, consumption, and shipments), forces their lack of failure or their absence for the processes, as if these occur data distortion is such that the information is not valid.

The balances in stock at a certain date and pending receptions for a fixed period are vitally important data when the future procurement program is prepared. The SMIS permits to know stocks or balances in the warehouses at any time, whether at national, regional or local levels. Data on pending receptions are taken from the procurement follow-up program at the Procurement Office.

The SMIS is installed at central level in UTMIM and in the five Regions of the country and is called the Regional Supplies Management Information System (RSMIS).

2.4 Procurement Programming

Worked in various aspects regarding this matter, such as:

- Frequency and composition of procurement through PIO/C AID funds (See document APSISA "A" Report 6 and Report 38). These analyses and future corrections allowed the arrangement of the PIO/C procurement cycle by year, together with the remaining MOH procurement programs and besides, obtained that the proportion of basic products, in variety and acquired quantity, be much more in agreement with the Project objectives.
- Arrangement of procurement cycles of products programmed by UTMIM with GOES and PL-480 funds (Drugs, Medical-Surgical Supplies, and Odontology). Regarding this, an analysis was made of drug availability for the biennial 1989-1990 (See document APSISA "A" Report 40), which permitted the organization of the programming aspects in the last quarter of a specified year; acquisition, reception, warehousing, and distribution in the next, and utilization from that moment onward (15 months) or at the beginning of the next year. The above-mentioned cycle has arranged the acquisition and availability of drug and medical supplies, odontology and laboratory supplies and, in many cases, the final location of the products which is reached after being 6-8 months in process, from the submission of the procurement program to the delivery of drugs to the final user, including quality control analyses when these are necessary.
- Elaboration of software to forecast requirements, which are the basis of the procurement program.

In this respect, a document titled "Norms, Procedures, and Requirements for the Elaboration of the Annual Drug and Medical Supplies Procurement Program, was prepared by UTMIM" (See document APSISA "A" Report 87). This document served as the logical design for the preparation of software, which is in process. This program was prepared by Computer Systems Advisor/MSCI, and incorporated to the SMIS under Report SMIS 4AO, and includes all the necessary data to carry out the analysis before procurement decision. Furthermore, this program was transferred to a LOTUS spreadsheet to improve its operation and rapid change of variables and greater use versatility. The use of this program will make available an information instrument consolidated, comprehensive,

and of rapid conformation and adjustment, the accuracy of which will be in close relation with the quality of the data source.

2.5 Distribution

Here, the activity centered in the development of new mechanisms for the assignment of drug and medical supplies

As mentioned, drug assignment lacked defined criteria to carry it out and, in general, the facilities with better access to the central level or more frequent submission of requirements, obtained a larger proportion of the shipments from the Central Warehouse. On the other hand, the Central Warehouse covered five Regions and 14 Hospitals with a quarterly frequency, that is only 19 places every three months.

One of the first measures in this aspect was to establish that the Central Warehouse included attention to the 15 Health Centers every quarter, relieving drug congestion (level 3 or higher) at the Regional Warehouses and expediting attention to the Health Centers by avoiding going through the Regions, that meant shipment, reception, checking, registry, and warehousing of drugs and medical supplies for the subsequent assignment, discharge, shipment, checking, reception, and warehousing at each Health Center.

The drug assignment process was substantially improved, substituting the unidirectional assignment type of fixed quotas by a tentative preliminary assignment with consultation or subsequent appointment between the doctor/Supply Advisor in the requesting health facility and the doctor/Advisor at UTMIM. This agreement or concertation process avoided the shipment of undesired drugs to the different health facilities, in larger or less than required quantities, or of an inadequate use level, allowing a better utilization of same.

At present, a preliminary percentual assignment has been established by facility (14 Hospitals, 15 Health Centers, 5 Regions = 34), which has been carried out based on reported consumption by the facilities during 1990 and deliveries to them in the same period (See document APSISA "A" Report 88).

This percentual assignment is the starting point for the development of a computer program for the management of drug and medical supplies assignments.

At present and as a preliminary activity, a spreadsheet has been developed containing all the drugs regularly acquired by MOH, percentual assignments defined on the basis of consumption reported by the Regions, Hospitals, and Health

Centers, the quantities acquired for the next annual shipment period, and the quantity assignments of each product according to the preliminarily allotted percentage; meaning that if the available quantity increases or decreases, assignments will be the same with the advantage that the estimate of 270 lines for 34 users (9180 operations) is automatic and reliable.

2.6 Development of Operative Instruments

To implement some norms, measures, or procedures, it was necessary to prepare manuals, instructives, or set up a place to carry out specific functions. We mention below the most relevant activities regarding this matter.

2.6.1 Elaboration of the Transferences and Returns Manual

The Transferences and Returns Manual was prepared, permitting that facilities having overstocks be able to offer them to others who do not, and viceversa. This activity has allowed, since its application (March 1990) the transference of approximately 5.0 million colones of drugs, ensuring their consumption in contrast with their traditional loss due to expiration (See document APSISA "A" Report 31).

2.6.2 Establishment of a Warehouse for Returns

The assignment of space, furniture, materials, and personnel was likewise promoted for the organization and operation of a "Returns Warehouse," to store those products which the facilities have in excess and could not transfer within their regional environment, to be reassigned at national level. The warehouse was initiated in July 1991 and will permit a better distribution of the available drugs. (See document APSISA "A" Report 79).

2.6.3 Elaboration of Organization and Job Description Manuals for UTMIM

Simultaneously and to adequately define the juridictional framework of each operational dependency of the Drug and Medical Supplies Technical Unit, the Manual for the UTMIM Organization and the Job Description Manual for UTMIM were prepared, defining responsibilities and tasks for the personnel in each dependency. (See documents APSISA "A" Reports 73 and 74).

2.6.4 Elaboration of the Norms Manual for the Regional Supply Committees

The Norms Manual for the Regional Supply Committees was also prepared to determine the composition and functions of this important component of the Drug and Medical Supplies Administration at Regional level (See document APSISA "A" Report 75).

2.6.5 Survey on Infrastructure and Warehousing Conditions in Health Facilities

In order to know in detail infrastructure and warehousing conditions in the different health facilities (building, cold chain, shelving, storage areas available, temperature, and other variables), a survey was carried out that collected all the information mentioned, which when tabulated will permit a more accurate vision of present conditions of the mentioned infrastructure and needs for future improvement. There are at present 200 processed survey questionnaires available out of a possible 300. Final tabulations will be submitted when the filling, collection, and input have been completed (See document APSISA "A" Report 89). We had the collaboration of the MSCI Technical Health Assistants (Monitors) and Computers Systems Advisor.

2.6.6 Norms and Procedures for Drug and Medical Supplies Reception, Warehousing, and Utilization in the Campaign Against Cholera

Due to the eventual arrival of Cholera in the country, norms and procedures were prepared for the warehousing and use of the different elements acquired by MOH and distributed at nacional level to fight the disease.

3. PROBLEMS AND RESTRICTIONS

In this chapter mention will be made of the main problems or restrictions which in some cases hindered implementation of actions that were to be carried out at a specific time, or actions that were obstructed or delayed due to these reasons.

3.1 Personnel Problems

As mentioned in Item 2.1 of this report and as an example, among the proposals submitted was the creation and outfitting of the Programming, Control, Evaluation, and Information Department (PCEID) at the Procurement Office, which would be the Technical Unit for Institutional Supplies in charge of

assistance to the Procurement Director in the definition of policies and guidelines for supply management, to perfect and modernize the operation and keep control of the activity. However, and regardless of the fact that authorities were in agreement (Ministerial Resolution 572 of August 1989), there were inconveniences in finding the qualified human resources in sufficient number to develop the PCEID, which added to budgetary problems finally impeded its operation.

In May 1991, at a meeting of the Administrative Direction, UTMIM, and the Procurement Office, it was decided not to go ahead with the PCEID mainly in view of the difficulties in recruiting the necessary personnel, and to strengthen the organization and operation of UTMIM and UTSNOM in selection, consumption and stock control, procurement programming aspects, and in product assignment to user levels. The Supply System Conceptualization will be adjusted according to these guidelines.

3.2 Problems in Decision-Making

Likewise, among the proposals of March 1989 one was submitted regarding the transformation of the distribution system based on product quotas to one based on budgetary assignment, issuance of orders, and invoicing of deliveries. The proposed change implied the establishment of operative budgets, by line item, by facility, for these to request orders against said budget and keeping a current account until the allotted funds were spent. This system would permit greater responsibility and freedom in requests by the different users and would adequately orient procurement through replacements, as procurement would be carried out based on real demand and not on allotments.

The proposal submitted was not endorsed by MOH at that time and lost the opportunity to make advances in this area that now, during the Project extension, is mentioned as a priority and of great interest. Project amendment N° 6, i) on page 6 mentions: "The MOH will have developed and presented in March 1992 a strategy for decentralization of specific functions, which delineates planning and budgeting responsibilities, authorities for allocation of resources within each region, and a timetable for implementation." In j) on page 7, it states: "The MOH will take measures to increase efficiency, i.e., by providing for allocation decisions to be made on the basis of need and resources availability. Indicators of achievement will include budget allocations to hospitals based on actual patient load, pharmaceutical allocations based on actual dispensing and morbidity patterns..." In summary, the development of the institutional Supply System would have advanced more if the proposals presented had had more support.

3.3 Lack of Counterparts in Specific Areas

In matters of budgetary allotments, financial aspects and costs, MOH does not have technical units well consolidated to support the activities mentioned. The collection and consolidation of the specific technical assistance in this field as an institutional routine is delayed and obstructed by this situation.

4. RECOMMENDATIONS

To continue and consolidate the development of the MOH Supply System the following are the activities considered necessary.

4.1 Basic Lists/Supply Catalog

Permanent revision and upgrading of the Basic Lists under UTMIM responsibility (Drugs, Medical Supplies, Odontology, Clinical Laboratory, Quality Control Laboratory). This activity should be carried out in coordination with the Technical Therapeutic Committee in the case of drugs and with the ad hoc Committees in the case of the other Basic Lists.

This task includes the revision and definition of drug subgroups, such as basic drugs, essential drugs, special drugs, and others.

This activity also includes the updating of the monographies of the Therapeutic Formulary, the updating of computer registries, publication of the different Basic Lists, training in the use of the latter, and their distribution. Support to the MOH Administrative Direction should continue for the completion of the Basic Lists under their responsibility, so that MOH can have a comprehensive Supply Catalog and the Procurement Office can better carry out their work through the use of computers, and not as at present when their task is half computerized and half manual.

4.2 Increase of the Use of the Supply Management Information System (SMIS)

The intensive use of the SMIS at Central (UTMIM) as well as at Regional level, should be promoted to give each level knowledge of stocks, consumption, shipments, and any other basic information from their dependencies necessary for adequate decision-making.

To improve drug management and use within their field of responsibility, the Regional Directions should use consolidated information on consumption, stocks, shipments,

morbidity data, treatment norms, drug effectiveness, health policies, financial availability, costs, and other factors.

If the use of operative budgets by facility is established starting 1993, with free demand from the Supply System (according to the Basic Lists and use levels defined at present), the consumption data reported could be substituted by a consumption estimate based on an initial inventory by product, annual receptions through shipments from the corresponding Warehouse, and a new inventory at the end of the period; this information would correspond to consumption by article in accordance with request by the user and in agreement with the System's capacity to satisfy said requests. It permits to register all shipments not effected in order to correct future procurement according to real user demand.

4.5 Infrastructure Survey

The data delivered by the processing of the infrastructure survey information, especially at Health Posts and Units level, will permit the preparation of a strategy to correct most relevant deficiencies found, orienting priorities that should be established for the utilization of Project funds available for this end.

4.6 Analysis of Performance of the Drug and Medical Inputs Supply System

The data delivered by the Supply Management Information System (SMIS) should be analyzed in detail at Central as well as at Regional levels to determine consumption performance in relation with prevalent pathologies, provision given to same, losses due to expiration, transferences made, coverage level of the different drugs and medical supplies, and other variables, to obtain more detailed knowledge of the performance of the Drug and Medical Inputs Supply System and propose the implementation of corrective measures.

4.7 Training

The training of human resources at UTMIM and the Regions should be promoted in the use of all the instruments designed and available, production of reports that could be required, and in the computer systems area to enable them to adequately use the hardware and know their use potential.

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3.1.2 PROCUREMENT SUBSYSTEM

1. Background

A diagnosis of the Ministry of Health Supply System, carried out by the technical assistance in collaboration with national counterparts, permitted the identification of the following problems when the APSISA Project was initiated:

- * Structural deficiencies preventing a clear definition of authority and responsibility for the elaboration of procurement programs and decision-making at time of award.
- * Inadequate terms of reference for the Procurement Division and the Procurement Department.
- * The elaboration of procurement programs was not timely.
- * Procurement procedures were not in agreement with technological advances in the data electronic process.
- * Lack of correspondence between the complexity and the volumen of tasks and human resources assigned for their implementation, from the quantitative as well as from the qualitative point of view.
- * Excessive duration of procurement process: twenty-seven (27) months for international market procurement and twenty-four (24) months for national market procurement.
- * Deficient technical specifications, inadequate work team, badly implemented processes, wrong distribution of physical plant, deficient working methods, excessive variety of bids and procurement requests due to programming failures, deficient work planning, and deficient personnel performance.
- * A list of registered suppliers was missing.
- * Inadequate procurement follow-up system.
- * Interference of the Supply Commission in procurement programming processes, award, and contracting, increasing the period for procurement.
- * Deficient procedure for the opening of letters of credit.

NOTE: To analyze in depth the above points see document: "Analysis of Supply System Organization and Process." (See Document APSISA "A" Report No. 7).

2. Development

To upgrade efficiency and effectiveness of the Procurement Subsystem and in agreement with the terms of reference of the APSISA Project, MSCSI technical assistance designed a strategy to change three fundamental elements: the organic structure, the subsystem itself, and resources (human, material, and financial). The fundamental aspects for the development of said components are stated below.

2.1 Organic Structure

An organic restructuring of the Procurement Division and the Procurement Department was made to establish an adequate work division and hierarchical levels. The following were designed for every Unit:

- Hierarchic dependency;
- The objective;
- The tasks;
- The type and scope of authority;
- Coordination relations;
- The departamentalization; and
- The basic legal arrangements to support their authority and functional content. (See document: "Organization Manual for the Procurement Department". (APSISA "A" Report No. 13).

To establish a reference framework for the adequate assignment of personnel functions and responsibilities that would facilitate reaching the Department's objectives and its operation, the Job Description Manual for the Procurement Department was designed and implemented.

The organizational changes were adopted by the Ministry authorities through Resolution N° 572 of August 15, 1989. This Resolution deleted the Supply Commission and modified the functions of the Tender Analysis Commission, significantly reducing the period of the procurement programming, tender elaboration, award, and contracting processes.

2.2 Procurement Subsystem

To improve the procurement subsystem operation and to guarantee the timely procurement formalities, the following changes were made:

- Standardization of product technical specifications according to the Basic Lists (Drugs, Medical Supplies,

Odontology, and Laboratory). Specifically, a code, generic description, and measurement unit was established for each item to facilitate communication between the different MOH dependencies and the Procurement Department. Said codes are a basic element for the computerized operation of the subsystem. The Basic Lists are installed in the computer microcenter at the Procurement Office and the personnel has been trained to carry out consultations and keep the Lists permanently updated according to the changes being reported by the Drug and Medical Supplies Technical Unit (UTMIM) and the Non-Medical Supplies Technical Unit (UTSNOM).

- Standardization of legal and administrative conditions of tenders according to procurement type (public bid, private bid, and free arrangements). These standards were approved by the Tender Analysis Commission and their implementation contributed to reduce tender production time.
- Norm definition for the reception and quality control of drugs, medical supplies, odontologic supplies, and clinical laboratory products.
- Standardization of the form for bid submission to facilitate the input of information and production of the corresponding analysis tables.
- Standardization of supply contracts for national procurement as well as imports.
- Design, testing and implementation of a computerized operational system that permits the production of tenders, analysis tables for bids, award resolutions, and contracts.
- Creation of a price file for items in the different Basic Lists, to facilitate the assessment of Procurement Requests and the automatic identification of the procurement mode according to quantity and financial source.
- Design, development, testing, and operation of a computerized suppliers registry providing information on each supplier regarding: license, legal representative, address, post office box, telex, and fax numbers, channel for distribution coverage, items provided, and evaluation of their performance assessed through contract compliance in due time, quantity, and quality delivered. This permits to know potential suppliers, their performance, and prices and dates of the last three procurements for each of the items in the different basic

lists.

The List of Suppliers has become a basic element for the support of free procurement and procurement through private bids, considerably improving its effectiveness.

- Design, development, testing, and operation of a computerized system for procurement follow-up, to provide information on the status or phase in which the formalities of a procurement request or program are at. It also permits to know procurement in transit and the program of delivery of the different items contracted. This system's reports facilitate the control of formalities for each of the Procurement Department sections and are a source of information for procurement programming and commodity reception at the Central Warehouse.
- Definition of a new procedure for the opening of letters of credit, eliminating the documents going through the Ministry of Economy once and twice through the Court of Accounts of the Republic and the Central Reserve Bank.

2.3 Resources

Regarding resources, the following changes were made:

- Definition and introduction of the personnel roll of the Procurement Department and its different sections.
- Elaboration and execution of a training plan for the Department's personnel in: Human Relations and Motivation, Communications, DOS (Disk Operating System), Word Processing (Word Perfect), Lotus 1,2,3, Network Use, Operation of the Software developed by the technical assistance: Management of Basic Lists, Procurement Subsystem (tenders, awards, procurement orders, and contracts), Suppliers Registry, and Procurement Follow-up.
- Construction of a cubicle for the computer microcenter at the Procurement Office, adaptation of the electric energy network and improvement in the distribution of the physical area of the Procurement Office through adequately delimitating the walkway area and the location of office equipment.
- Definition of computer equipment technical specifications (Local Area Network), acquisition, instalation, testing and operation.

3. Problems, Restrictions, and Solution Alternatives

The main restriction encountered by the procurement subsystem has been the lack of financial resources for the acquisition of products demanded by health facilities and the MOH administrative offices. In order to solve these problems, MSCI technical assistance initiated the design of a program for drug cost recovery which should be developed during the APSISA Project extension, expanding its coverage to the sale of external consultation, hospitalization, clinical laboratory, X-Rays services, and surgical interventions. It will also be necessary to continue total implementation of the strategy for the financial strengthening of the Ministry.

A problem that has prevented greater expediency in the procurement process lies in the slow-paced actions of the Financial-Accounting Division of the Ministry of Health and the Direction-General of the Budget at the Ministry of Finance for the establishment of credit reserves charged against Government of El Salvador funds. To solve this problem, MSCI technical assistance elaborated a proposal to simplify the process, avoiding the documents going twice through the Ministry of Finance and suggested the appointment of a Budget Office Inspector at Ministry of Health level, to go toward a decentralization of the budgetary formalities. This, however, was not accepted by the Budget Subdirection of the Ministry of Finance. So, while other solution alternatives are designed, it was decided to define a follow-up system for the establishment of credit reserves to reduce the process period and, at the same time, promote a system of administration by results at the Financial-Accounting Division level.

The budget of the Ministry of Health has been the same every year, with no structural modifications and the same amounts in the different line entries assigned for procurement of materials and supplies to permit a rational distribution of the scarce financial resources of the institution. This situation forces the Ministry to request approval of budgetary transfers every year, which make the work more difficult. It is logical that solutions have to be oriented toward the amendment of the budget formulation process.

4. Recommendations for Future Technical Assistance in This Field

AID technical assistance to the Ministry of Health in this field should concentrate in the following:

- Consolidation of the procurement subsystem through the computerized operation and production of tenders, analysis tables for bids, award resolutions, and the contracts. The utilization of the subsystem should be expanded to the other Basic Lists included in the Supplies Catalogue, assigning maximum priority to vehicle and biomedical equipment spare

parts.

- Promotion of the use and permanent updating of the List of Registered Suppliers, expanding its coverage to the products in the other Basic Lists foreseen in the Supplies Catalogue. Following the same lineaments of the procurement subsystem, priority should be given to the basic lists for transport and biomedical equipment spare parts.
- Identification of other supply sources at international level to obtain better unit prices and savings through procurement in great quantities. The above study should concentrate in those drugs and medical supplies with greater impact on the Ministry's budget.
- Consolidate utilization of the procurement follow-up system to improve efficiency and effectiveness of the Procurement Department and provide users with periodic information on the status of their requests or procurement programs.
- Coordination of efforts with the Financial-Accounting Division to improve the procedure for the establishment of credit reserves and, therefore, reduce the period for procurement formalities.
- Establishment of a computerized system for implementation control of the materials and supplies budget, from the establishment of credit reserves to payment to suppliers, to avoid that part of the budget be left out thus obtaining a better level of supply.
- Work in the design and introduction of the Cost Recovery System and in the identification of new financing sources to increment the budget assigned to the procurement of drug and medical supplies.

3.1.3 WAREHOUSING SUBSYSTEM

1. Background

1.1 Central Level

At the initiation of the Project, the MOH Warehousing Subsystem, at the Central level was characterized by a series of administrative deficiencies in the existing organizational structure as well as in the functional and operative conditions in general.

These deficiencies were the cause of a series of abnormal situations in the administration and control of medical supplies inventories managed by the Warehousing Department.

The norms and procedures affected the warehouse organization as they were not well defined and, therefore, their application was far from adequate for the good functioning of the warehousing subsystem. There was duplication of activities in some of the typical functions as well as delays in the checking and reception of the different shipments and deliveries of medical supplies, and in the corresponding reception documents.

The computerized inventory control system was outdated and the information provided by it was not accurate and truthful.

The environmental and physical conditions for the warehousing of medical supplies were inadequate as they did not fill the minimal requirements for security, warehousing capacity, and custody. The warehousing did not meet basic norms and requirements for stowage and for the internal organization in each warehouse.

The Diagnosis on the Warehousing and Storage System in the Central Level was carried out (APSISA "A" Report No. 17, October 1989) and was the starting point to expedite the organization of the Warehouse.

The personnel were not adequately trained in the safe handling of drugs, fire prevention, etc.

1.2 Regional Level

At Regional Warehouses the functional and operational problems and environmental conditions were critical and had the same characteristics as the Central level as there was no

improvement program nor standardization of the Regional Warehousing System.

Among the main problems identified at Regional level are the following:

- a) Inadequate physical space and infrastructure conditions.
- b) Environmental conditions unsuitable for the warehousing of medical supplies.
- c) Deficient administrative controls.
- d) Lack of equipment for the handling of medical supplies.
- e) Personnel lacked training in the safe handling of medical supplies.
- f) Expired drugs.
- g) Improper job description for the Regional Warehousing System personnel.

2. Development

2.1 Central Level

The MOH Warehousing Subsystem at Central level has been consolidated during the last two years. The efforts for the establishment and implementation of norms, procedures, and controls (APSISA Reports 32 and 34), have permitted the improvement of efficiency in the daily reception and warehousing activities for medical supplies (APSISA Report 60). The process of reception and control of imported medical supplies has been reduced from the previous eight weeks to three days.

Additionally, the readaptation and expansion of the physical installations of the Warehousing Department (remodeling of 1600 m² and construction of 120 m²) have also permitted to improve the environmental conditions (high temperatures) and optimize the physical distribution of medical supplies usually managed in the different buildings which integrate the Department. Furthermore, the security, management, and warehousing of flammable products were improved through the development and establishment of a Flammables Warehouse totally functional and isolated from the other installations.

The organizational structure of the Department was upgraded, emphasizing delegation and supervision of work. A Job Description Manual was also elaborated for the activities

assigned to every member of the Warehousing and Storage Department at the Central level (APSISA Report 36).

The computerized system was developed to become a useful, efficient, and timely tool for decision-making in the control and improvement of inventories managed daily by the Department authorities. Controls to verify the data input into the computer system were adopted to obtain the accuracy of the computerized information (See APSISA Reports 46, 48, and 58A).

As a result of the introduction of the computerized inventory control system, losses due to drug expiration and damage to stored supplies have been minimized in approximately 95%. This is an achievement in one of the more critical areas of the Warehousing System. The Reception Area has also been developed.

Training courses were given to administrative and financial personnel in reception techniques, warehousing, safe handling of supplies, computerized inventory system operation, fire extinction practices, and others. These courses have improved personnel skills in medical supplies handling as well as their motivation in service delivery to health facilities.

As part of the organizational changes at Central level, the setting up and utilization of the equipment for supply management that had been obtained with VISISA Project funds have to be mentioned. This equipment had never been utilized due to lack of orientation, training, and motivation, thus implying a waste of funds, an inadequate use of personnel in the handling of heavy and bulky medical supplies, causing them losses and damages, and working accidents.

2.2 Regional Warehousing Subsystem (Period: Jan.-Sept. 1991)

The Regional Warehousing Subsystem has been systematically studied through periodic visits and coordination meetings and the supervision of activities and operations in each one of the following Regional Warehouses:

- * Paracentral Region Warehouse,
- * Metropolitan Region Warehouse,
- * Central Region Warehouse,
- * Eastern Region Warehouse,
- * Western Region Warehouse.

A Diagnosis was prepared for every one of these Warehouses based on their operations and functions as well as on improvement opportunities for the warehousing subsystem at short, medium, and long-term (APSISA Reports 65, 68, 71, 78, and 80).

As a result of the Diagnoses the Plan for the Integral Development of the Warehousing Subsystem in the Paracentral, Central, and Western Regions has been elaborated. This plan will largely solve the main inconveniences and failures at present afflicting the Regional Warehousing Subsystem.

The expansion and upgrading of the physical and environmental conditions of the Paracentral Region Warehouse have been designed as the first phase for the development of this plan which will be completed at the end of 1991. At present, the corresponding tender calling for bids is under process at the MOH Procurement Office. MOH authorities have already approved the development of the remaining Regions in 1992.

A Job Description Manual has been elaborated for the Regional Warehousing Subsystem that will standardize functions and operations of the Regional Warehouses.

Training courses have been carried out at national level in the safe handling of medical supplies to improve skills and capabilities of personnel in charge of their safe keeping to minimize losses and damages. The total personnel trained were 230 persons.

The list of the necessary equipment for the handling of supplies in each warehouse was prepared and is at present under procurement process at the MOH Procurement Office.

The medical supplies inventory control has been considerably improved at manual as well as at computerized level. Each item has now a corresponding reference code for identification and control.

3. Problems and Restrictions

At present, the main problems and restrictions in the Warehousing Subsystem at Central as well as at Regional level, are caused by the excessive personnel turnover at Warehouse Head, Storekeeper, and lower levels. A solution at short and medium term can not be foreseen, as the main reason for the turnover is income improvement and migration to the industrial sector of the country.

Another problem and restriction in the normal operations of the warehousing subsystem is the physical infrastructure which is not adequate in almost every Regional Warehouse. This problem has been identified in the above-mentioned Diagnostic Reports. The solution, however, is already known for the Paracentral, Central, and Western Regions, at technical as well as at financial level. The only pending problem is the one regarding the installations of the Metropolitan Region Warehouse due to the lack of an adequate piece of land, therefore preventing a solution even though the

Diagnosis submitted some solution strategies at short, medium, and long term. It would be more feasible for the Regional Direction to obtain land, either donated or with funds from the MOH budget, and then design the adequate warehouse based on the characteristics and topography of the land, as well as on volumes and operations handled, taking into consideration the model elaborated by the Paracentral Health Region.

4. Recommendations

4.1 Specific Recommendations

Within the specific recommendations from the Technical Assistance for the Warehousing Subsystem is to promote that the present MOH authorities continue their support to this subsystem which has grown and consolidated in the last two years. A relapse should be avoided. The warehousing subsystem covers one of the main MOH assets, medical supplies, therefore, support at Central and Regional levels should be continued for an adequate health service delivery.

A series of recommendations and general norms for the warehousing of medical supplies, which could be generally applied to all products stored and managed by MOH, is given below.

RECOMMENDATIONS AND GENERAL WAREHOUSING NORMS

The recommendations for the good operation of the Regional Warehouse can be classified in accordance with each internally developed process.

Recommendations Applying to Reception of Medical Supplies:

The following should be taken into consideration when receiving supplies from the Central Warehouse or directly from suppliers:

Any anomaly should be checked when receiving medical supplies from the Central Warehouse, even when the cover packing is sealed (i.e., irregular weight, breakage or leaks, etc.), and label and codify every package stored.

Products should be carefully checked against corresponding shipping documents to certify that numbers and information in the document coincide with the physical counting.

If there exists a difference or any discrepancy, Minutes should be prepared specifying same.

When orders are received, packages should be handled with care to avoid possible damage to the contents. It should be verified if the physical quantity received is as specified in the corresponding documentation.

Recommendations for medical supplies control:

Inventory control should be always kept up to date for accurate stock information.

The person in charge of kardex control should be someone on whom the Storekeeper can rely for the identification of drugs with close expiration dates, to avoid losses on this account.

Open communication should exist with the person in charge of local data processing to keep the computerized inventory system up to date.

Quality Control of the computer generated reports should be effected weekly or fortnightly to ascertain their accuracy. This could be carried out by the Storekeeper or the Assistant.

Regarding Internal Control, the Head of Supplies should be informed of any discrepancy or irregularity existing between controls and the physical stock in the warehouse.

Recommendations applying to storage:

Products first received are despatched first, or products that expire first are despatched first.

Products in greater demand should be at hand, close to reception and delivery doors.

Reduction of distance covered by the product as well as by personnel. This is a way of reducing labor.

Reduce movement and maneuvering. Every time products are moved there is chance of damage.

Foreign personnel should be forbidden entry to the warehousing area. Only personnel authorized for inventory taking or for another reason should be permitted to enter.

Control the exit of products from the storage area through the corresponding authorized documentation.

Stock controls should be up to date.

When receiving drugs check that they are duly described according to the Basic List.

Check that quantities and unit prices are correct according to invoices, purchase order, contract, etc.

If possible, the packing used by the manufacturer should be used to expedite deliveries.

Check all descriptions and/or symbols of the packing for correct handling and storage.

Inspect drugs every fortnight for obsolete products or close expiration dates.

Due attention to those products stored under special conditions: flammable materials, degradable materials because of high temperatures, heavy articles.

Drugs should be stowed transversally and intertwined to keep the stacked boxes stable to avoid their fall.

A strick pest control should be exercised in the warehouse to avoid drug and medical supplies losses.

A last recommendation is to have special care in the compliance of the following norms for a more efficient warehousing system.

WAREHOUSE NORMS

There are warehouse norms that even though they are frequently unwritten, are followed or complied with to ensure the better management of the medical supplies under custody. They are the following:

Work Schedule

It is important to establish a work schedule for the warehouse which will govern its functioning, and all personnel should comply with it.

Drug Reception Schedule

The support of the Procurement Office Director and of the Regional Manager, under whose responsibility is the warehouse, is important for the establishment of a time limit for the reception of medical supplies and which should be respected. It is natural that there will be instances when it is required to work outside the schedule, but this should be the exception and not the rule.

Double Checking

Double checking should always exist during reception and despatch of any drug under custody at the warehouse. This step is frequently omitted due to excess of work in the warehouse.

One Door for Entry and Another for Exit

The ideal situation is one door for reception of products and another door for their delivery. However, if this were not possible because of certain circumstances, one door can double as exit and entry. When this happens, it is recommended to establish a reception schedule to avoid receiving supplies at the time when there are more deliveries.

It is necessary that during the working schedule the doors be permanently locked to avoid the entry of unauthorized persons. Frequently, these doors should be horizontally divided in two, leaving the upper part open and the lower closed. If the Storekeeper is alone and has to leave the warehouse for a few minutes, he should leave it locked and under no circumstance leave another person in charge during his absence, unless he is able to vouch for that person.

Persons Authorized for Access to the Warehouse

It is frequent that other Department Heads enter the Warehouse without being duly authorized. It is, therefore, necessary that either the responsible Regional Direction or the Head of Supplies authorize the persons with access to the warehouse; this should be done in writing specifying if they can be accompanied by any other person or persons, or not.

In any case, when someone strange to the warehouse enters it, even if authorized, a norm should be established that this person should be always accompanied by someone from the warehouse personnel.

Orders Should Be Respected

It is important that the Department Head be the first to obey his own rules and if they are not respected, to enforce them and apply the corresponding sanctions.

Degraded Drugs

All products that have not been accepted should be placed separately in the warehouse, but under control, and timely information about the fact relayed to the Central Warehouse for them to take the necessary steps for the required replacement.

Centralized Authority

At the medical supplies warehouse there should only be one command authority.

Formal Requirements

The warehouse personnel should very carefully watch for compliance with all the formal requirements established for the documents covering reception and exit of products from the warehouse. These formal requirements refer, among others, to the use of the authorized forms: requisitions should be signed by the authorized persons; remittances should refer to the order number or copy of the order be annexed to them; both should mention the account which they will be applied to, etc.

Fire Extinguisher Installation

Fire extinguishers have to be installed strategically to avoid the spreading of fire. The extinguishers should be checked periodically to verify that they are charged, in good working order, and that the area where they are installed is free and duly marked. Hoses and safety equipment have to be checked for their good performance when and if they are needed. It is necessary to install extinguishers at the entrance to the Warehouse.

Discipline, Order, and Cleanliness

Every warehouse has to have discipline, order, and cleanliness. If these are absent, the consequences are burglaries, the presence of obsolete or damaged products, mistakes in informing that something is not in stock when it is, but in the wrong place, etc.

There should be a place for everything, the hallways have to be respected and care taken that working equipment is in the best of conditions.

Switch Location and Switching Off

In order to avoid fires in the warehouses, there should be a switch that when switched off will automatically disconnect energy in all installations.

Materials Out of the Warehouse

Due to certain characteristics some materials should be stored out of the warehouse, these are the very heavy ones or that are one of these two:

Flammable (alcohol, oxygen, etc.)

Radioactive and others.

4.2 Projections

At Regional level and regarding the Warehousing Subsystem, we foresee the modernization of the MOH Warehouses in the Paracentral, Central, and Western Regions, being the Warehouse in the Paracentral Region the model for a modern and systematized warehouse at Regional level.

Said complex will have well-defined areas that will facilitate the upgrading of the medical supplies Reception, Warehousing, and Despatch processes. There will also be areas defined for the storage of non-medical supplies (stationery, Vertical Programs, etc.) and liquids and/or flammable materials.

Regarding the consolidation and systematization of the warehousing subsystem at Regional level, this will need a Norms and Procedures Manual for Reception and Warehousing, to be elaborated and subsequently introduced in order to standardize all the MOH Regional Warehouses.

The manual and computerized inventory control of medical supplies should provide an efficient and timely tool to verify the physical stocks in the warehouses.

The computerized system for Inventory Control will assist in the appropriate decision-making at Regional Supply Committee level to determine the action to be taken regarding those drugs and medical supplies with close expiration date, with no movement, already exhausted, etc.

3.1.4 DRUG MONITORING

1. Background

The group of Assistant Health Technicians (Health Monitors) foreseen in the APSISA Project had as fundamental objective the development of activities to support the different Project components, emphasizing all actions related with the selection, acquisition, distribution, control, and management process for drugs and medical supplies, as well as all actions related with the organization and operation of the Drug Warehouses. The main task of the AHTs was to carry out monitorials for data collection and to verify the logistic process in general in order to promote the feedback to reach the goals and objectives established by the Project at Central, Regional, and Local levels.

2. Development

The main products obtained by the AHTs during the Project period can be summarized in three main categories:

- 2.1 Monitorial of drugs and medical supplies,
- 2.2 Technical Assistance,
- 2.3 Others.

3. Monitorials

During the life of the Project, the Assistant Health Technicians in compliance with one of the specific functions in the APSISA Project, which is the control, verification, and follow-up of drug distribution, carried out frequent monitorials in health facilities (Tables 1 and 2).

Table 1
Health Facilities Visited 1988-1991

TYPE OF FACILITY	NATIONAL TOTAL	TOTAL VISITED	COVERAGE %
Regions	5	5	100%
Hospitals	15	15	100%
Health Centers	15	15	100%
Health Units	129	80	62%
Health Posts	163	41	25%
T O T A L	322	151	47%

Among the objectives reached with these monitorials, the following can be mentioned:

1. Verification of reception/shipment and distribution of drugs from the Central Warehouse to Regional Warehouses and from the latter to health facilities.
2. Identification of expired and/or damaged drugs to recommend their withdrawal incrementing the space available and improving the arrangement of products.
3. Identification of drugs with little consumption/movement for their redistribution, avoiding expiration losses.
4. Identification of drugs with inadequate use levels by type of facility, for their redistribution.
5. Follow-up of warehouse arrangement in health facilities that have been identified as problematic.
6. Verification of shelving delivery and its use for drug storage.
7. Follow-up of adequate utilization of internal controls in warehouses and pharmacies, such as kardex, requisition and shipment forms, daily consumption tabulators, and monthly consumption summaries.
8. Identification of drugs in greater demand.
9. Identification of drugs that because of forthcoming expiration date and by their consumption, can be transferred avoiding losses.
10. Support the Procurement Plan through the study of historical consumption of drugs in 20% of primary health facilities and 100% of hospitals during the years 1987, 1988, 1989.
11. Submitted report on 1990 morbidity to support the decision of selecting greater demand drugs at primary attention level.
12. Diagnosis on the basic needs for the organization, warehousing, and management of medical supplies in the MOH hospital system.

2.2 Technical Assistance

1. Elaboration of statistical reports based on data obtained in the monitorials, to identify percentual

coverage of drug stocks.

2. Assistance in personnel training courses (Doctors, Nurses, Store and Warehouse Keepers) in the supply area.
3. Work meetings with supply personnel for transference and return of drugs and medical supplies at national level.
4. Follow-up and control the preparation of the Daily Consumption Tabulators and the Monthly Consumption Summaries.
5. Follow-up the arrangement and adequacy of functions of the Regional Warehouses.
6. Assistance to Regional Managers/Supply Chiefs in different administrative aspects such as schedule of distribution and adequate transport routes, as well as expediting distribution from the Central Warehouse.
7. Transfer of technology and experience to MOH counterparts.
8. Assistance in training courses for the safe handling of supplies to personnel in the warehouses of Health Regions.
9. Technical assistance to regional personnel in the planning, organization, training, execution, and evaluation of drug and medical supplies inventories at national level, in all health facilities.
10. Assistance in the feasibility study for the upgrading of the infrastructure and operation of the regional warehouses in the Health sector.
11. Elaboration of the Procedures and Operation Manual for the supervision of the management and use of medical supplies.
12. Assistance in the elaboration of the Manual and Instructive for:
 - Transference and Return of Drugs and Medical Supplies,
 - Daily Consumption Tabulator and Monthly Consumption Summary,
 - Functions of the Regional Supply Committee,
 - Guidelines for drug provision,

- Orientation Course in the Supply System.

13. Assistance in the planning, implementation, and analysis of the survey results on basic infrastructure services in all the primary attention facilities of the system.

2.3 Others

1. Assistance to the communication-information system in a vertical form from the Central Warehouse to the Regions, Hospitals, Health Centers and primary attention levels.
2. Follow-up of computerized Supply Management Information System (SMIS) programmes.
3. Attendance to information and coordination meetings at Central as well as Regional levels.
4. Analysis of information and recommendations to solve or prevent problems avoiding delays in the supply chain.
5. Support to the diagnosis carried out at the meetings of the Regions, proposing different solutions to administrative problems related with supplies and identifying the needs to improve their operation.
6. Monitorial of facilities affected during the offensive (1989) to determine emergency requirements as well as to provide assistance in the inventory of medical supplies donated during the emergency.
7. Monitorial of drugs and medical supplies acquired during the Cholera emergency plan for the MOH health care system and at the Central and Regional Warehouses.

2.4 Drug Availability at Primary Health Care Level

The average availability of 60 drugs, use levels 1 and 2 (primary health care) in the five Health Regions varied from 24 products (40%) in April 1989 to 39 (65%) in November 1990, as can be observed in Table 3 and Fig. 2. This availability varied for each Health Region, as reported by the Monitorial effected in November 1990 (Fig. 1):

	<u>Average Availability (%)</u>	
Eastern Region	=	36 products (60%)
Western Region	=	34 products (57%)
Paracentral Region	=	39 products (65%)

Metropolitan Region	=	45 products	(75%).
Central Region	=	43 products	(72%)

On the other hand, the average availability of 30 essential drugs (Basic List) investigated in 60 Health Units and Posts in April 1991, varied between 60 and 80% in 37 health facilities (Fig. 3).

Drug distribution was more constant in 1990 and 1991, as quarterly distribution intervals were regularly met at Central and Regional levels. The main problem found was the insufficient quantity of drugs delivered.

However, scarcity was partly covered by the promotion of drug transfers among the facilities in each Region. The estimated value of the transferences was ₡1,923,574 in 1990 and ₡695,193 up to September 1991.

Drug losses due to expiration progressively decreased since the initiation of the Project; for example, the losses reported were ₡76,000 in 1989 and ₡40,000 in 1990. The introduction of the Supply Management Information System (SMIS) and the activities of the Technical Health Assistants have helped to solve this problem through the provision of advance information on drug expiration dates to the Regional Supply Committees.

This information indicates significant progress in the supply of basic drugs used at local level. However, demand has not been fully satisfied, therefore, it is planned to increase procurement of these products 50% in 1992 (procurement with PIO/C and PL-480 funds).

3. RESTRICTIONS AND/OR LIMITATIONS

The absence of communication between the Health Technical Assistants and UTMIM prevented, at Project initiation, the organization and development of a more effective drug monitoring system for decision-making, to improve the drug acquisition, distribution, and use processes. During the third quarter 1989, communication and coordination improved and it was better still in 1990 when two UTMIM members participated in the monitorial carried out to evaluate drug and medical supplies distribution for the Cholera Emergency Program.

4. RECOMMENDATIONS

The Technical Health Assistants' technical support will be of great significance in 1992-1994 in promoting the use of the information provided by the Regional Supply Management Information System (RSMIS). Their participation in the training of management

LOCATION REGION/DEPARTMENT	F A C I L I T I E S														
	HOSPITALS			CENTERS			UNITS			POSTS			TOTAL		
	TOTAL	VISITED NUMBER	%	TOTAL	VISITED NUMBER	%	TOTAL	VISITED NUMBER	%	TOTAL	VISITED NUMBER	%	TOTAL	VISITED NUMBER	%
EASTERN REGION	2	2	100%	7	7	100%	40	21	53%	62	18	29%	111	48	43%
USulután	1	1	100%	2	2	100%	8	3	38%	15	3	20%	26	9	35%
San Miguel	1	1	100%	2	2	100%	16	11	69%	15	5	33%	34	19	56%
Morazan	0	0		1	1	100%	6	3	50%	17	4	24%	24	8	33%
La Unión	0	0		2	2	100%	10	4	40%	15	6	40%	27	12	44%
PARACENTRAL REGION	2	2	100%	4	4	100%	18	9	50%	34	6	18%	58	21	36%
Chuscatlán	0	0	100%	2	2	100%	4	2	50%	8	2	25%	14	6	43%
La Paz	1	1	100%	0			7	3	43%	17	2	12%	25	6	24%
Cabanás	0	0		2	2	100%	1	1	100%	4	0	0%	7	3	43%
San Vicente	1	1	100%	0	0		6	3	50%	5	2	40%	12	6	50%
CENTRAL REGION	2	2	100%	1	1	100%	14	10	71%	29	3	10%	46	16	35%
Chalatenango	1	0	100%	1	1	100%	4	3	75%	17	1	6%	23	6	26%
La Libertad	1	1	100%	0			10	7	70%	12	2	17%	23	10	43%
METROPOLITAN REGION	6	6	100%	1	1	100%	32	18	56%	0			38	25	66%
San Salvador	6	6	100%	1	1	100%	32	18	56%	0			38	25	66%
WESTERN REGION	3	3	100%	2	2	100%	26	22	85%	38	14	37%	69	41	59%
Ahuachapán	1	1	100%	0	0	100%	6	6	100%	13	5	39%	20	12	60%
Santa Ana	1	1	100%	2	2	100%	12	8	67%	16	4	25%	31	15	48%
Sonsonate	1	1	100%	0			8	8	100%	9	5	56%	18	14	78%
TOTAL	15	15	100%	15	15	100%	129	80	62%	163	41	25%	322	151	47%

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COMPARATIVE CONSOLIDATE CHART ON DRUG AVAILABILITY *

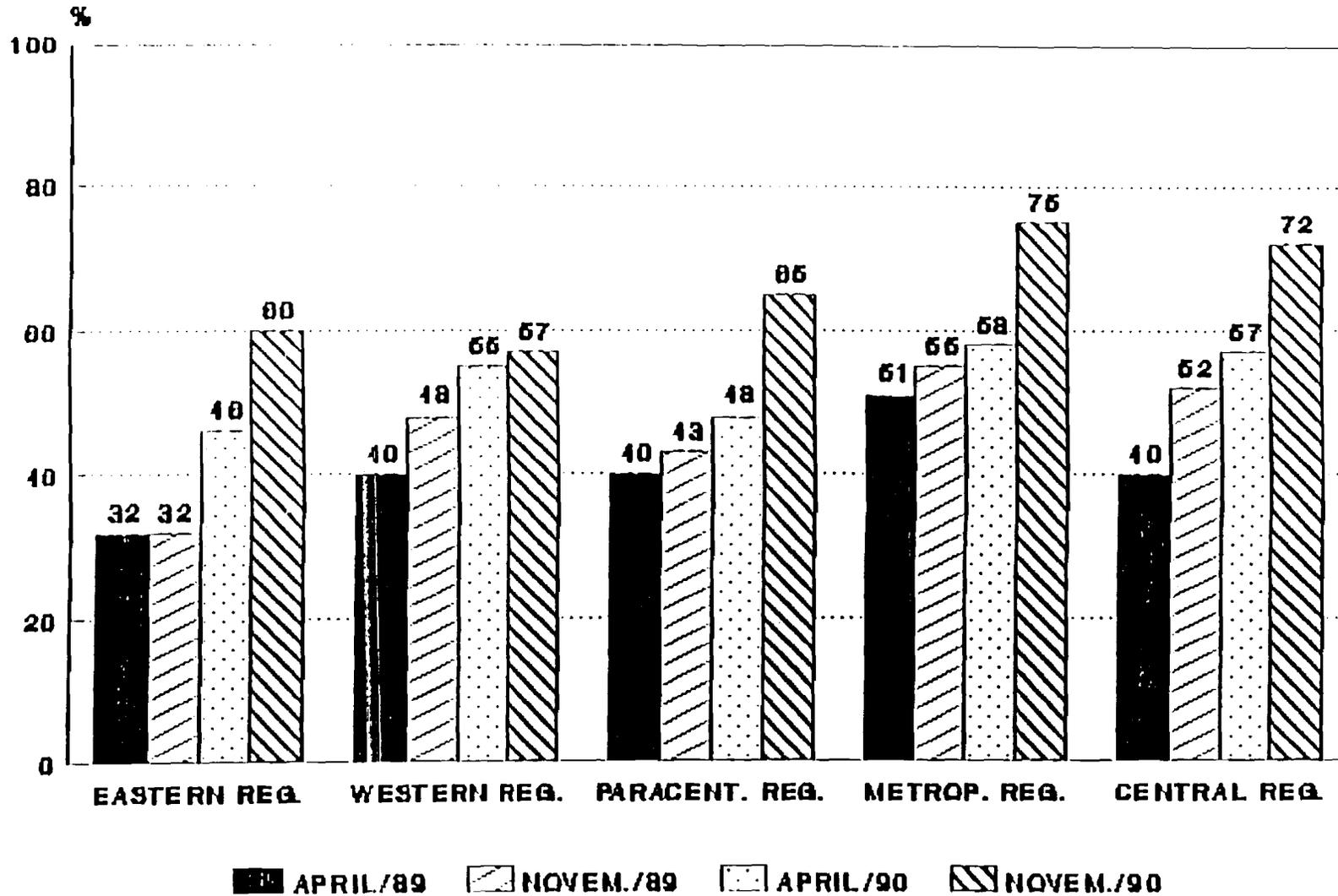
REGIONS	APRIL/89	NOVEMBER/89	APRIL/90	NOVEMBER/90
WESTERN REGION	19 = 32%	19 = 32%	28 = 46%	36 = 60%
EASTERN REGION	24 = 40%	29 = 48%	33 = 55%	34 = 57%
PARACENTRAL REGION	24 = 40%	26 = 43%	29 = 48%	39 = 65%
METROPOLITAN REGION	31 = 51%	33 = 55%	35 = 58%	45 = 75%
CENTRAL REGION	24 = 40%	31 = 52%	34 = 57%	43 = 72%
AVERAGE:	24 = 40%	28 = 47%	32 = 53%	39 = 65%
* 60 BASIC DRUGS				

MEDICAL SERVICE CORPORATION INTERNATIONAL (MSCI)/TECHNICAL HEALTH ASSISTANTS.

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REGIONAL COMPARATIVE CONSOLIDATED CHART DRUG AVAILABILITY 60 BASIC DRUGS



MEDICAL SERVICE CORP./ATS

FIGURE 1

NATIONAL COMPARATIVE CONSOLIDATED CHART DRUG AVAILABILITY

AVERAGE IN FIVE REGIONS

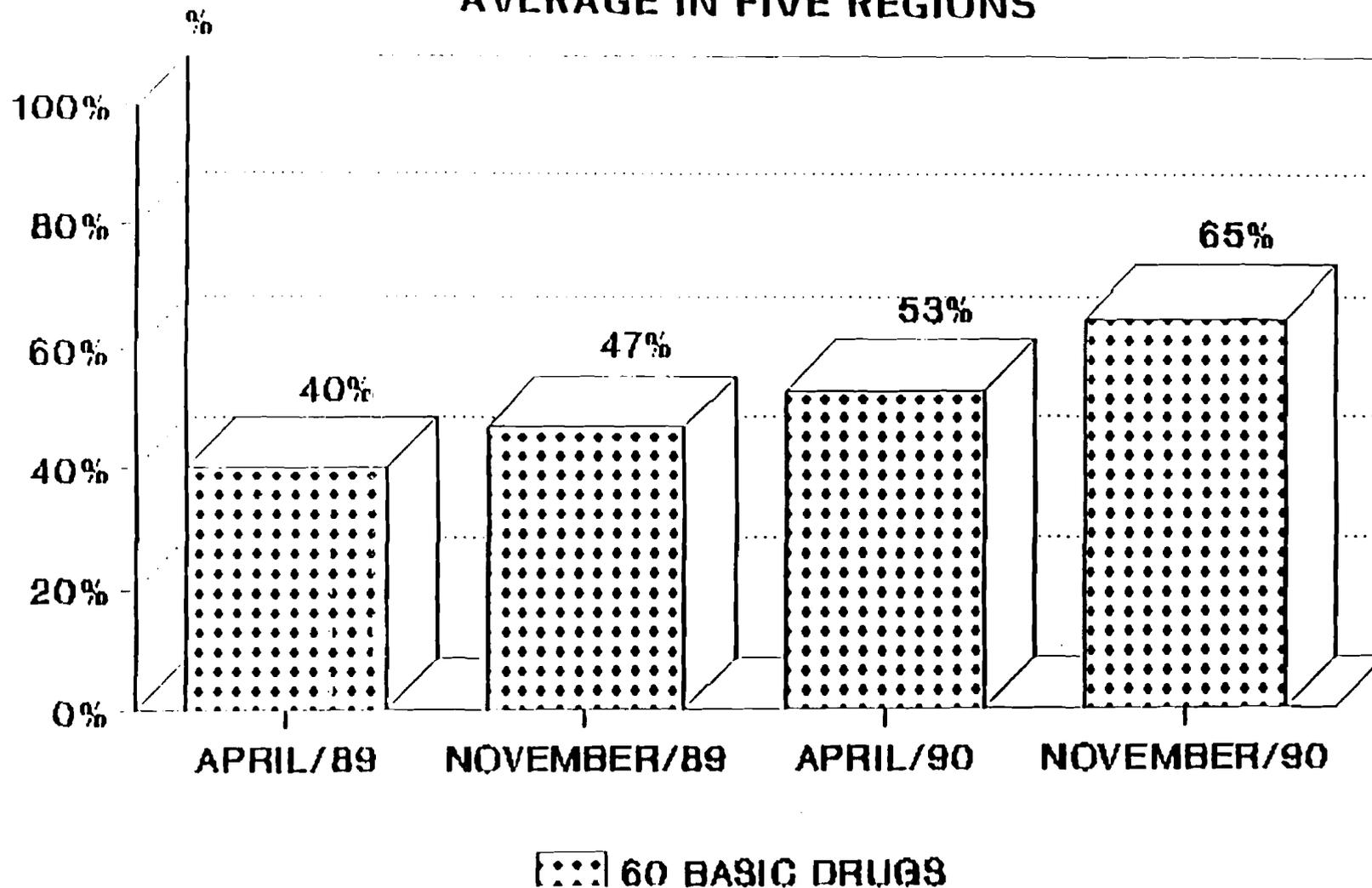
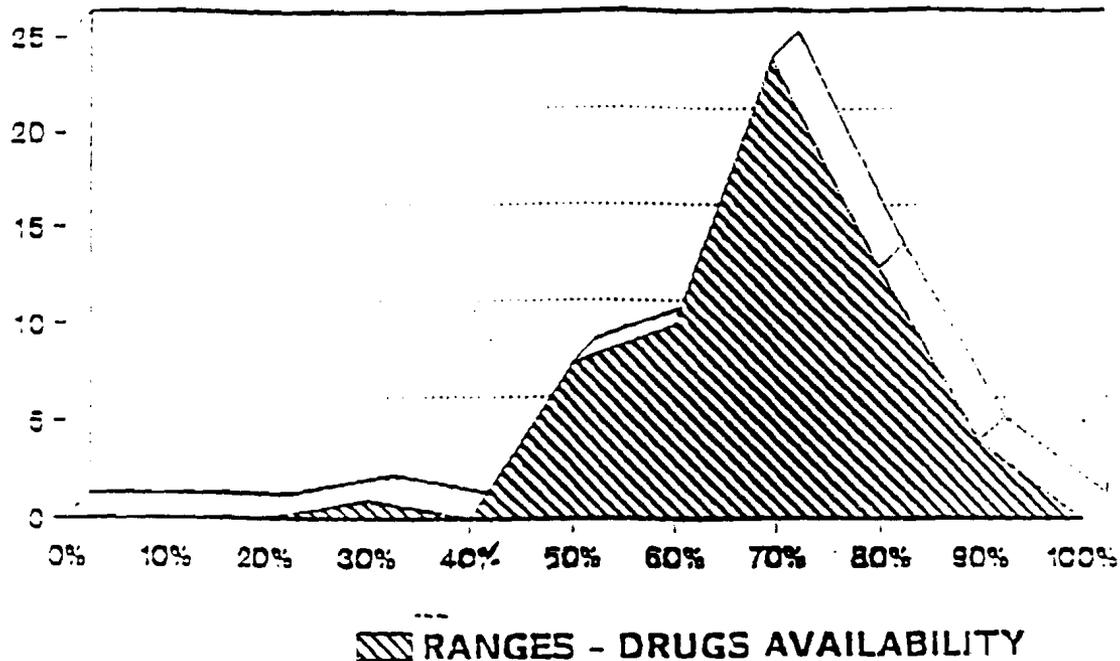


FIGURE 3

AVAILABILITY OF 30 BASIC DRUGS IN VISITED FACILITIES, APRIL/91

ESTABLISHMENTS:



ATS/MSCI

PERCENTAL RANK	TOTAL ESTABLISHMENTS	%
90%-100%	0	0.0%
80%-90%	4	6.7%
70%-80%	13	21.7%
60%-70%	24	40.0%
50%-60%	10	16.7%
40%-50%	8	13.3%
30%-40%	0	0.0%
20%-30%	1	1.7%
10%-20%	0	0.0%
0%-10%	0	0.0%
TOTAL:	60	100.0%

3.1.5 STRENGTHENING OF THE TECHNO-SCIENTIFIC COMPONENT OF UTMIM - MOH DRUG POLICIES

1. Background

The development of the techno-scientific component of UTMIM and the establishment of MOH drug policies has been effected with the collaboration of Dr. Albin Chaves Matamoros, short-term Pharmacology Advisor, who carried out two consultancies: one in August 1990 and the second one in August 1991. His contribution can be seen in APSISA "A" documents Nos. 54, 55, 56, and 102.

With Ministerial Resolution No. 382 of June 2, 1986, the Drug and Medical Supplies Technical Unit (UTMIM) was created. The Unit was assigned planning, coordination, standardization, and supervision, functions and assistance to the Ministry in all actions tending to upgrade the MOH drug and medical supplies provision.

Ministerial Resolution No. 85 was issued on February 26, 1988, ratifying the creation of UTMIM and transferring its dependency to the Direction-General of Health. UTMIM functions were confirmed. Furthermore, the elaboration of the procurement programs for drugs, instruments, equipment, and medical and surgical materials, X-ray, odontologic, and laboratory equipment for all MOH dependencies, programs, and projects fall now under UTMIM responsibility.

On the other hand, when revising the UTMIM organization chart, it is observed that the techno-scientific component is supported by assigning the Unit drug selection, use, quality, and education.

This discrepancy between UTMIM's conceptualization and the infrastructure created for its functions was the reason why the Unit did not function satisfactorily at the initiation of the Project. The need to define the techno-scientific functions of UTMIM was approached in 1990.

Thus, the Ministry of Public Health and Social Assistance, with the collaboration of Dr. Albin Chaves Matamoros, short-term Pharmacology Advisor of the APSISA "A" Project, issued Ministerial Resolution No. 461 of August 14, 1990, by which they confirmed the creation of the Technical Therapeutic Committee which would be the one to establish the MOH pharmacotherapeutic policies, with emphasis on drug selection, quality, and education. The Technical Therapeutic Committee was assigned four well-defined fields:

- a) Drug use,
- b) Pharmacovigilance,
- c) Drug Use Rationalization,
- d) Drug Information.

The same Ministerial Resolution assigns UTMIM two specific functions:

1. Executive Unit of studies and actions resulting from the tasks developed by the Technical Therapeutic Committee, to guarantee drug use rationalization and quality.
2. Provision of technical assistance to the operative component for drug programming, acquisition, warehousing, and distribution, functions that were previously assigned to the Procurement Division.

The strengthening of the techno-scientific component has been defined in the organization chart, with four areas covering functions oriented toward drug selection, use, education, and information:

Pharmacotherapy
Pharmacovigilance
Drug Information Center
Hospital Pharmacy

Five professionals in Health Sciences, three Medical Doctors, and two Pharmacists, with post-graduate training, work at UTMIM. The Unit has also the constant support of the computer microcenter. Therefore, the bases for the MOH strengthening, expansion, and drug policy improvement policies exist.

2. Development

Achievements have been obtained in different fields of action:

a) Drug Use

Drug selection: There is the Basic Drug List, which is compulsory for all the Ministry dependencies. It has 234 generic products in 317 presentnations. Since 1986, 38 generic products were excluded and included 23 generic products.

Drug consumption: The logistic process has been reported, therefore, the necessary information for drug consumption studies by the Defined Daily Dose System (DDD) is available.

b) Pharmacovigilance

A one-year pharmacovigilance pilot project was developed at the Health Center in Cojutepeque and at the Health Unit in Lourdes. The program includes suspicion notification of adverse reaction to drugs and of therapeutic failure.

c) Drug Use Rationalization

With the collaboration of the Pan-American Health Organization (PAHO) and with the Salvadoran Social Security Institute (ISSS), UTMIM organized a course in methods to design Health Sciences courses (Continuous Education in Therapeutics) in which were trained 14 General Practitioners and Specialists.

In September 1991 and with the collaboration of Dr. Albin Cháves M., short-term Pharmacology Advisor of the APSISA "A" Project, the first participative course in the "Rational Use of Non-Steroid Anti-inflammatories" was carried out. Six additional courses are projected in 1992.

d) Drug Information

From August 1990 to August 1991, UTMIM responded 90 consultations regarding drug doses, indications, and adverse effects, and three information bulletins were issued.

3. Problems and Restrictions

- a) The Technical Therapeutic Committee is the entity recommending health authorities the drug policies to be followed. To comply with this function it has to be a permanent organ, meeting periodically once or twice a month. The Committee has not met periodically. UTMIM should coordinate the Committee meetings to define its functions and responsibilities and to solve pending technical aspects.
- b) The Drug Basic List has to be observed by all MOH dependencies. However, the Hospitals continue procuring drugs not included in the Basic List without UTMIM authorization.

It is convenient to technical analyze some of the 23 inclusions in the Basic List, for example: Amoxiciline, Lincomicine (oral), Doxiciclina, and other products.

- c) The Pharmacovigilance Program has not had the expected impact. To promote its introduction, information and reminders, should be provided and visits made to the different health facilities.
- d) The information on drugs has been scarce. This activity should be promoted.
- e) The Techno-Scientific Section personnel should reduce their participation in the administrative activities, as there is an Administrative Section at UTMIM.

4. Recommendations

- a) Drug Selection: The objective is the availability of the drugs required for the treatment of predominant pathologies among the population with the lowest possible cost. Drug policy is included in health policy, therefore, it is important to obtain a reasonable budget for drug procurement. The estimated requirements and cost of ten essential drugs at use levels 1 and 2 (primary attention) are submitted in Table No. 4.

In 1990, the MOH budget for drug procurement was ¢25,947,890. This was a technical allotment as it was necessary to subtract ¢10 million colones for the procurement of medical supplies and chemical substances. The real line item for drug procurement was ¢15,947,890 representing 4.02% of the MOH global budget which was ¢396 million colones.

It is estimated that the budget for drug procurement should be 10% of the MOH budget in order to satisfy the requirements demanded by health service care delivery.

At present, the budgetary limitation is relieved by the assistance of the APSISA/USAID Project, which provided US\$5,180,000 in 1990 (= ¢38,850,000). Therefore, the global budget for drugs was incremented to ¢54,797,000 colones.

An ampler analysis of available requirements and resources for drug acquisition is in the APSISA "A" documents Nos. 37 and 38.

The need of funds for drug acquisition is evident. This could be obtained with an annual budget increment, justified to the Central Government on the basis of the urgent needs to solve health problems and the MOH own funds through mechanisms such as cost recovery for drugs and services. For the last alternative, the APSISA "A" Project elaborated a proposal on the "Feasibility of a Drug Cost Recovery Program at MOH" (APSISA "A" document No. 78, April 1991).

On the basis of a real budget, UTMIM should carry out the selection of drugs to guarantee their availability to solve the most frequent pathologies in the first level of attention and based on the following epidemiological indices:

- Most frequent reason for External Consultation,
- Most frequent reason for Hospitalization,
- Most frequent reasons for Mortality,
- Most frequent etiology of infectious and parasitic diseases.

- b) Drug Consumption Studies: These studies are essential for the implementation of national drug policies. UTMIM has initiated these studies using a low-cost methodology known as the Defined

Daily Dose (DDD) with the collaboration of Dr. Albin Cháves Matamoros, short-term Pharmacology Advisor of the APSISA "A" Project, determining the daily DDD/1000 inhabitants for different drug groups (antiepileptic, antimicrobial, etc.) for the years 1987, 1988, 1989, and 1990 (Table No. 5). These studies will permit the identification of problems, monitor the impact of regulating and educational/informative interventions, and adequately plan drug provision according to the population exposed to disease.

- c) Pharmacovigilance: The project initiated by UTMIM in 1990 as a pilot project has to be progressively expanded to other health facilities, starting with the country hospitals.
- d) Drug Use Rationalization: It is recommendable that UTMIM continue development of the continuous education program initiated with the collaboration of PAHO and APSISA "A." The program incorporates the health worker in the analysis of the correct use of medications to guarantee the adequate attention to the patient. This continuous education methodology should be expanded to health promoters.
- e) Drug Information: UTMIM should continue providing information to the Health Team to assist in the rationalization of drug use.

CODE	P R O D U C T	M/U	ESTIMATED REQUIREMENTS	UNIT PRICE	T O T A L
0-13-5504-2	Hierro Sulfato 300mg. Tableta	CTO	264,837	2.11	558,806.07
0-13-1241-1	Acido Folico 5mg. Tableta	CTO	264,837	2.49	659,444.13
0-01-6722-3	Metronidazole 500mg. Tableta	CTO	4,707	42.79	201,413.00
0-02-7447-1	Penicilina G. Procaínica 4.0 mill. U.I. Fco. Ampolla, polvo para 10 ml.	C/U	5,391	5.66	30,513.00
	Probenecid	CTO	107	85.00 (500 mg).	9,095.00
0-44-2314-1	Benzilo Benzoato 20% Fco. 120 ml. loción	C/U	13,711	5.50	75,410.50
0-01-6722-3	Metronidazole 500 mg. Tableta	CTO	3,560	200.00	712,000.00
0-01-6317-1	Mebendazole 100 mg. Tableta	CTO	9,380	6.51	61,064.00
0-01-6896-1	Niclosamida	CTO	1,000	12.00	12,000.00
0-16-1009-2	Acetaminofen 500 mg. Tableta	CTO	22,354	2.75	61,473.50
0-16-1009-1	Acetaminofen 120 mg./5ml.Fco.ambar 120ml. Jbe.	C/U	30,000	3.50	105,000.00
0-16-1009-3	Acetaminofen 100mg./ml. Fco. Gotero 15ml.	C/U	10,000	2.86	28,600.00
0-25-3039-2	Clorfeniramina Maleato 4mg. Tableta	CTO	14,900	1.56	23,244.00
0-24-3503-1	Dextrometorfano (Bromohidrato) 15mg./5ml. Fco. Ambar 120 ml. Jbe.	C/U	100,000	4.20	420,000.00
0-40-8230-1	Sales de Rehidratación Oral	C/U	580,000	1.20	696,000.00
0-11-5330-1	Hidroclorotiazida 50mg. Tableta	CTO	157,000	9.05	1,420,850.00
0-37-8946-1	Tolbutamida 500 mg. Tableta	CTO	240,000	18.82	4,516,800.00
0-37-5707-1	Insulina Cristalina 100 U.I./ml. Fco.Amp. 10ml.	C/U	140,000	29.90	4,186,000.00
	T O T A L				13,777,713

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TABLE 5
DRUG CONSUMPTION STUDY
1987 - 1990
D.D.D. SYSTEM *
MINISTRY OF PUBLIC HEALTH AND SOCIAL ASSISTANCE
EL SALVADOR

D R U G	1987	1988 IN DDD/1000 hab./d.	1989	1990
Antidiabéticos				
Insulina	0.12	0.11	0.12	0.11
Tolbutamida	0.32	0.38	0.42	0.41
Total	0.44	0.49	0.54	0.52
Antihipertensivos				
Alfa-Metil-dopa	0.32	0.48	0.47	0.30
Hidralazina	0.06	0.06	0.06	0.06
Prasozina	0.02	0.05	0.02	0.02
Propanolol	0.04	0.09	0.14	0.13
Verapamilo	0.06	0.10	0.14	0.14
Nifedepino	0.03	0.01	0.03	0.03
Hidroclorotiazida	0.65	0.57	0.73	0.72
Captopril	--	--	--	0.006
T O T A L	1.18	1.36	1.59	1.40

Enganex2
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* Defined Daily Dose (D.D.D.) System

DRUG CONSUMPTION STUDY
1987 - 1990
D.D.D. SYSTEM *
MINISTRY OF PUBLIC HEALTH AND SOCIAL ASSISTANCE
EL SALVADOR

D R U G	1987	1988 IN DDD/1000 hab./d.	1989	1990
Anti-Epilépticos				
Valproato de Sodio	0.01	0.01	0.01	0.01
Carbamazepina	0.06	0.06	0.09	0.06
Fenitoína	0.80	0.70	0.86	0.69
Fenobarbital	0.99	1.29	1.26	0.93
TOTAL	1.87	2.08	2.22	1.69
Antibióticos				
Amikacina	0.0009	0.01	0.02	0.02
Ampicilina	0.85	0.86	1.15	0.96
Cefalotina	0.001	0.001	0.003	0.003
Cloranfenicol	0.11	0.11	0.11	0.09
Dicloxacilina	0.02	0.03	0.04	0.03
Eritromicina	1.43	0.83	1.05	0.79
Gentamicina	0.01	0.02	0.03	0.02
Penicilina G. Benzatinica	0.06	0.06	0.008	0.07
Penicilina G. Procaínica	0.55	0.42	0.34	0.30
Penicilina G. Sódica	0.16	0.16	0.15	0.15
Tetraciclina	0.65	0.64	0.62	0.46
Doxiciclina	0.18	0.19	0.21	0.21
TOTAL	4.06	3.33	3.76	3.13

Anexo 12: ACUM: egh

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3.1.6 DRUG QUALITY CONTROL

1. Background and Development

The Drug Quality Control Laboratory was created by the VISISA Project in 1986 as part of the Drug and Medical Supplies Technical Unit (UTMIM). The construction of the one-story building at "El Matazano" was completed in 1987 and the installation of the equipment acquired by AID was begun.

The basic objective for the Laboratory creation was to provide UTMIM with the technical element necessary to determine the safety and effectiveness of the drugs acquired by MOH, especially those incorporated in the Drug Basic List.

During the first quarter in 1988, MSCI in coordination with UTMIM, the Laboratory personnel, and members from AID and the MOH APSISA coordinating group, analyzed the administrative and functional situation of the Laboratory to establish the necessary collaboration for its operation. It was found that functions were still delayed due to the following technical problems:

- a. Delay of the installation and calibration of the electronic equipment (scales, spectrophotometers, chromatographers, etc.) due to the absence of polarized electric installations and current stabilizers required for normal equipment functioning.
- b. Lack of special equipment for the provision of "soft" and demineralized water to the Laboratory.
- c. Absence of propane gas.
- d. Sterilizer and water distillers not installed due to the lack of demineralized "soft" water.
- e. Lack of laboratory reagents, culture facilities, and referenced chemical substances.

From all these problems, the most complex was the acquisition of reagents and referenced chemical substances due to their high cost and because they have to be imported. The advice was to program their procurement by phases according to the annual work program.

On the other hand, the Laboratory compromised to carry out drug quality control analyses at national level according to the Sanitation Code approved in August 1988. This compromise posed an immediate and exaggerated demand in 1988 and 1989 on the Laboratory resources. MOH carefully analyzed this particular problem to expedite the Laboratory development according to the acquired compromise.

In July 1990, the APSISA Project Evaluation Team recommended to terminate technical cooperation to the Laboratory on September 30, 1991, and indicated the need to elaborate a less ambitious program for quality control and the identification of funds to absorb the assistance provided by APSISA/USAID.

2. Development

In November 1988, Dr. María del Carmen Becerril, Head of the Evaluation and Cosmetics Department of the National Health Laboratory, Mexico, Short-term Consultant, provided technical assistance in the analysis of the administrative and functional situation of the Quality Control Laboratory. Dr. Becerril also prepared the Manual for the Laboratory Organization, detailing the administrative structure and personnel job descriptions. (Document APSISA "A" No. 4).

Completed the construction of the cabin for the installation of the equipment to "soften" and demineralize water and the propane gas cylinders. Through an AID contract, the plant to "soften" and demineralize water for laboratory service was installed. The Laboratory personnel received training in the operation of the equipment.

Three (3) members of the Quality Control Laboratory were trained at the National Health Laboratory in Mexico, in 1989:

- * Lic. Rita Ivon Grande Vega in "Quality Control processing (Analysis Techniques)." Scholarship, April 10-15, 1989.
- * Lic. Ana Isabel Granados in "Administrative Processes in Quality Control Laboratories." Scholarship, May 1-31, 1989.
- * Lic. Vilma Estela Henríquez in "Microbiological Analysis and Sterilization Tests for Injectables." Scholarship, June 1-31, 1989.

The installation and calibration of the 76 sets of equipment acquired with USAID funds in 1986-87 was completed in 1990.

The Laboratory personnel, integrated at present by five "Licenciadas" with a degree in Chemistry and Pharmacy, systematically participate in the inspection and identification of the drugs received at the Central Warehouse. They also carry out physical and chemical testing although in a limited way, due to the scarcity of reagents. The Laboratory distributes a weekly report of the activities carried out.

The Ministry of Finance and the Court of Accounts approved the creation of the "Special Activities Fund of the Quality Control

Laboratory," which will regulate the reception and use of the funds collected by the Laboratory. UTMIM has appointed the personnel responsible for the collection, administration, and use of the funds. It is estimated that by 1992, the Laboratory can have a ₡900,000 income that will enable it the procurement of reagents and materials to increase its effectiveness.

An internal evaluation report prepared by Lic. Arturo Waldron in July 1990 (Document APSISA "A" No. 41) showed the progress of the Laboratory as well as its limitations, basically due to the lack of laboratory reagents and chemical reference substances.

The "Quality Control Laboratory Basic List" was completed in 1991, APSISA "A" Report No. 84), this expedited the procurement process for laboratory reagents and chemical reference substances for ₡800,000. This procurement will ensure the normal functioning of the Laboratory in 1992.

3. Problems and Restrictions

The lack of laboratory reagents and chemical reference substances is the main problem of the Drug Quality Control Laboratory. The elaboration of the "Quality Control Laboratory Basic List" which includes coded products, has partly solved the delay in procurement during the previous years.

The operation of the "Special Activities Fund for the Quality Control Laboratory" will facilitate in the future the acquisition of the essential products required for the Laboratory operation.

4. Recommendations

It is important to obtain the administrative operation of the "Special Activities Fund for the Quality Control Laboratory." This will provide economic support to increase the Laboratory efficiency.

It is equally important that the Laboratory prepare annual work plans with well-defined goals in accordance with the available human, material, and financial resources.

3.2 TRANSPORTATION SYSTEM

1. Background and Development

The efficient delivery of health services, medicines and supplies to the five Regions that the MOH supports depends upon an effective transportation system. A major component of this system is an integrated network of vehicles, maintenance shops, parts warehousing, fueling facilities run by transportation coordinator, and ready access to radio communication.

The systems that were designed and implemented during the past three years of the APSISA "A" Project include:

- Computerized transportation cost administration;
- Computerized parts and fuel inventories;
- Procedures for preventive maintenance implementation and monitoring;
- Shop and warehouse administrative indicators;
- Training programs;
- Asset inventory control and disposal;
- Radio communications protocols and maintenance; and
- Transportation planning optimization.

Many of these systems and procedures were developed when the MOH transportation systems were one-fourth their current size. These procedures have been adapted to an expanded system. During the past eight years, the MOH has received significant vehicle donations that have increased the need for the structuring of transportation and radio communications systems. The major indicators of transportation capacity are fleet size, kilometers of transportation delivered, unit costs and the number of cost centers. In the MOH system, the dominant factor is fleet size. Figure 4 depicts the total number of vehicles in the current MOH system.

The total overall transportation costs and kilometers have increased with the increase in the MOH health programs and the size of the MOH fleet, bringing MOH transportation costs to more than ₡29,000,000. This figure, including donations, comprises over 10,000,000 kilometers of transport per year. This figure does not include 300 motorcycles.

The APSISA "A" Project has focused resources and technical assistance to help the MOH reduce transportation unit costs and improve fuel efficiency. The overall growth of the MOH transportation system has made it a significant factor in the successful delivery of health services and supplies. At the same time, this rapid growth has hindered the administration of health programs and projects in the hundreds of Units and Posts, Hospitals, Centers, and Regions that rely on the timely

availability of transportation and radio communications. The importance of both transportation and ease of communication is vital to the availability of health care to all segments of the population.

Throughout this period of exceptional growth, both the MOH and AID have responded to the needs of the rural and urban communities with resources such as training, systems development, short-term technical assistance, commodities, and functional decentralization through the MOH's regional structure.

Since the 1986 earthquake in El Salvador, UNICEF and the Governments of Japan, Germany, and Italy have complemented AID's efforts to assist the Ministry through the donation of vehicles. Training, budgets, and technical assistance required to assure the smooth operation of the expanding transportation system, however, have not always kept pace with this growth. Now that the MOH fleet has attained a maximum sustainable size, and given the limitations of the GOES budget, international donations and loans, more importance should be given to consolidating improved procedures, processes, and systems. In these areas, USAID has provided training and technical assistance on a short-term intermittent basis.

Transportation Areas of Special Interest

Since 1988, the technical assistance and vehicle and spare parts donations have worked to develop a strong Transportation Department at the Central level. The systems, training, and growth of the vehicle fleet have supported the Hospitals and Regions.

An important point to be considered in future transportation action plans is how to take the successful procedures and systems from the central level to make functional decentralization operative in the Regions at the local, Hospital, Health Center, Unit and Post levels.

An example that typifies this are the two transportation computer systems for costs and parts inventories. The cost administration system is the integration of all the economic indicators for the transportation functions. It was one of the first MOH systems to be computerized and provided valuable reports used in decision making at all levels. The system was largely designed for a significantly smaller fleet with the limitations of the data base and computer technology available in 1984. During the past seven years improvements have been made and parts and fuel inventory sub-systems added. However, the initial constraints of an eight-year old computer with insufficient memory and speed, outdated programming language (earliest versions of d'Base) and short-term, intermittent TA

have made a system that was designed for 300 assets work in a Department that now manager well over 1,100 vehicles, radios, and motorcycles.

Similar examples can be made for the parts and fuel inventory subsystems, MOH regional shops and parts warehouses (except the new San Miguel facility and San Vicente which is in the design stage) and the transport utilization and maintenance evaluation systems.

In general, what works fine for a system of 300 assets producing 2,000,000 kilometers per year in 1980, has reached its limits to provide current information for decentralization decision-making in a system with over 1,100 transportation assets producing well over 10,000,000 kilometers per year in 1991. The strategy of donations of new vehicles by other governments and AID will now need to evolve into a strategy for sustainability and constant improvement as the systems, GOES budget, and human resources have lagged the growth in MOH fleet size which is at or near the capacity required to support the current level of MOH health programs.

All lots of replacement vehicles (PIC/C's) were received, signed for, included in the TD computerized vehicle inventory and distributed. Specifications for smaller trucks (PIO/C 0295) as well as turbo diesel and bicycles were included in the final PIO/C's to minimize MOH fuel consumption and budget short falls.

Preventive Maintenance Program (PMP)

The administrative indicators used to monitor the PMP in the 30 cost centers are punctuality and effectiveness (conforming to PMP standards). None of the 30 transportation cost centers operated at less than 75% during the 1990-1991 evaluations. The validity of the PMP is indicated by the fact that the cost centers with the highest transport cost are also those with the lowest PMP evaluations. Specifically, these are:

PLANSABAR	60.0
USULUTAN HOSPITAL	66.0
ROSALES HOSPITAL	70.0
SPECIALLY ASSIGNED VEHICLES	75.0

Action Plans for 1990-1991

Of the nine goals included in the Action Plan, four are in process at the close of the Project. They are goals number:

1. Improve vehicle utilization rate and modernize the TD. 70%.
4. Systematize the parts inventory management system to include regional needs. 60%.
5. Implement new technology areas within the TD such as diesel fuel lab, engine and component rebuild sections, alignment brake bonding, tire retreading, and accident damage repair. 70%
7. Improve the fuel inventory systems to include regional underground storage tanks and fueling stations. 50%.

Regional Transport Shops, Parts Warehouses, and Centers

One of the most significant results was the equipping, remodeling, and opening of the new Eastern Region transportation facility in San Miguel. The TD was the first, and still is, the only MOH department occupying this site in San Miguel. A radio tower, vehicle lift and water system were added in 1991. The modernization of the parts warehouse, tools, and shop equipment as well as construction of new regional facilities in Santa Ana and San Vicente should be high priorities for 1992.

Restrictions and Proposed Solutions

Vehicle and Obsolete Parts Auctions

The five auctions held in 1991 did not produce the results hoped for. None of the obsolete parts and only 17 of 81 vehicles were sold. There will be a backlog of about 100 vehicles and over 1,000 different spare parts that need to be removed from the inventory and sold in public auctions in 1991-1992. The procedures should be improved and practiced with the TD. This is an area where the MOH loses a good potential for income generation due to lack of good procedures, training, and a modern fixed asset system.

2. Restrictions

The goals outlined earlier are consistent with the Action Plans, transportation activities and TA areas that have resulted in improving the MOH capacity to deliver health services and supplies. To further improve the MOH transportation systems at the regional level and sustain the present capacity one should take into consideration:

- the increased MOH fleet size and transportation capacity;
- the increased levels of health services and supplies being delivered (Cholera, population and MOH services growth);
- the need for operative decentralization through increased regional responsibility and authority;

- investment in information system integration, training, tool and vehicle replacement and facilities (shop, parts warehouse, and office) improvements at the Regional level;
- the regional ability to improve operations, maintenance, fuel efficiency, and reduce unit costs;
- processes and procedures based on functional not structural MOH decentralization in the regions;
- the MOH departmental users of the services such as transportation, eventually need to pay for use on a kilometer and/or per repair basis. These costs can then be charged against MOH departmental budgets if the services are to be sustained and economically viable. This is a basic fundamental of public administration if the long term requirement for cost recovery and cost reduction are to be achieved. This area takes on added importance when costs of all transportation is eventually passed on to the GOES part of the MOH budget.

Direct costs of MOH transport will be over ₡29,000,000 in 1991 and over ₡48,000,000 if the international donations and indirect transportation costs are considered. This makes transport the highest cost line items within the MOH budget after salaries, medicines, and supplies.

While the original premises on which transport action plans and activities were based produced positive results for the MOH delivery system, to make further gains and to sustain current capacity will require taking into account these additional considerations:

1. The factors such as population growth, health services and supplies delivered, number of health projects, programs, hospitals, health centers, posts, and units, have significantly increased, the requirements for/and demands on the MOH transportation systems. As a result, the MOH has responded by increasing their capacity as measured by size of fleet, parts and fuel inventories, costs, radio networks, and total kilometers of transport used.

2. The GOES budget as well as international funding and physical resources available to the MOH are not likely to increase significantly. Therefore, the transportation strategies and TA focus must shift from raising capacity to raising the productivity of existing resources and implanting transport strategies that lead to a sustained improvement of MOH regional operations.

3. The methods suitable to such an environment are formalized procedures that lead to improved resource allocation and utilization, cost reduction through productivity and quality improvement, operative decentralization, cost recovery mechanisms, and improved decision-making at the local and regional levels facilitated by integrated and practical information systems.
4. The MOH vehicle fleet is getting older. The same vehicles the MOH has come to rely most heavily on (turbo-diesel Cherokees, Comanches, Fords, and Toyotas) are arriving at a utilization level (four to six years over 60,000 kilometers) where the maintenance and repairs required are getting to be more costly and complicated.
5. All transport subsystems: vehicles, fuel, parts, and radio communications have increased almost four times in size during the last eight years. In order to sustain the current levels of services significant technical as well as administrative improvements are required.

3. Proposed Solutions

To sustain economic viability of the MOH transportation system as well as unit cost reductions, increased productivity and quality, the following activities should be considered:

1. Define and specify a steady state transportation system based on health services and supplies projected to be delivered as well as projects and programs to be supported during the next three to five years.
2. Implement at the regional level, the recently approved transportation optimization plan.
3. Promote functional not structural decentralization by consolidating the transportation system around the existing 29 cost centers. Do not add new cost centers to the system by working out transport needs and planning on a regional basis.
4. Improve and integrate the existing information systems. A practical example of this is the coordination required in the use of ambulances and emergency response vehicles. While the MOH has all the components to form a trauma system: a good radio network, over 115 MOH ambulances, telephone lines, and a trauma capacity in place in the Hospitals, there is no coordinated integration of these components. The desired result is an efficient, reliable ambulance service that brings emergencies to the hospitals and MOH health centers in an effective manner. Similar examples can be made for the transportation computer programs, parts and fuel inventories,

and regional purchasing processes.

5. Analyze and institutionalize formal procedures for the areas detailed in the RFP to improve the MOH transportation system.
6. Specify time commodity procurement to coincide with the sustainability of a stable transport system. The upgrading of the regional transportation, fueling, shop, and warehouse facilities, training and specialized tools and equipment for the radio communications network and mechanical sections are particularly important.
7. Produce a transport administrative manual prior to the need of the Project that gives formal authority and continuity to the procedures and systems developed.
8. Evaluate and implement cost recovery mechanisms such as improved vehicle and parts auctions, effective use of private sector in maintenance as well as contract transport, and commodity reuse programs such as tire recapping and oil recycling. An important tenant of public administration is the charging of MOH departmental budgets for the use of services as described earlier.
9. Develop a detailed budget at the regional, departmental, and hospital levels that allows for the financial viability of the MOH transportation system. From over 80% in 1984 to 1988 to at present an estimated 70% of the actual costs of MOH transportation is provided by international donations. While the MOH has improved the system sustainability, there is a considerable gap in the GOES budget to continue the current level of service. GOES users should be made aware of costs and feel the impact of their decisions by having budget accountability at each MOH cost center.
10. Recent studies indicate the cost of transportation for MOH commodities is twice that of warehousing. In the case of service delivery the limiting constraint is only transportation as storage is not a factor. Given the gains made in the MOH supply system, it appears a similar level of effort to improve the transportation system would result in high returns for MOH sustainability.

MOH TRANSPORT EQUIPMENT

INCREMENT OF MOH FLEET

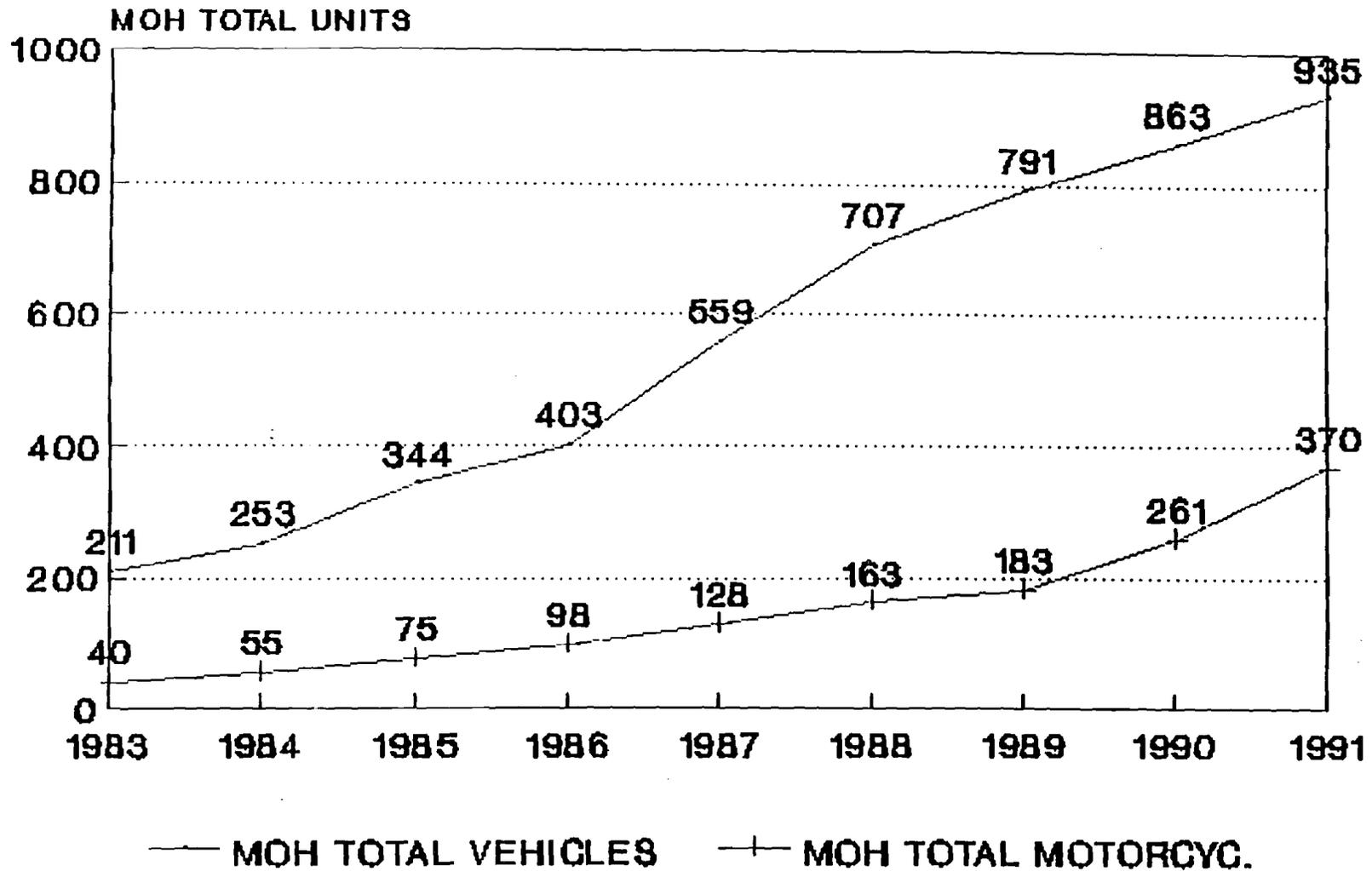
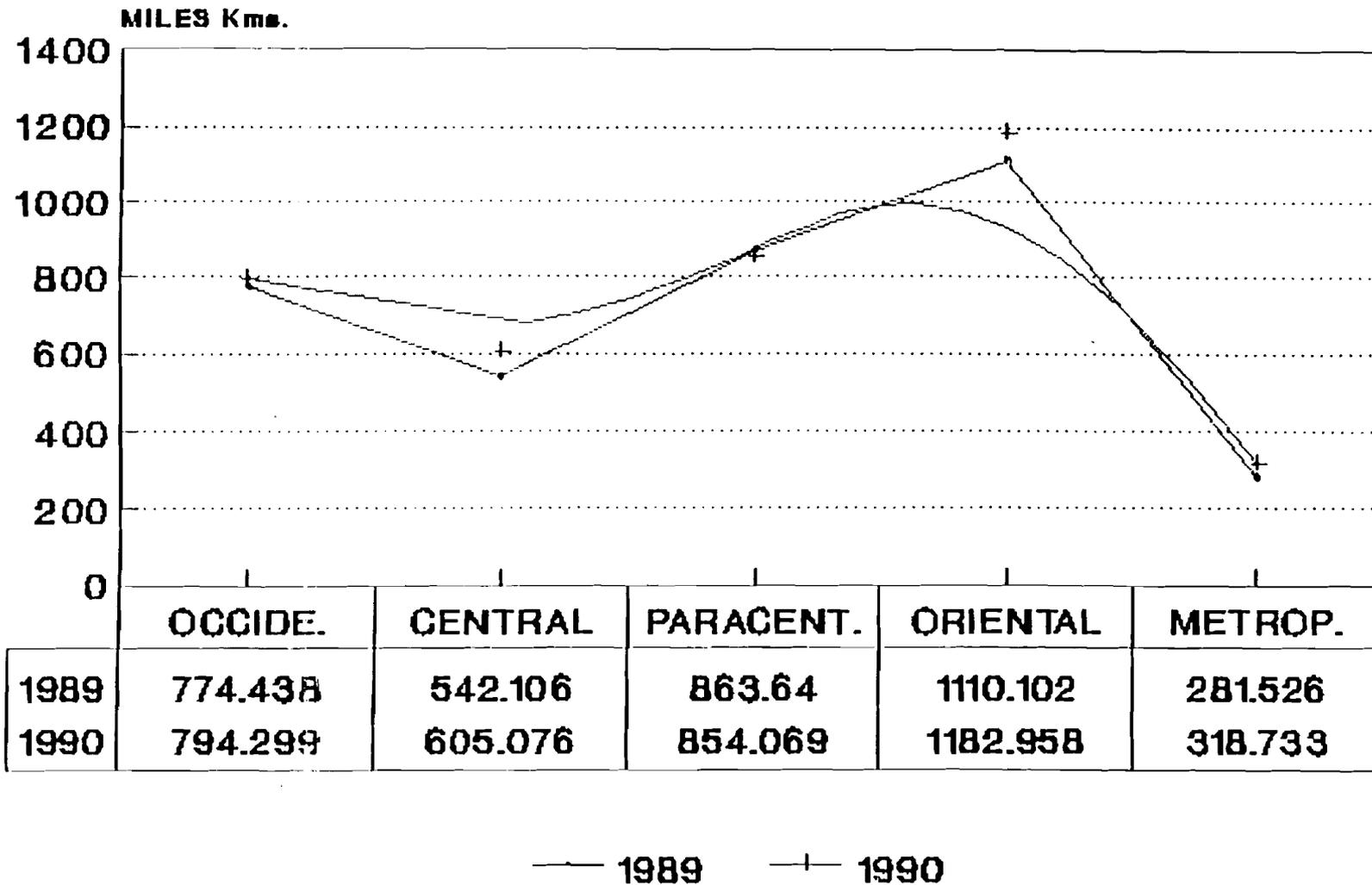


FIGURE 5

ANALYSIS OF THE USE OF REGIONAL TRANSPORTATION



3.3 MAINTENANCE OF BIOMEDICAL AND HOSPITAL EQUIPMENT

1. Background

To strengthen the operativity of the biomedical equipment maintenance system, in 1985 the "Vitalization of Health Systems" Project (VISISA), programmed the creation of a Central Maintenance Workshop to cater to the Metropolitan and Central Regions and three Regional Centers to be located in the Eastern, Western, and Paracentral Health Regions.

The development of this component was included in the "Health Systems Support" Project (APSISA), 1987-1991, when establishing within its goals personnel training activities for the Maintenance Department, equipment and tool acquisition for the three new Regional Centers, and the development of preventive maintenance program for biomedical and clinical laboratory equipment.

2. Development

Ruben Worrell, Engineer, long-term Advisor in Biomedical Equipment Maintenance, October 1987-September 30 1990, and Víctor Manuel Alvarez, Engineer, short-term Advisor, July 2-August 16 1991, participated in the development of this component. According to the Project orientation, technical collaboration tended to the Regional and Local levels. Main achievements are presented below.

Biomedical Equipment Technical Inventory

The computerized inventory of biomedical and clinical laboratory equipment in the country's Health Units and Posts was completed in 1990. To carry out this inventory it was necessary to train, with the Central Maintenance Department cooperation, Nurses and maintenance and general service personnel in the Health Regions. Approximately 3,800 biomedical and Clinical Laboratory equipment were inventoried.

With the participation of the Data Processing Unit and the Institutional Development Unit, the Health facilities code was modified for the inventory.

The Central Maintenance Department and German Cooperation (GTZ) compromised to complete the biomedical and clinical laboratory equipment inventory in the country's Hospitals and Health Centers.

This is quite valuable information for the Ministry as it will permit the elaboration of Norms for Equipment Deletion, Equipment Standardization, and Replacement of Obsolete Equipment.

Infrastructure

The Eastern Health Region is the only one with its own premises for the Maintenance Workshop. The new Workshop has been designed for the Paracentral Region, which will be located in the complex assigned for the Drug Warehouse and the Transport Workshop. It is expected that this structural complex be completed in 1992, its cost is estimated in \$450,000 colones. The Western Health Region has already defined the place where the Workshop will be built in 1992-1993 with PL-480 funds.

The construction of these two Workshops will permit the adequate decentralization of the corrective and preventive maintenance services for biomedical and Clinical Laboratory equipment starting in 1993.

Human Resources

The work team at the Eastern Region Workshop is integrated by 16 persons. For the biomedical equipment maintenance the technical team is distributed as follows: three polyvalent technicians for biomedical equipment maintenance; one polyvalent technician for odontologic equipment maintenance; and the Workshop Assistant Head who works in general and laboratory equipment maintenance.

The Western Health Region Workshop has only two technicians for the biomedical, odontologic, and laboratory equipment maintenance.

A total of 300 technicians from the Central, Regional, and Hospital levels received training in basic electricity, electron mechanics, refrigeration, motor control and protection, X-Ray, welding, water treatment, and dental equipment.

Biomedical Equipment Maintenance Through Contracts With The Private Sector

Contracts were signed for the installation and calibration of 70 sets of specialized equipment for the Drug Quality Control Laboratory as well as for the installation of the Water Treatment System in the same Laboratory, the maintenance of X-Ray equipment, and the calibration of the OHMEDA Vaporizers of the anesthesiology equipment. A total of 30 OHMEDA vaporizers were sent to Miami with USAID funds.

The strategy of contracting private firms for the maintenance of specialized equipment was a new one for the Ministry of Health. But it has permitted to kindle the interest of the Central Maintenance Department in training personnel in the country and abroad to progressively take responsibility for the

equipment maintenance.

While this level of competence is reached, it is recommended that MOH identifies GOES resources to continue the contracting of the private sector for the preventive maintenance of the X-Ray and Anesthesiology equipment.

Preventive Maintenance Program for Biomedical and Clinical Laboratory Equipment

Mainly, in the Central and Regional levels corrective maintenance activities are oriented toward biomedical and laboratory equipment. The Preventive Maintenance Program (PMP) has not progressed satisfactorily, even though maintenance routines have been elaborated and maintenance service routes have been established in Health Units of the Metropolitan Health Region to cover some basic equipment, such as centrifuges, microscopes, autoclaves, sterilizers, dental compressors, and electrocauteries.

From July 2 to August 16, 1991, Engineer Víctor Manuel Alvarez, short-term Advisor, assisted in the elaboration of a proposal for the upgrading of the preventive maintenance program for laboratory and dental equipment in the Health Units of the Eastern and Western Health Regions.

Víctor Manuel Alvarez worked in coordination with the Central Maintenance Department and the maintenance personnel for biomedical equipment of the Eastern and Western Regions. Health Units and Posts were visited to observe the operation and conditions of the laboratory equipment: microscopes, centrifuges, sterilizers, serological baths, etc.

The maintenance routines for the laboratory equipment in the Eastern and Western Regions were checked and talks were had on electromedic safety.

Some comments from the diagnosis on the present situation in the Workshops are given below.

a) Biomedical Maintenance Department, Eastern Region

- * The Maintenance Department covers all traditional preventive and corrective service areas.
- * The demand for biomedical equipment preventive maintenance service is rapidly growing.
- * At present, the workshop does not have either the organization nor the planning for laboratory and dental equipment preventive maintenance.

- * The workshop does not have preventive maintenance routines for microscopes, centrifuges, sterilizers, serological baths. All service is carried out by "maintenance service request and work order." The service is deficient due to:
 - Delay in approval and execution.
 - Insufficient personnel and transportation.
 - Lack of spare parts and technical information.
- * There are 16 members in the workshop personnel from which three polyvalent technicians work in biomedical equipment maintenance; one polyvalent technician works in odontological equipment, and the Workshop Assistant Head works in general maintenance and laboratory equipment maintenance.
- * There is quite a number of damaged maintenance equipment in the Region, especially in the farthest Health Units.
- * There are not sufficient spare parts for maintenance, particularly for the maintenance of sterilizers and autoclaves.
- * Most of the Argentinan anesthesia equipment is not in service as it is faulty and of bad quality.
- * The Odontology Units in the Region are almost all useless. It has not been possible to repair them due to lack of spare parts, funds, and technical information.

Summarizing, it can be said that the Eastern Region Workshop has been assigned premises and personnel, even though insufficient, for the biomedical and laboratory equipment maintenance. There is interest in upgrading and strengthening this service area.

The Report includes an annex stating equipment and spare parts requirements at the Regional Workshop. It also lists the needs of odontological equipment to replace the old one in ten Health Units.

The possibility of the APSISA Project including odontological equipment within its priorities will be discussed.

b) Biomedical Maintenance Department, Western Region

The workshop covers all service areas: General maintenance; medical equipment (Maintenance Chief); basic medical equipment, odontologic, laboratory, and carpentry

(one polyvalent technician); electricity and refrigeration (two polyvalent technicians); motor vehicle mechanics (one polyvalent technician); masonry and plumbing (one polyvalent technician).

The space is inadequate (its construction is planned in 1992 or 1993). The present section dedicated to biomedical equipment maintenance is not organized and lacks a preventive maintenance program.

The report of Engineer Alvarez should be discussed with the Central Maintenance Department to program the following action lines:

1. The need to acquire equipment and spare parts for the Maintenance Section of the Eastern Region.
2. The possibility to bring the Biomedical Equipment Maintenance Advisor to provide technical assistance to the Preventive Maintenance Program in the Eastern Region (two months in 1992). The development of this workshop will be a model for the Western and Paracentral Regions.

3. Problems and Restrictions

In general, Project achievements were limited due to the lack of adequate infrastructure, scarcity of trained human resources, centralization of activities, lack of adequate transportation, and, undoubtedly, to the increasing demand for corrective maintenance for equipment damaged because of the lack of preventive maintenance. The Central Department is not capable of efficiently serving the whole country. The need to elaborate decentralization plans is urgent and this need will be favored by the construction and equipping of the Paracentral and Western Regions Workshops and the upgrading of the Eastern Region Workshop.

4. Recommendations

The APSISA Project should concentrate in the institutionalization of a biomedical and laboratory equipment preventive maintenance program at regional level.

This objective will be reached through the following strategic approach:

- Elaboration of a laboratory and biomedical equipment preventive maintenance program in the Paracentral and Western Health Regions to define:

- * Available human resource and the immediate needs at Regional level (Regional Workshops and Hospitals).
- * Feasibility of available equipment, spare parts, and materials.
- * Identification of basic equipment (microscopes, sterilizers, autoclaves, centrifuges, microcentrifuges, etc.) that will receive preventive maintenance.
- * Elaboration of preventive maintenance routines.
- * Establishment of work routes.
- * Obtain transportation facilities.
- * Approval of norms to regulate coordination, supervision, and evaluation between the Central and Regional levels to ensure the operative decentralization of the system.
- * Identification of the program's recurrent costs and decision-making for their incorporation in the regular MOH budget.
- * Construction of the Maintenance Workshops in the Paracentral and Western Regions, with the adequate infrastructure and service organization for regional requirements.
- * Progressive expansion of the laboratory and biomedical equipment preventive maintenance program prepared for Health Units and Posts, Health Centers and Hospitals, in accordance with availability of human and material resources.

3.4 UPGRADING THE CLINICAL LABORATORIES IN HEALTH UNITS AND POSTS

1. Background

The Clinical Laboratory in El Salvador, an important part of the Health Care System, is organized in three levels with a total of 81 laboratories.

Central Level: Includes the Central Laboratory Unit located in San Salvador.

Regional Level: Integrated by 32 laboratories distributed among the 15 Hospitals in the country, 15 Health Centers and in two of the five Health Regions.

Local Level (Primary Level): Includes the laboratories located in 48 of the 112 Health Units in the country.

The Health Regions lacking laboratory facilities at the local level are the Paracentral and the Eastern Regions. The Paracentral Region has only one laboratory in one of the 14 Health Units. The Eastern Region has three laboratories in 39 Health Units. The reason for this limitation is the scarcity of economic and human resources and in some areas, the restrictions imposed by the armed conflict.

The administrative and functional organization of the laboratory chain is still deficient due to the absence of a comprehensive plan to regulate its development. What exists is a "regionalization" of laboratory services, characterized by the location of human and material resources in the Hospitals and Health Centers and Units, with no direct relation to a central technical body with enough authority to standardize and coordinate its development.

2. Development

During the period 1987-1991, the APSISA "A" Project carried out an upgrading program for the clinical laboratories and Health Units (Primary Level) through: a) acquisition and distribution of laboratory equipment and material with a value of US\$406,000 and US\$283,000, respectively; b) upgrading of the electrical infrastructure of Health Units in the Metropolitan, Central and Western Regions; c) elaboration of the architectonic design and budget for the expansion of the physical area in the laboratories in the Health Units at La Libertad (Central Region), Zacamil (Metropolitan Region), and "Dr. Tomás Pineda Martínez" (Western Region).

The computerized inventory of approximately 3,800 sets of laboratory and biomedical equipment in Health Units and Posts was

also completed. This inventory contains valuable information for deletion of obsolete equipment, standardization of laboratory equipment, and organization of a preventive maintenance program at regional level.

3. Problems and Restrictions

The Health Laboratory Unit lacks an organic structure to norm and coordinate its technical, administrative, and operational direction. The Central Unit or Central Laboratory located in San Salvador has no authority to regulate the development of the national chain in accordance with priority health requirements and resource availability.

On the other hand, the Supply System is totally disorganized as there are no adequate procurement, warehousing, and distribution processes for laboratory reagents, materials, and equipment.

These conditions difficult the technical support and supply provision for the APSISA Project.

There is urgency for the administrative and functional reorganization of the National Health Laboratory chain. As APSISA "A" does not provide technical assistance in this area, it is recommended for MOH to request another International Agency's cooperation.

4. Recommendations

The technical approach in this area should be focused on the improvement of the Primary level laboratory chain, according to the operative decentralization plan promoted by MOH. The technical and financial assistance should be oriented toward the:

- Provision of basic laboratory equipment to replace obsolete equipment and/or introduce new laboratory tests;
- Expansion of physical space in the laboratories with structural limitations to upgrade their operation and expansion, and
- Technical assistance in the training activities for laboratory personnel, including review and updating of laboratory techniques, shipment of reference samples, and the use and care of laboratory equipment.

The national Health Laboratories chain will need technical assistance in the organization of the supply system in its three levels, however, most urgently at central level. Its physical organization will permit the introduction of the computerized information system for data on stocks, consumption, and

distribution of laboratory reagents and materials, an important element to rationalize the corresponding procurement programs. However, this technical collaboration will only be useful if MOH appoints an administrator and a storekeeper in the Laboratory Unit for the adequate management of the system.

It is important to mention that the upgrading of the laboratory services at Primary level will be closely related to the development of other components, among them: a) the introduction of a cost recovery system for health care systems; b) the establishment of a biomedical and laboratory equipment preventive maintenance program at national level; and c) malaria control and surveillance as well as for other infectious diseases at community level.

The health laboratory chain will play a very important role in the strategy to incorporate malaria diagnosis and treatment to the General Health Services.

This technical assistance will, however, require a joint effort from health authorities to approve a new organic structure of the Laboratory Services to respond to the evident needs for technical, administrative, and operational direction in the three levels of attention. Different phases have to be taken into consideration in its planning and organization, whose development could be simultaneous or sequential:

- Identification of the tests to be carried out at the different levels of health attention, in accordance with prevalent diseases and available resources;
- Available and/or required personnel;
- Premise, equipment, and furniture inventory;
- Personnel training;
- Laboratory functions delimitation at the different levels;
- Introduction of norms to regulate the Reference System among laboratories;
- Establishment of an efficient supervision and evaluation program at Central and Regional levels.

It is recommendable that MOH promote the cooperation of other International Agencies for the comprehensive development of the national health laboratories services.

3.5 IMPROVEMENT OF POTABLE WATER AND SEWAGE SYSTEMS IN HEALTH UNITS AND POSTS

1. Background

A survey carried out in 1985 by the VISISA Project reported that 60% of health facilities had deficient potable water and sewage systems.

The APSISA "A" Project established the need to analyze the availability of potable water and sewage in the MOH Health Units and Posts and to upgrade these systems in at least 90% of health facilities. To reach this objective it was agreed to finance the procurement of water pumping equipment and the construction or repair of cisterns, wells, and aerial water tanks.

2. Development

In 1989 another survey on the potable water supply was carried out in 77 (27.6%) MOH Health Units and Posts functioning in the country. The survey showed a number of deficiencies in the potable water supply systems and sewage in the 77 facilities surveyed (**). The enclosed Table 9 shows facility distribution by Health Region.

In the period January-September 1991, the APSISA "A" Project completed the repair work of the potable water and sewage systems in the following 15 health facilities:

GROUP 1

1. Cara Sucia Health Unit, Ahuachapán	Western Region
2. Belén Guijat Health Post, Santa Ana	Western Region
3. Masahuat Health Post, Santa Ana	Western Region
4. San Juan Las Minas Health Post, Santa Ana	Western Region
5. San José Ingenios Health Post, Santa Ana	Western Region
6. San Jerónimo Health Post, Santa Ana	Western Region
7. Tepecoyo Health Post, La Libertad	Central Region
8. San José Villanueva Health Post, La Libertad	Central Region
9. Talnique Health Post, La Libertad	Central Region
10. Mizata Health Post, La Libertad	Central Region

Contractor: AQUA SYSTEMS, S.A. de C.V.
 Contract Value: \$447,350.92
 Period for completion: June 10 - August 10, 1991

(*) Worrell, R. "Techo del Presupuesto Total y Alternativas para las Mejoras al Sistema de Abastecimiento Secundario de Agua Potable y Alcantarillado en Unidades y Puestos de Salud." Document: APSISA "A" USAID MSCI. September 1990.

GROUP 2

1. San Pedro Masahuat Health Unit, La Paz	Paracentral Region
2. San Luis Talpa Health Post, La Paz	Paracentral Region
3. La Herradura Health Post, La Paz	Paracentral Region
4. Las Isletas Health Post, La Paz	Paracentral Region
5. Oratorio de Concepción Health Post, Cuscatlán	Paracentral Region

Contractor: REQUIPSA
 Contract Value: ₡447,350.92
 Period for completion: June 10 - August 10, 1991

In order to assist the maintenance and repair of water pumping equipment, Engineer Oswaldo Ramirez, short-term Potable Water Advisor of the Project, prepared the document: "Complementary Guide for the Maintenance of Potable Water and Drainage Systems in Health Units and Posts." The objective is to provide the polyvalent technician with the information necessary to keep in operation the installations and equipment of the potable water and sewage systems in Health Units and Posts. To complement this assistance the following tools were delivered to facilities of Group No. 2:

- 12" Stillson Wrench
- 10" Stillson Wrench
- Set of Screwdrivers
- 10" Adjustable Spanner
- Adjustable Pliers
- Box Spanner
- Tape Measure (Mts.)
- Hacksaw

General Description of Improvements

The modifications to the Potable Water Systems in Health Units and Posts have covered from the replacement of faucets and valves to the complete replacement of the network and fixtures; construction of septic tanks, and pump installation in wells.

For the facilities with a well, a cabin has been built to house the automatic and manual control systems of the submersible pump. These control the pump operation and regulate the cistern level and protect it in case the well went dry.

An automatic control has also been installed for the horizontal centrifugal pump; this controls the centrifugal pump operation when the aerial tank is empty or full and protects it when the cistern does not have any water.

A manual pump has been interconnected to the horizontal centrifugal pump impellent line to pump water to the aerial tank during the long energy cuts.

The pumps installed in the well have a tank filling capacity of 40 minutes maximum.

The aerial tank made of glass fiber, has storage capacity of 2.3 m³ and is mounted on a 6 m. metal tower; the tower has concrete supports 1.0 x 1.0 m.

At Health Posts, the tank discharge line has been installed in 1"φ and for Health Units (Alliance type) in 1-1/4"; at the same time, the internal network of the building has been substituted by 1-1/4" φ and 3/4" φ for greater flow with the 6 m. charge obtained with the aerial tank.

Inside the buildings, faucets, valves, and siphons have been replaced and have done a complete cleaning of fixtures and tiles. In those facilities where the deterioration was almost complete, a total replacement of fixtures and supply networks was effected.

Regarding sewage, there has been cleaning of the existing piping and septic tanks and in the cases requiring it constructed septic tanks, sewer wells, and new drainage.

In their majority, the potable water systems are supplied by the ANDA networks (National Aqueduct and Sewage Administration) and PLANSABAR (National Plan for Rural Basic Sanitation), being minimal the number of Health Units and Posts having a deep or shallow well for their supply.

Sewer waters are drained into the sewage system of each town; in the rural sector, all Health Posts have a septic tank and absorption well duly located, thus avoiding any risk of contamination for the wells close to health facilities.

3. Recommendations

The extension of the APSISA Project for the period 1991-1994 also takes into consideration the upgrading of potable water and sewage systems in Health Units and Posts. It, furthermore, defines the need to prepare a routine maintenance program for the pumping installations and equipment and the corresponding training for regional and local personnel.

It is estimated that with short-term technical assistance for a period of six month, the upgrading program can be completed in 30 health facilities as follows:

Eastern Region	=	10 facilities
Paracentral Region	=	5 facilities
Metropolitan Region	=	5 facilities
Central Region	=	5 facilities
Western Region	=	5 facilities

Simultaneous training for the regional and local personnel can be planned for the adequate maintenance of the systems installed. This training has to be carried out with PLANSABAR and the Central Maintenance Department collaboration and should be oriented toward the organization of a decentralized maintenance program at regional and local levels, to repair and prevent water pumping equipment deterioration.

Guidelines for the adequate use of the equipment installed are going to be provided to the personnel in the upgraded facilities, they will also be trained in simple plumbing, such as repair or change of siphons.

TABLE 6

HEALTH FACILITIES - POTABLE WATER AND SEWAGE SURVEY

<u>Regions</u>	Health Units			Health Posts			TOTAL
		1 Prior ity			1 Prior ity		
	In Oper.	Survey	Closed	In Oper.	Survey	Closed	
Western	23	13	--	41	7	--	64
Central	13	4	--	32	7	10	45
Paracentral	18	9	--	35	6	3	53
Eastern	37	6	3	53	8	10	90
Metropolitan	24	15	--	3	2	--	27
Total Country	115	47	3	164	30	23	279

COMPONENT "B": IMPROVEMENT OF BASIC HEALTH SERVICE DELIVERY

THIS COMPONENT INCLUDES THE FOLLOWING SUBCOMPONENT:

3.6 MALARIA CONTROL

1. Background

The conditions for Malaria control included in the Health Systems Support Project have provided assistance to GOES in containing and reducing still more the incidence of the disease through the support to an efficient and effective national Malaria control program. To reach this objective the efforts of the Projects have been addressed toward the consolidation of integrated control activities in accordance with priorities provided by the epidemiological stratification and through different activities which included training and assistance to the voluntary collaborators network, training in the different Malaria control aspects for MOH personnel and related institutions, and improvement of the surveillance system through the automation of the Information System to strengthen the program's epidemiological approach in decision-making.

Efforts were also made to expand the integration of control measures through the innovative inclusion of projects tending toward vector source reduction by the construction of permanent sanitary engineering works in the coastal area where there is greater incidence of the disease. The latter was carried out to obtain in the future less Program dependency on the use of expensive insecticides.

2. Development

2.1 Epidemiological Situation

The epidemiological situation that had shown a significant improvement from 1980 to 1987 when APSISA began, continued improving after that period until reaching a level of 9000 cases consecutively reported every year during the last three years (1988-1990). This represents a reduction equivalent to 28% of the total cases reported during 1990 in comparison with 1987, when the Project started. This reduction of the problem observed during the period covered by this Report, should be analyzed subsequent to a 70% improvement obtained early in the period (1980-1986), which adds to a 90% total reduction of the problem between 1980 and 1990, which can be considered of great significance.

Thus, Malaria in El Salvador (Graphic N° 1) that had produced 96,000 cases in 1980 with an incidence of 20

cases per 1,000 inhabitants, has declined continuously until reaching during the last three years (1988-1990) the above-mentioned level of 9,000 cases per year. In this way, a 90% reduction was obtained in the total number of cases reported as compared with 1980. Incidence confirms the phenomenon when it decreases to 1.76 cases per 1,000 inhabitants during the last year, with a morbidity rate corresponding to 176 cases per 100,000 inhabitants. Another index, of positive slides, which normally serves to measure the degree of transmission occurring in a determined area, has reached 4.0, this confirms that transmission has lessened reaching the lowest levels reported during the last 30 years of Malaria history in the country. However, what is most relevant among the results obtained, is the extraordinarily continued reduction in the number of P. falciparum infections which, contrary to P. vivax infections, would appear to have become stationary at the 9,000 cases level per year; the latter has reached during 1990 the highly reduced number of 18 cases, the lowest number reported in the Malaria history of the country. This phenomenon made the reduction reach an amazing 84% in the number of cases of falciparum comparatively reported between 1980-1986 that will increase even more with a 97% during the Project period 1987-1990. With this situation a possible eradication of this type of infections is expected in a near future.

This significant improvement in the epidemiology of the disease in El Salvador has placed the country in a position it never before in relation with the other countries of Central America and Panama. This is how during 1980 El Salvador contributed with 40% of the total number of cases reported in the area against a scarce 6% during 1989 (Graphic N° 2), which we estimate could have been even lower during 1990, but that can not be calculated to date due to the lack of data from the other countries. All this improvement has been shown by El Salvador during the last three years despite a general increment of the disease in the Region.

2.2 Projects for the Reduction of Vector Sources

During the Project period technical assistance was provided to the vector source reduction national plan for Malaria control through the design and execution of engineering works in the coastal area, where the disease's incidence reaches its highest level. The designs were completed and the construction of the final works of the first of four projects was begun, which covers the Ticuiziapa Estuary in the Department of La Libertad, the

objective of which is to manage the water levels of the estuary to avoid the flooding of the neighboring land and, consequently, the formation of vector breeding sources. The works consist of six channels with lengths varying between 60 and 400 meters; a 30-meter width dam in the San Antonio River, and a discharge to the sea through a 24-inch diameter by 230-meter long pipe. The works were completed in August 1989.

The technical and economic feasibility studies and the final designs of the other two Estuaries (San Diego and Metalío) were also completed. During this last Project year (1991) the final works in the San Diego Estuary were initiated, these consist of three concrete-lined drainage channels, 205, 720, and 1,005-meter length, respectively, three contention dikes of 1,578, 1,128, and 1,246-meter length, a 660-meter long pipe for water discharge into the sea and, a 15-meter width water dam; the completion of these works is planned for April 1992 and, once they are completed, continue the works at the Metalío Estuary which could not be initiated due to lack of funds, hoping, however, to implement them in the coming years. These projects received financial support through PL-480 Title I, as they will contribute to less dependency on the use of insecticides in the hyperendemic area by the control programm in the future, in addition to other benefits as the employment generation during their construction and recovery of farming land.

The total cost of the Ticuiziapa Project was ₡1,027,000 (US\$250,400), while the construction cost of the San Diego Project, with greater outreach, is ₡6,500,000 (US\$812,500) in addition to the ₡550,000 (US\$68,750) for the cost of design studies.

2.3 Surveillance System

Before the Project, the Malaria Program had a manual surveillance information system based mainly on the blood samples collected through the voluntary collaborators network at national level (2,600), which was available at relatively short time but offering little possibilities of use in decision-making as it did not permit focusing on individual problem areas. Its coverage reached up to Department level but for the required analysis it was essential to reach the hamlet, as it is the latter the program's epidemiological unit at present.

To solve the impasse and be able to improve the surveillance at national level, a computerized information system was created under the Project with cooperation from

the Regional Malaria Project AID/PAHO, which at present is providing, on a weekly basis, the data from the country up to the week before this Report's date. The information includes the following:

1. The results of all blood samples examined, the positives by species and the number of negatives by information source (voluntary collaborators, general medical services, and active search by program personnel).
2. Similar results to those above in decreasing order by Health Region, Department of the country, municipality, and, finally, by hamlet, weekly, during the last four weeks, and yearly cumulative totals.
3. Additionally, it compares the totals accumulated for the current year with the similar ones of the previous year, and can also provide many other combinations of data and indices, specially those related with the epidemiological stratification of the country.

This system, which is the most recent product developed under the Project, consists of a Local Network Area integrated by a Lan Server Advisor and two work stations using the NOVELL NETWARE Operative System, applied through the FOXPRO data base operator, network version including a data base and two service manuals, one technical and an operative one for its maintenance (available at the Malaria Department). This system is crucial for the development of the control strategy utilized at present by the program, which is based on a purely epidemiological approach where decisions determining control measures are made based on the weekly epidemiological analysis in the different areas. Furthermore, this system provides the control program with an excellent tool to improve its efficiency as well as its effectiveness that are two determining elements to continue reducing even more the incidence of the disease in the country.

2.4 Training

For the first time in its history, the Malaria Control Program could carry out training and motivation courses specifically for the Voluntary Collaborators. This training emphasized the taking of blood samples for the diagnosis and specific treatment of cases. A manual for the Voluntary Collaborators was prepared (available at the Malaria Department), which contents describe in detail the aspects regarding both procedures. During 1987 and 1988,

900 and 1,394 Voluntary Collaborators were respectively trained, a total of 2,294 collaborators trained, equivalent to 90% of the active collaborators network for the program at that time. This activity was considered a significant success as besides being an excellent example of primary health attention through community participation it also significantly contributes to the institutionalization of the technical capabilities in the Malaria Program and, consequently, of the Ministry of Health.

Another training area was for the improvement of capacity and quality of the microscopical diagnosis of the disease by the program's microscopist personnel and the laboratory technicians in the different health services, even including a group of ISSS (***) ones. The Program microscopists (35) were additionally provided with new microscopes acquired with Project funds. This type of training, through improvement of skills and quality of the diagnosis, has contributed to shorten the time between taking the blood sample and the diagnosis and, finally, of the specific treatment for the case, having obtained at present an average period of eight days at national level which is considered quite significant.

The safe handling in the use of the different insecticides was also emphasized during the Project period in order to prevent the contamination of the program personnel in charge of spraying as well as of the population in general. Because of its relevance, this aspect has also been included within the contents of the other courses offered on epidemiology and Malaria control.

It is important to mention that the different training courses offered were not exclusively for the personnel of the Malaria Program, but were also for personnel of the General Medical Services and, once, even for the ISSS laboratory technicians. This was planned in order to prepare health personnel in the different aspects of Malaria control to facilitate the integration of the Program to the general health services.

2.5 Control Measures

Completed three intradomiciliary spraying cycles with residual action in hyperendemic areas where susceptibility to the product existed, using Propoxur first and then Bendiocarb. This activity covered approximately 35,000 houses at the initiation of the Project and 30,000 in the

*** I.S.S.S. Instituto Salvadoreño del Seguro Social.

last two years. As a result of that planning, a total of 336,984 sprayings were applied during the period 1987-1990, having completed three cycles per year and obtaining an average coverage of 90% of what was planned for each year. The perseverance observed in the application of this measure during the period is significant in comparison with the years before the Project, when there were too many interruptions that were the cause of a sensible decrease in its impact.

Because of economic reasons it was also necessary during this period to change the Propoxur used originally by BENDIOCARB, another very similar carbamate. This change needed previous field studies which lasted two years and then, a study of the environmental assessment because of the use of the product. The study was carried out with the assistance of the Vector and Biology Control Project (AID/Washington). All this was before it was finally accepted and approved for its use by the Project.

Ultralow volume (ULV) spraying operations using a pyrethroid (permethrin) were carried out in a selective form during the life of the Project in periods when transmission was high and as a direct consequence of the detection of high densities of the vector Anopheles albimanus in hyperendemic areas especially during the rainy season.

Likewise, larvicide (ABATE) applications were effected during the dry season every year in an average of 200 breeding sources previously identified within the same hyperendemic areas. These applications were made in response to high larval densities in each of the sites under constant monitoring.

2.6 Infrastructure

The hematology and entomology laboratories were remodeled during 1989 and an area of the Malaria Department was provided for an auditorium with a 50-person capacity and film projection facilities, sound, etc. This was done to develop all the necessary training for the correct execution of the control program and to improve the quality of the diagnosis through the establishment of a quality control system for the adequate diagnosis. Besides filling space requirements for training within the program, this auditorium is also being used by other MOH dependencies, therefore, it is used at present 90% of the time.

3. Problems and Restrictions

The relevant restrictions perhaps worth mentioning are those related with the vital supplies for the program's development. Among them are the antimalarial drugs, which since 1988 are being procured with GOES funds, experimenting the delays corresponding to the Procurement System. However, despite the fact that the system has improved lately, there are always legal problems regarding documentation or other types that delay the acquisition of drugs, interrupting the development of the program and, especially, the maintenance of the voluntary collaborators network who, in addition to being the largest users of the drug, are considered the backbone of the control program.

Another similar restriction was being experimented in the procurement of insecticides, especially due to the bad quality of the product or for delayed shipments. However, when the insecticide was changed (propoxur for bendiocarb) this improved so much that during the last two years of the Project the Program, for the first time since the beginning of operations in March of each year, had all the insecticide programmed for the year. This improved coverage during those years.

Finally, an additional restriction should be mentioned: a very restricted fuel quota for the Program. Besides being very scarce, most of the time is delayed which causes great difficulties to a program such as the Malaria one whose main activity is in the field and, under the new strategy, has to have all its control measures carried out with maximum timeliness, as otherwise their impact is significantly reduced; this, at the same time, increases cost that is evidenced in the cost-benefit relation.

This is also true of all supplies related with the development of the different control activities used by the Project whose timely application is an essential part to obtain a significant impact on the incidence of the disease. This is also why so much emphasis has been given to the improvement of program planning which is now more accurate, especially because it is from down to upward, that is from the field to the central level, allowing numbers closer to real needs but, at the same time, demanding that supply acquisitions and deliveries meet the dates previously planned to avoid interruptions.

4. Recommendations and Suggestions

The improvements of the Malaria Control Program within its present structural organization are unquestionable, having implemented a control strategy with a purely epidemiological approach whose response is based on priorities established

through the epidemiological stratification of the problem. However, the Program now has to face a very significant subject as is its integration within the national system of Health Services Delivery as established by the decentralization policies of the Ministry of Public Health and Social Assistance (MOH). Maybe the most important challenge in the Malaria Control Program integration process will be, without doubt, to find the perfect balance that when gradually integrating the different activities of the Program, the products obtained to date are maintained through the acceptance, maintenance, and strengthening at regional level of the strategy used now on which present results are based.

Therefore, it will be necessary to look for the most adequate methodology that will permit to comply with the decentralization process adopted by MOH, that will not impair the results obtained up to now in Malaria control, but that will surpass them. Toward this end it is necessary to ensure that the country will continue to implement the same control strategy approached since 1980; this is considered essential for the total consolidation of the products obtained.

TABLE No. 1

MALARIA COMPONENT: TRAINING

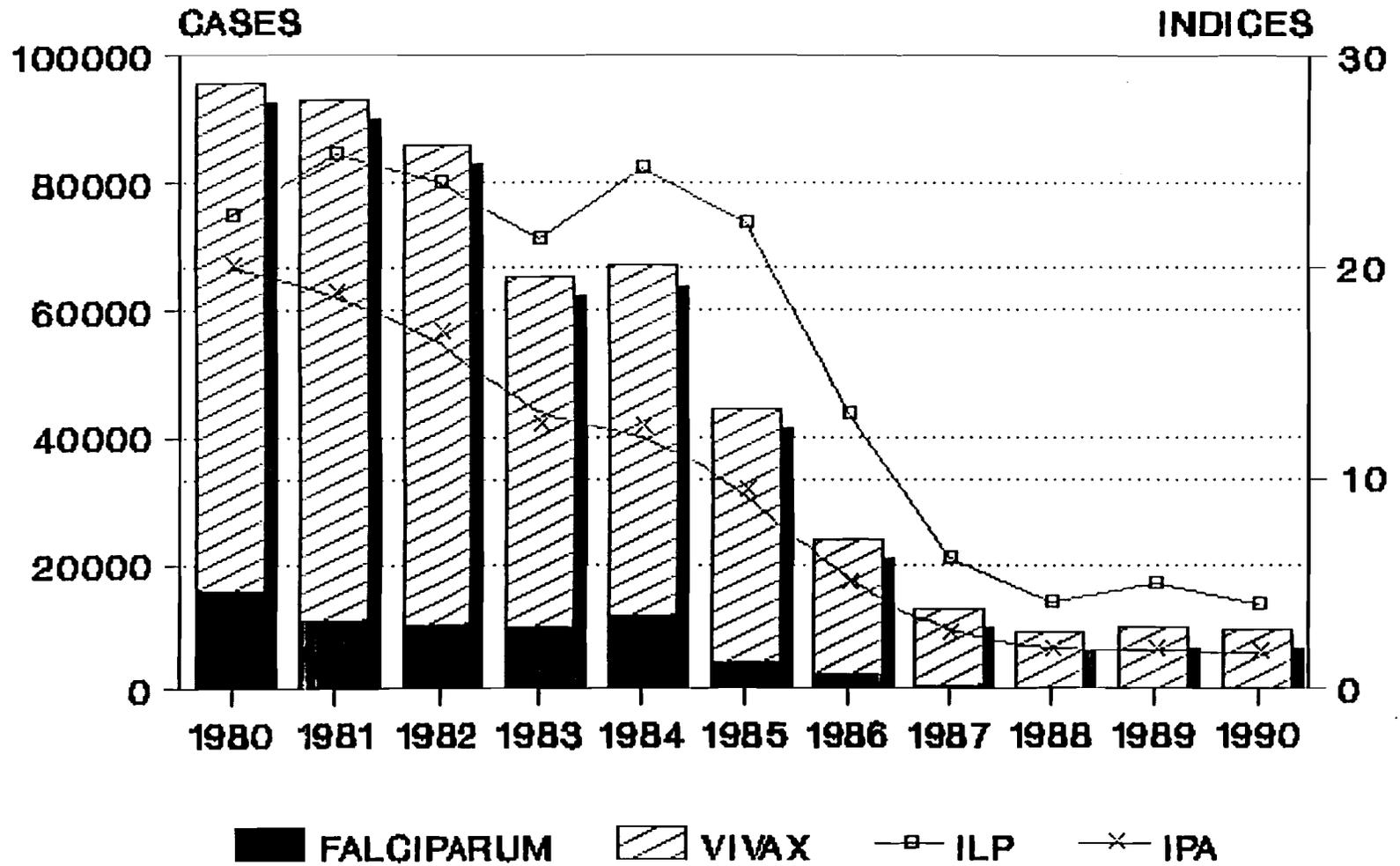
1987 - 1991

TRAINING AREA	TRAINED PERSONNEL	1987 N° OF PERSONS TRAINED	1988 N° OF PERSONS TRAINED	1989 N° OF PERSONS TRAINED	1990 N° OF PERSONS TRAINED	1991 N° OF PERSONS TRAINED	TOTAL PERSONS TRAINED
Voluntary Collaboration	Malaria Voluntary Collaborators	900	1394	--	--	--	2294
Improvement of Microscopical Diagnosis	Malaria Program Microscopic Technicians	--	30	34	25	0	90
Improvement of Microscopical Diagnosis	Medical Services Laboratory, Technicians including the ISSS	--	20	37	40	22	119
Malaria Epidemiology	Health Regions' Physicians, Nurses and Inspectors.	--	--	145	--	--	145
Safe Handling of Insecticides	Sprayers-Malaria Program	--	--	92	92	92	276
Malaria Control	Epidemiological Assistants, Entomologists, and Drug Providers of the Malaria Program.	--	--	--	37	34	71
T O T A L		900	1444	308	195	148	2995

Component
Accepted

^A ISSS = Instituto Salvadoreño del Seguro Social.

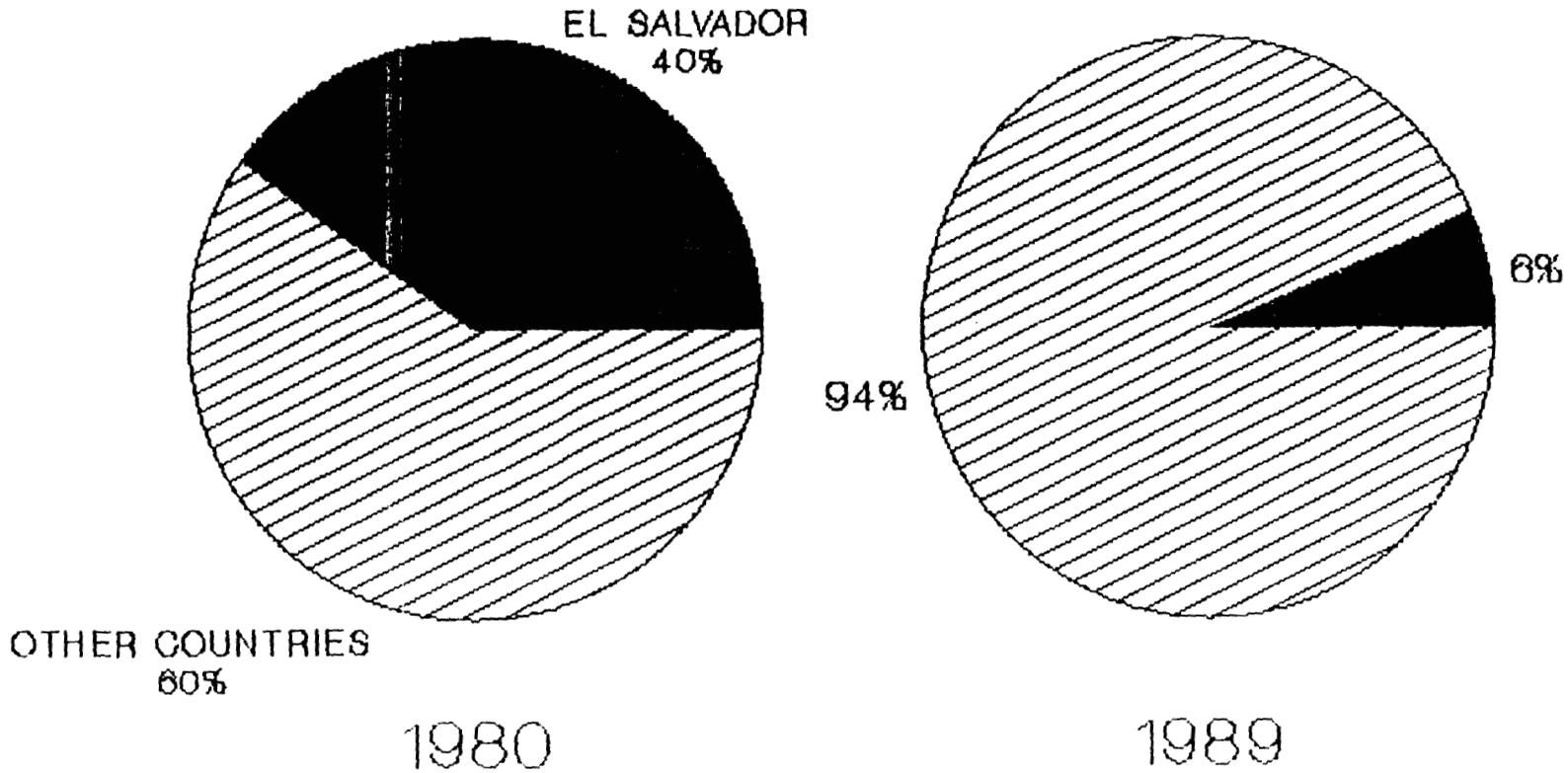
MALARIAL EVOLUTION - EL SALVADOR 1980 - 1990



SOURCE: Malaria Department

GRAPHIC No. 2

MALARIA IN CENTRAL AMERICA



**COMPONENT "C": STRENGTHENING OF PLANNING AND MANAGEMENT
ADMINISTRATION POLICIES AND PROGRAMS**

3.7 MANAGEMENT INFORMATION SYSTEMS

1. Background

The initial provision of computer equipment and development of the information systems for MOH began under the VISISA Project and basically consisted in the installation of a minicomputer for the Data Processing Unit, several PC's that were installed in different Ministry dependencies, and the development of the following Information Systems: A system for control of transport cost and an inventory control system at the Central Drug Warehouse. The training of personnel in the computer area was also carried out.

With the APSISA Project the provision of computer equipment continued, several computer information systems were developed covering the different phases of the supply process, i.e., selection and standardization, programming, acquisition, reception, warehousing, and distribution and consumption; a system for inventory control of transport spare parts; and the redesign and upgrading of the epidemiological system for Malaria control. Different training courses were carried out for the Data Processing Unit personnel as well as for the personnel who will use the systems. Special emphasis was given to the transference of technology to MOH to ensure the adequate institutionalization of the systems.

The above-mentioned activities are detailed below.

2. Development

2.1 Development of Information Systems

To implement the development of the systems we used a methodology based on the life cycle of the systems, which consists of the phases for requirements definition, logical design, physical design, programming, testing, and operation.

The definition of requirements and the logical design were carried out with the participation of the personnel of the MOH user Unit and the MSCI long or short-term technical advisor in the corresponding area.

The programming and testing of the systems was carried out in a personal computer environment, using the Foxbase and

Foxpro database management systems; and were carried out by MSCI technical personnel (programmers).

The implementation consisted in data conversion activities, training of operational personnel in data capture and use of the system, creation of technical and operational documents, and training of the Data Processing Unit personnel to provide support for the system.

Several other operational follow-up activities were carried out to obtain an adequate administration and utilization of the systems as well as corrective and improvement activities to upgrade the programs.

2.2 Supply Area

2.2.1 Selection

Programs were developed for the creation, modification, and reporting of the Basic Lists of products to be acquired by MOH.

These products are classified according to a specified grouping criterion and include drugs, medical supplies, laboratory products, odontology, spare parts, etc.

The programs for the management of the Basic List were installed at the Drug and Medical Supplies Technical Unit (UTMIM), at the Procurement Office and the Central Warehouse. Training in the operation of the system was provided to the user personnel to enable them to carry out the required upkeep of the Basic Lists.

2.2.2 Warehousing

The Drug Inventory Control System installed at the Central Warehouse was redesigned to correct some operational characteristics and improve the reports produced. Assistance was provided for the operation of the system and considerable follow-up to the system's administration until its complete institutionalization was obtained. Subsequently, the system was expanded to include the control of medical supplies in addition to drugs.

This system was, furthermore, installed in each of the MOH Health Regions for the control of the Regional Warehouses. Likewise, the system was installed at the Regional Hospital of Santa Ana as a model to be duplicated later.

This system was documented in its technical and operational aspects (See document APSISA "A" Nos. 98, 99).

2.2.3 Consumption

In order to determine drug and medical supplies consumption in each of the MOH health facilities (Health Units, Posts, Centers, and Hospitals), a system was developed for the processing of monthly consumption of drugs and medical supplies, with capacity to produce information on real consumption as well as to adjust it to consider the effects of scarcity during the reported month. Additionally, the system is able to consolidate the information at Regional and National levels.

The system was installed in each Health Region and, subsequently, incorporated the processed data to the Supply Management Information System described below.

2.2.4 Supply Management Information System

In order to manage the supply system through a quantitative tool and facilitate decision-making in what relates to procurement programming and stock distribution, a Supply Management Information System (SMIS) was developed. The SMIS consolidates stock information from the Warehouses (Central and Regional); of consumption by Health Units, and shipments made by the Central Warehouse to the Regions, Hospitals and Health Centers, as well as shipments made by the Regional Warehouses to Health Units and Posts; and of the orders from the Procurement Office still pending receipt (in transit).

From all this data, SMIS also provides information on actual stocks in the Warehouses and on theoretical stocks in Health facilities, provides consumption statistics, and permits to estimate quantities to be procured, according to established rules that guarantee a specified coverage.

Initially, a SMIS version was developed and installed at the MOH central minicomputer using technology based on relational data bases and with multiuser characteristics, that served as a prototype version. Subsequently, a SMIS version was developed to be installed in Health Regions, with capacity to manage local information and provide reports/consultations regarding the Region; and a SMIS version for Drugs and Medical Supplies (UTMIM), with capacity to consolidate the information from the whole country and, therefore, control the national system.

Ampler details can be found in the user and technical documents (See Documents APSISA "A" 43, 43A, 43B, 90, 91, 92, 93, 94).

2.2.5 Acquisitions

A subsystem was developed for a List of Registered Suppliers which is part of the drug and other supplies acquisition system, and consists in the identification of the different providers, their basic information, and the different products they can supply (including prices); as well as registering the distribution type and coverage and classifying providers through different criteria. Furthermore, produces reports and consultations in accordance with different grouping characteristics.

A procurement subsystem was later developed in order to improve the efficiency of the process and reduce the acquisition period in national and international markets to increment availability of supplies. This subsystem permits the computerized operation of procurement requests, public or private tenders, analysis of bids from the suppliers and their subsequent award; and, finally, the issuance of contracts for the items in the basic lists for drugs, medical supplies, odontology, clinical laboratory, and quality control laboratory.

This subsystem was installed in a Local Area Network (LAN) that permits the simultaneous processing by different users, which facilitates the use and increases the system's efficiency. Several training courses were given for the personnel using the system and for the network management. At present, the system is operating and supporting all phases of the acquisition process. (See APSISA "A" documents Nos.50, 95).

2.3 Transport Area

A system was developed for the control of stocks and motor vehicle spare part movement at the MOH Transport Department. This system permits the control of items under procurement process, stock consultation, and expedites reception and dispatch of items in the vehicle repair workshop. In general, it reduces manual labor in document processing, a situation that has progressively increased with the substantial acquisition of new vehicles and a very large stock of vehicle spare parts. The system is a tool for the efficient administration of the spare parts warehouse.

The system was installed and training in its operation was carried out. Initiated operations assigning codes to items in

stock and later the operation will be continued with the physical inventory of the warehouse. As this activity has not as yet been implemented, the system has not completely supported dispatches. Operation and technical documentation for the system was also produced. (See APSISA "A" documents Nos. 48, 51).

2.4 Malaria Control Area

To support Malaria control, an information system previously developed with the cooperation of the Pan-American Health Organization (PAHO), was redesigned and improved.

This system facilitates decision-making through the processing of hematic samples collected at national level and registers the information from hamlet level to the municipal and department levels. It also automatically updates the epidemiological card of each location. In general, the system offers different report possibilities, chronologically as well as by sites, and estimates different groups of statistical indicators.

Support was given to the operation of the system, improved operation efficiency and new reports were developed. The documentation of the system was prepared (see APSISA document No. 96) and, besides, the system was modified for its operation in a multiple user environment installing a Local Area Network.

2.5 Equipment

The development of the above-mentioned systems was accompanied by a process for the selection and installation of computer equipment adequate to the requirements of every system. Therefore, computers with several years of use were substituted by computer equipment with greater capacity and speed at the Central Drug Warehouse and in each of the five Health Regions. This equipment was accompanied by the operation and application programmes (spreadsheet, word processing, etc.), as well as by equipment for electrical energy protection, continuous energy supply, and office furniture for computer equipment. Similarly, additional computer equipment was selected and installed at the Drug and Medical Supplies Technical Unit (UTMIM), the Transport Department, the Procurement Office, and the Malaria Department.

For more information on equipment configuration and the justification for its procurement, see APSISA "A" documents listed. Computer equipment was also selected to install the supply systems in Hospitals and Health Centers in the Western Region, and to implement a multiuser system at the Central Warehouse with a Local Area Network. This equipment has not

yet been installed as the physical space and electrical installations are being adapted.

2.6 Training

In addition to training courses for users of the systems developed, training in Relational Database was given to the systems personnel in the Data Processing Unit, to introduce concepts and methodologies on the subject as well as develop capabilities in the use of Data Base Management, in order to increment efficiency in the information systems development process at MOH. (See APSISA "A" document No. 33).

Training in the use and management of Local Area Networks was given as MOH did not have experience in this technology. This training also included, in addition to the final users, technical personnel from the Data Processing Unit to enable them to assist in the installation of networks and continue the future training of MOH users.

Also carried out training sessions for technical personnel from the Data Processing Unit in advanced subjects related with the operating system of personal computers and on the use of utilities and application products to improve support for the installed systems and promote the adequate and efficient use of computer equipment.

3. Problems and Restrictions

One of the reasons that has hindered the operation of some systems is the length of the process for the acquisition of computer and related equipment. The complete cycle, which starts with the Ministry of Health's authorization of the request and ends with the installation of the equipment, has had an average delay of 12 or more months, period which, considering the duration of the Project, causes more delays in the implementation and reduces the operational support time that technical assistance can give MOH. As a matter of fact, the last order for equipment will remain pending of installation as up to date is not available due, on the one hand, to the delay in the procurement process and, on the other, by the MOH delay in having ready the physical and electrical infrastructure.

Another area that has not hampered the development of the systems, but has not facilitated or promoted their support, is the MOH organizational structure in relation with the administration of computers and information systems. The Planning Direction should actively participate in the planning, coordination, and control of the development and utilization of the systems at MOH, by itself and through an active management

of the Data Processing Unit. At the same time, the Data Processing Unit does not have the physical and human resources necessary to become a real factor for change and leadership in this area.

It is also necessary to mention that responsibility for the efficient utilization of the systems developed falls on the MOH Units which, through the participation of their executives, are responsible for decision-making, priority and resources assignment (especially of personnel and responsibilities, problem solution, etc.). Even though it is true that difficulties were successfully solved in the few cases where they arose, it is also true that MOH routinely experiments problems due to lack of personnel, excessive personnel turnover, lack of motivation, and lack of follow-up on the tasks assigned and their completion.

4. Recommendations

It is possible to suggest the following recommendations in the information systems area, feasible to be carried out at short term and within the MOH institutional framework:

- a) A clear definition of responsibilities, actions, and participants in Systems Planning at MOH, that consists in the establishment of priorities, action areas, work programmes, resources, evaluation of results, etc. regarding the analysis, design, development, operation, and maintenance of Information Systems, computer equipment, other related technologies, coordination of cooperating agencies, etc.

This Planning function and, therefore, those for administration and control of the information systems will promote a better utilization of institutional and technical cooperation resources, and of the products developed.

- b) The MOH Data Processing Unit should be provided with the necessary resources to promote and effectively assist the development and use of information systems. For this, it is suggested to redefine the present structure of the Unit and adapt it to these objectives, defining clear lines of action and jurisdiction, assigning responsibilities and resolving conflicts (especially, related with the multiple association to the different MOH levels and areas), and the rational assignment of the physical, economic, and human resources necessary to reach, at short and at long term, the goals set.

- c) It is advisable to develop and improve the participation of the different MOH management levels in the administration, development, and utilization of the computer and information systems, considering them not as an end by themselves but as tools of the administration that should contribute to the specific objectives of each Unit and the general objectives of MOH. Although this change of attitude and compromise is a long-term process, it should be stated here that it has already begun and that it should be continued, promoted, and facilitated at all MOH levels. Toward this end, different activities are suggested, among them we can mention formal training, in-service training, participation in the definition of needs, training in information analysis, decision-making based on objective and quantitative criteria as much as possible and in a progressive form, etc.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

A summary of the most important conclusions is given below.

1. One of the basic goals of the APSISA "A" Project oriented toward the restrengthening of the MOH logistical support in the drug and medical supplies selection, acquisition, warehousing, distribution, and monitoring, was successfully achieved.

The diagnosis of the MOH Supply System carried out by MSCI technical assistance in collaboration with the national counterparts permitted the identification of structural and operational problems. On July 19, 1989, health authorities approved the development and implementation of the MOH Supply System proposal, which was integrated by the Direction, Acquisition, Warehousing, Distribution, and Information Subsystems. The impact of the System on Health Care Services has been evident. The following accomplishments confirm this:

- a) MOH now has a General Supply Catalogue (although incomplete), integrated by the Drug, Medical-Surgical Supplies, Odontology, and Laboratory (Clinical and Quality Control) Basic Lists, and by Non-Medical Supplies Catalogues (Transportation, Cleaning and Materials, Office and Data Processing). All products are duly codified, which facilitates their adequate acquisition and management.
- b) The modernization of the Procurement Subsystem has reduced the MOH procurement process from 27 months to an acceptable minimum of six to eight months.
- c) The organization of the Drug Warehouse at "El Matazano" is a model one. The introduction of Norms, Procedures, and Controls has produced greater efficiency in medical supplies reception and warehousing. The imported products reception and control process has been reduced from eight weeks to three days. The product inventory control is reliable and timely.
- d) Improvement in the drug quarterly assignment. A percentual assignment by facility is under study on the basis of reported consumption and shipments made. There is, as a consequence, greater availability of drugs at local level.

- e) Development of an effective drug transference process among facilities. This activity has permitted product transference for ₡5.0 million colones in 1990-1991, ensuring their consumption and avoiding traditional loss due to expiration.
- f) An adequate Supply Management Information System (SMIS) was elaborated, consolidating and relating at national level the information generated by the Local, Regional, and Central levels. The system is installed at UTMIM (Central level) and in the five Health Regions. Results: more reliable data is obtained on drug requirements, consumption, stocks and use.

The Supply System that has been developed is being managed by national personnel and the processes are an integral part of MOH operations.

2. Great progress has been obtained in the development of the techno-scientific component of the Drugs and Medical Supplies Technical Unit (UTMIM) and in the introduction of the MOH drug policy as regards health care. The following so indicate:
 - a) Health authorities ratified the existence of the Technical Therapeutic Committee as an advising entity to MOH, to recommend pharmacotherapeutic policies emphasizing on the selection, use, quality, and education of drugs.
 - b) There are five professionals in Health Sciences in UTMIM: Three Physicians and two Pharmacists with post-graduate training. There is also UTMIM's own computer microcenter.
 - c) There is a Drugs Basic List for drug selection, with 234 active principles and 317 presentations, which is compulsory for all MOH dependencies. There is a list of 30 essential drugs for primary level use, whose acquisition will be incremented in 50% starting 1992.
 - d) There is adequate information on drug consumption, which is permitting the carrying out of consumption studies through the Defined Daily Dosis (DDD) System.
 - e) The development of a pharmacovigilance pilot project is in operation (notification of suspicion of adverse reactions to drugs and of therapeutic failure). The project should be progressively

expanded to other health facilities, especially hospitals.

- f) With the collaboration of the Pan-American Health Organization (PAHO) and the APSISA "A" Project, UTMIM has initiated a Continuous Therapeutic Education Program oriented toward drug use rationalization.

UTMIM has progressively assumed the main functions for Drug Selection, Use, Quality, and Education (technical function), without relaxing its advisory functions to the operative component (drug programming, acquisition, warehousing, and distribution) managed by the Procurement Division. It is important to keep up the stability of the professional team to ensure the future development of the functions programmed.

3. There have been restrictions for the basic objective of the APSISA "A" Project to strengthen the MOH logistic support in drug supply selection, procurement, warehousing, distribution, and monitoring for the improvement of basic health care services. For example:

The MOH budgetary limitations, the lack of a well-defined administrative and technical structure and the absence of an institutional development policy for personnel recruitment, permanence, and promotion, are factors affecting the effective use of the available resources.

The budgetary funds have been constant in absolute numbers, but in relative terms the acquisitive capacity of the colón has been reduced due to an approximate 30% devaluation during the second half of 1989.

In 1990, the availability of funds for drug acquisition was of \$54,797,890 (GOES-SETEFE funds \$15,947,890 and APSISA/USAID funds \$38,500,000). According to historical consumption data annual drug requirements add up to \$97,016,530. That is, the available funds covered approximately 56.5% of such requirements.

When analyzing these data the conclusion can be reached that the drug shortage in health facilities is not easily solved by the improvement of the Supply System only. It will be necessary to introduce complementary actions to explore new resource sources that guarantee a coverage level with available drugs.

On the other hand, the MOH should also look for technical support to develop an efficient health administrative infrastructure and a salary administration system

according to specific requirements. Personnel selection and promotion has to be related with their job descriptions and the evaluative process based on work performance.

4. The support to the Transport System by the APSISA "A" Project has resulted in an efficient vehicle maintenance program. Equally effective have been the activities for the modernization of the vehicle fleet, its standardization, and the introduction of cost controls. Facts:

- a) The APSISA "A" Project provided MOH with a total of 228 Cherokees and Comanches, 32 Ford Trucks, 10 Ford Pick-up Trucks, Motorcycles and Bicycles.
- b) The Preventive Maintenance Program (PMP) reports an effectiveness of 75 to 80%.
- c) The transportation unit cost was reduced from ₡0.47/Km. in 1987 to ₡0.42/Km. in 1989. It is, however, expected that it will increase to ₡0.67/Km. in 1991 due to the increment in fuel prices. That is why it is needed to implement the Transport Rationalization Plan (use of fuel in particular), initiated in 1991.
- d) A total of 367 transportation technicians from the Central and Regional levels were trained.

However, there have been restrictions for its development; for example, the slowness in the clearance of obsolete vehicles and the delays in the organization of the Spare Part Warehouse. Transportation costs are progressively increasing due to the increase in number of units (a total of 935) and kilometers covered (from 6.0 million kilometers in 1988 to 10.0 million kilometers in 1990).

5. The impact of the Project on the Malaria Control Program has been successful due to an efficient technical assistance and the timeliness of supplies acquired with Project funds. This is confirmed by the following:

- a) Malaria incidence was reduced from 23,953 cases in 1986 (Annual Parasitic Incidence-API = 5.0) to 9,269 cases in 1990 (API = 1.7).
- b) In 1980, El Salvador's contribution to Malaria in Central America was 40%. In 1989, it was only 6%.

- c) A total of 2,995 persons were trained in Malaria diagnosis, epidemiology, and control; from them 2,994 were Voluntary Collaborators.
- d) Engineering projects have been initiated for the malaria vector control in some estuaries (Ticuiziapa, San Diego, and Metalío). These works have an epidemiologic, agricultural, and economic impact.
- e) The Malaria Information System was redesigned and improved to support vigilance and control actions. The system facilitates decision-making through the processing of hematic samples collected at national level and collects information from hamlet level to Municipality and Department levels.

The Malaria Program deserves Project and MOH authorities support to acquire the necessary material and personnel resources. The operative decentralization process should be carried out with technical criterion. The MOH should analyze future financial support requirements to keep up the Program achievements.

- 6. The technical assistance of the APSISA "A" Project has strengthened the development of Computer Systems, which have supported decision-making at Central and Regional levels for the development of health programs. Continued the provision of hardware initiated by VISISA. Several computerized Information Systems were developed: In the supply area (drug selection and standardization, programming, procurement, reception, warehousing, distribution, and consumption); an inventory system for transport spare parts, and redesigned and improved the Malaria Control Information System. The transference of this technology to the Technical Units and the Data Processing Unit was emphasized to guarantee the adequate institutionalization of the Systems. The suitability of this strategy is clearly indicated by the results as, despite the Data Processing Unit limitations, its technical support has expedited system installation and use. In the future, the Project and MOH should more clearly define responsibilities, tasks, and functions of the Unit in charge of System Planning. This is an urgent decision to better coordinate the technological support of different International Agencies avoiding duplication of activities.
- 7. The upgrading of the Potable Water and Sewage Systems in Health Units and Posts was only initiated in January 1991, but it improved the systems in 15 health facilities (APSISA/USAID = \$853,497.37). The adopted administrative

process--bidding and contracting of private firms through Medical Service Corporation International (MSCI)--expedited an effective execution of the works. To consolidate these results, the Maintenance Department and PLANSABAR initiated a preventive maintenance program for the water pumping equipment. There are 60 facilities more located in MOH land, that require the repairing of their potable water and sewage systems.

8. On the other hand, the progress of the technical cooperation in the biomedical and hospital equipment maintenance subcomponent was limited, basically due to the ambitious programming of the Project which called for the introduction of a Preventive and Corrective Maintenance System for biomedical equipment in the MOH Maintenance Department, which lacks the adequate physical infrastructure, human resources, and logistical support. This goal was also conditioned to a biomedical equipment and spare parts inventory prepared by the VISISA Project, which was incomplete and inadequate. As a consequence, the strategy had to be changed to assist, with Regional support, in the development of a technical inventory of biomedical and laboratory equipment in Health Units and Posts. The technical inventory was completed, computerized and delivered to the Central Maintenance Department for its updating. With this short-term technical assistance, a decentralized preventive maintenance program was designed for biomedical and laboratory equipment, to be developed in the future at the Eastern, Paracentral, and Western Regions.
9. The Project's support to the Health Laboratories Network was centered on the provision of equipment to modernize the laboratories in Health Units. Equipment, numbering 249, were acquired with a value of \$406,000 and distributed to laboratories in Health Units and Centers, with exception of the more complex equipment that were sent to Hospitals and the Central Laboratory Unit. Undoubtedly, the Health Units need equipment and materials to improve their functions. However, it is urgent that MOH define a new organizational and functional structure of the Health Laboratory System in accordance with health priority needs and resource availability.
10. The APSISA "A" Project collaborated with MOH providing the necessary resources for the preventive maintenance of X-Ray, hardware, and vaporizers for anesthesia equipment, through contracts with private enterprise. The MOH has to analyze the availability of funds to contract for the maintenance of all equipment in the year 1992 and define strategies for the reduction of costs and operational expenses through the elimination of obsolete equipment.

11. The strategy adopted by the APSISA "A" Project to ensure the effectiveness and continuity of the technical cooperation with MOH was oriented toward an effective coordination among the members of the MOH Technical Units and USAID and Technical Assistance representatives. This strategy was implemented through the promotion of individual and group participation in the Project administration and in the development and evaluation of the included Action Plans. The coordination of the Project by the Steering Committee, chaired by the Vice-Minister of Health and Social Assistance, as well as the weekly coordination meetings established for the Project management teams, MOH, and USAID, and the Chiefs of Party of the Technical Assistance Groups, facilitated the participative approach in the Project development. Another important element for the success of the APSISA "A" Project was the permanent location of the Technical Advisors in their counterparts' work areas to promote their collaboration in the programming, development, and evaluation of progress in goals and activities.

Retrospectively, it was observed that some of the strategic elements of technical cooperation were not adequately developed due to:

- a. At the initiation of the Project, the MOH Technical Units personnel did not have sufficient information regarding Project objectives, available resources, work methodology, and indicators to measure its development.
- b. As a consequence, the Technical Assistance also faced initial problems before adapting to the work methodology and designed strategy. The lack of coordination with the national counterparts produced action plans with routine or operational type of activities, without defining the responsibilities of the national counterpart in the carrying out of those activities. These problems were overcome in the second year of technical assistance.

4.2 Recommendations

Following are important recommendations for the maintenance and development of the APSISA "A" Project achievements in the different subcomponents.

1. Drug Acquisition and Distribution

- 1.1 Efforts should be made to periodically review and improve the Basic Lists for Drugs, Medical Supplies, Odontology, Clinical Laboratory, and Quality Control Laboratory. In the case of drugs, this activity

should be developed in coordination with the Technical Therapeutic Committee and in the case of the rest Basic Lists with the ad hoc Committees. If this process is not carried out, the information becomes obsolete and is not an effective instrument for the planning of resource procurement, management, and use.

- 1.2 Support the MOH Administrative Direction for the completion of the Non-Medical Supplies Basic Lists managed by the Non-Medical Supplies Technical Unit (UTSNOM). The MOH will then have a comprehensive Supplies Catalogue that will facilitate the procurement process to the Procurement Office.
- 1.3 The Supply Management Information System (SMIS) will be used at Central and Regional levels to improve drug management and use. The consumption registry of odontologic and laboratory products has to be incorporated at Central level.
- 1.4 In 1992, the drug and medical supplies assignment process has to evolve into a percentual assignment system based on reported consumption and concerted with the quantity to be despatched. When the facilities are assigned operative budgets, an order system based on the assigned budget should be considered.
- 1.5 The software installed at UTMIM will be used for the automatic forecast of requirements and to define the quantity of drugs to be procured, using data on morbidity, treatment norms, drug effectiveness, health policies, financial availability, costs, and other factors.
- 1.6 Establishment of a strategy for the correction of deficiencies found in the survey on warehouse infrastructure carried out in 1991 by the Technical Health Assistants in Health Units and Posts. Elaboration of priority proposals to be financed with Project funds.
- 1.7 The data from the Supply Management Information System has to be analyzed by UTMIM at Central as well as at Regional level to determine consumption in relation to prevalent pathologies, supply, drug coverage level, and drugs to be expired, in order to propose corrective measures.

2. Procurement Subsystem

- 2.1 Consolidation of the Procurement Subsystem through the computerized operation and production of tenders, bid analysis tables, award resolutions, and contracts.
- 2.2 Promote the permanent utilization and updating of the library of Registered Suppliers and incorporate the Basic Lists foreseen in the Supply Catalogue.
- 2.3 Coordination of efforts with the Financial-Accounting Division to improve the procedure for the establishment of credit reserves and reduce the time required for procurement formalities.
- 2.4 Establishment of a computerized system for the control of the materials and supplies budget to avoid that part of the budget be left unused.
- 2.5 Elaboration of design and introduction of the Cost Recovery System and the identification of new financing sources for the acquisition of drugs and medical supplies.

3. Drug Monitoring

- 3.1 With the collaboration of the Technical Health Assistans, promote the use of the information provided by the Supply Management Information System, particularly at Regional level. This will be a valuable cooperation to support the decentralization process for the improvement of drug administration at Regional and Local levels.
- 3.2 Incorporation of two to three members of UTMIM to the Project's Technical Health Assistants team to obtain the feeding of information and information feedback on drug administration and use from Regional to Central level and viceversa.

4. Drug Policies

- 4.1 Obtain greater drug availability for the treatment of predominant pathologies among the population, with the least possible cost.
- 4.2 Budget incrementation for drug acquisition, either through an annual budgetary increment justified by urgent needs to solve priority health problems, or

through the generation of own income through cost recovery mechanisms.

- 4.3 Continue studies on drug consumption using the low cost methodology known as Defined Daily Dose (DDD).
- 4.4 Progressively expand the pharmacovigilance pilot project to other health facilities, starting with the hospitals in the country (notification of adverse reactions to drugs and of suspicion of therapeutic failure).
- 4.5 Continue developing the Continued Therapeutic Education Program to promote drug use rationalization within the health sciences personnel. This activity can be carried out by the Health Promoters.
- 4.6 Obtain implementation of the administration of the "Special Activities Fund for the Quality Control Laboratory," approved by the Ministry of Finance. It will be the first service cost recovery mechanism introduced by MOH.

5. Warehousing Subsystem

- 5.1 The Procurement Division has to continue supporting the definitive consolidation of the Central Warehouse. Special supervision should be given to the functioning of the computerized Inventory Control System which has reduced in 95% drug losses due to expiration. The installation of the Multiuser System in the Warehouse has to be ensured, providing it with the Local Area Network already foreseen.
- 5.2 Support the modernization of the MOH Warehouses in the Paracentral, Central, and Western Regions. Implementation of the Norms and Procedures Manual for Drug Reception and Warehousing. Introduce the manual and computerized control of medical supplies inventories for adequate decision-making regarding stocks with close expiration date, without movement, exhausted, etc.

6. Transport System

- 6.1 Define transportation needs and vehicle replacement for the period 1992-1995 and identify funds to cover these requirements.

- 6.2 Implement the Transport Improvement Plan to strengthen the rational use of fuel. The institutionalization of procedures for fuel reconciliation and control will be beneficial for MOH. A gas station has to be built at the Regional Workshop in San Miguel and another one in the vehicle distribution garage in San Salvador.
- 6.3 Execute the construction projects for the regional complex in San Vicente and the complex in Santa Ana, and support their equipping.
- 6.4 Improve plant distribution and storage techniques in the Spare Parts Warehouses.
- 6.5 Institutionalize the procedures of the Manual for the Spare Part Inventory Administration in the Regions. Establish computer training courses for the institutionalization of these procedures in the Regions.
- 6.6 Elaboration of a Transport Administration Manual to integrate all processes, services, and procedures related with Transport, Workshops, Spare Parts and Radios Warehouses into a comprehensive Transport System.
- 6.7 Introduction of the computerized Inventory System for Spare Parts (PIM). This system, combined with a better spare part procurement system and the warehouse administration system, are the key components to improve MOH transport efficiency.
- 6.8 Introduction of a training and continuous education plan through the establishment of an internal Training School within the Department. In the future, if this is developed, it could generate income for MOH for its own support.
- 6.9 Expand the radio network. Support training of personnel and spare part procurement to keep the network in operation. Each Regional Health Direction should have a movable radio.

7. Biomedical and Laboratory Equipment Maintenance

- 7.1 The APSISA Project will have to concentrate in the development of a Preventive maintenance Program (PMP) for biomedical and laboratory equipment at Regional level. This activity can be initiated in 1992 in the Eastern Region; subsequently, in the Paracentral

and Western Regions and, at a future time, in Hospitals and Health Centers.

- 7.2 Support the construction of the Maintenance Workshops in the Paracentral and Western Regions.
- 7.3 Establish a permanent training program for the biomedical and clinical laboratory equipment maintenance personnel.

8. Upgrading of Clinical Laboratories in Health Units

- 8.1 Provide basic laboratory equipment to replace obsolete equipment and/or introduce new lab tests.
- 8.2 Support laboratory personnel training activities, including subjects on the review and updating of Laboratory techniques and the use and care of laboratory equipment.
- 8.3 Organization of Supply administration in accordance with the system developed at MOH.

9. Upgrading of Potable Water and Sewage Systems at Health Units and Posts

- 9.1 Complete the upgrading of the Potable Water and Sewage Systems in at least 30 health facilities.
- 9.2 In collaboration with the Central Maintenance Department and PLANSABAR, plan and execute a preventive maintenance and simple repairs program for the new potable water systems installed at health facilities.

10. Malaria Control

- 10.1 Support malaria control activities with the timely provision of insecticides, drugs, fuel, and other laboratory supplies and entomological equipment.
- 10.2 Support the construction of engineering works at the San Diego and Metalio Estuaries for vector control. These have an epidemiological impact in malaria transmission and, furthermore, an economic and social impact.
- 10.3 Initiate cost-effectiveness studies on vector control measures, diagnosis, and malaria treatment as a step foreseen toward operative decentralization

and the integration of control measures within the General Health Care Services.

11. Management Information Systems

- 11.1 Clear definition of the function of the Committee responsible for the Information Systems Planning, which depends from the Planning Division. This Committee has to have direct influence in the analysis, design, development, operation, and maintenance of the Information Systems, hardware equipment acquisition, other computer technologies, and the coordination of cooperating Agencies participating in the development of Information Systems.
- 11.2 Provide the Data Processing Unit with the necessary physical and human resources to support the development of Computer Systems and their transformation into a change and leadership factor in this area. Redefine their structure and adapt it to the objectives and lines of action established for the development and maintenance of the Computer Systems at Central and Regional levels.
- 11.3 Develop and improve the participation of the different MOH management levels in the administration, development and utilization of the Computer and Information Systems. This can be obtained through formal training, on-the-job training, participation in the definition of requirements, training in information analysis, decision-making, etc.

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ANNEX 1
 HEALTH SYSTEMS SUPPORT PROJECT - APSISA "A"
 PROJECT GOALS AND ACHIEVEMENTS AS PER INDICATORS ESTABLISHED IN ANNEX A OF DOCUMENT AID/IAC/P-338
 RECOMMENDATIONS TO THE MINISTRY OF PUBLIC HEALTH AND SOCIAL ASSISTANCE TO KEEP AND INCREMENT ACHIEVEMENTS

SUMMARY	VERIFIABLE INDICATORS	RECOMMENDATIONS TO MOH
<p><u>Products Expected</u></p> <p>1. Improvement of Drug Acquisition, Distribution, and Management Systems.</p>	<p><u>Achievements</u></p> <p>1a. Supply Management Information System (SMIS) installed and operating at Central level (UTMIM, Procurement Office, and Central Warehouse) and in the five Regional Warehouses.</p> <p>1b. The availability of 60 basic drugs for primary attention use was incremented from 40% in 1989 to 65% in 1991 (Regional level average).</p>	<p>- Supervise and support SMIS development at Regional Level. Promote use of information for decision-making.</p> <p>- Continue training of medical supplies personnel in the operation and maintenance of Computer Systems.</p> <p>- Consolidate procurement subsystem, incorporating non-medical supplies and vehicle and biomedical equipment spare parts.</p> <p>- Identification of new financing sources for drug and medical supplies procurement.</p>
<p>2. Improvement of Biomedical Equipment Maintenance System.</p>	<p>2a. Completed biomedical and laboratory equipment inventory at Health Units and Posts in the country.</p> <p>2b. A biomedical equipment standardization policy was adopted by the Maintenance Department.</p>	<p>- Complete construction of Biomedical Workshops in the Paracentral and Western Regions. Procurement of equipment and spare parts.</p>

SUMMARY	VERIFIABLE INDICATORS	RECOMMENDATIONS TO MOH
2c. Prepared design and budget for the construction of the Biomedical Equipment Workshop at the Paracentral Region. Land is available for the Western Region Workshop.	2d. Trained 300 maintenance technicians. To assist in maintenance activities 30 Manuals were translated into Spanish.	<ul style="list-style-type: none"> - Support development of the Preventive Maintenance Program (PMP) for biomedical and laboratory equipment at the Eastern, Paracentral, and Western Regions. - Complete biomedical equipment inventory in Hospitals and Health Centers. Promote updating of the computerized inventory.
2e. Initiated the Preventive Maintenance Program (PMP) for some biomedical and laboratory equipment in the Metropolitan Region. Prepared proposal for development of the PMP at the Eastern, Western, and Paracentral Regions.	3a. Transport Cost Control System institutionalized.	<ul style="list-style-type: none"> - Define a permanent training program for maintenance technicians in different areas. - Try to obtain support from International Agencies for the structural and operational development of the Central Maintenance Department. - Identify GOES funds for annual maintenance contracts to cover X-Ray and anesthesia equipment.
3. Improvement of Transport Cost Control System.	3b. The Transport Department keeps a Preventive Maintenance System (PMP) with a 75/80% effectiveness.	<ul style="list-style-type: none"> - Introduction of a permanent policy for the elimination and restoration of obsolete vehicles according to priority needs. (Identification of funds).

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SUMMARY	VERIFIABLE INDICATORS	RECOMMENDATIONS TO MOH
	3c. A total of 367 transport technicians, at Central and Regional levels, were trained.	- Introduce rational use of fuel to reduce costs.
	3d. A total of 228 Cherokees and Comanches and 32 Ford trucks, plus 10 Ford Pick-ups were acquired for MOH.	- Construct and equip regional complexes in San Vicente and Santa Ana.
	3e. The unit transport cost was reduced from ₱0.47/Km. in 1987 to ₱0.42/Km. in 1989, but increased to ₱0.67/Km. in 1991 due to fuel price increase.	- Improvement of spare parts warehousing at Central and Regional levels (computerized).
1. Health facilities with adequate Potable Water and Sewage Systems.	4a. A survey carried out in 77 Health Units and Posts operating in MOH land showed different deficiencies in potable water and sewage systems. The systems were upgraded in 15 of them. (Value ₱379,251.37).	- Elaborate Transport Administration Manual.
	4b. The Maintenance Department has trained polyvalent technicians to carry out simple maintenance repairs.	- Introduce a continuous training plan. - Expansion of radiocommunications network.
		- Expand upgrading of potable water and sewage systems to 60 health facilities at primary level.
		- Promote the introduction of a Preventive Maintenance Program for water pumping equipment at Regional and Local levels.

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SUMMARY	VERIFIABLE INDICATORS	RECOMMENDATIONS TO MOH
5. Improvement of infrastructure and operation of laboratories at Health Units. (The scope of this objective was reduced).	<p>5a. Laboratory equipment and materials were procured for ₦406,000 and ₦283,000 respectively. MOH has 81 laboratories, 41 of them at Health Units.</p> <p>5b. Electrical infrastructure was improved at Health Units in the Metropolitan, Central, and Western Regions.</p> <ul style="list-style-type: none"> - Prepared the design and budget for the restoration of three laboratories at Health Units. - Trained 175 laboratory technicians in diagnosis techniques and the adequate use of laboratory equipment. 	<ul style="list-style-type: none"> - Organize supply administration in accordance with the system established at MOH. - Support the comprehensive plan that norms and regulates development of the Laboratories national network in the technical, administrative, and operational aspects. Establish a reference system among the laboratories.
6. Improvement of the Malaria epidemiological vigilance (case incidence and selective spraying of insecticides).	<p>6a. In 1990 collected 230,246 hematic samples, that is 10% more than was programmed.</p> <ul style="list-style-type: none"> - Malaria incidence was reduced from 23,953 cases in 1986 (Annual Parasitic Incidence - API 5.0) to 9,269 cases in 1990 (API 1.7). 	<ul style="list-style-type: none"> - Support control activities through the timely provision of insecticides, drugs, transportation, and other laboratory supplies and entomological equipment. - Initiate cost-effectiveness studies on vector control measures, diagnosis, and treatment, as a previous step

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SUMMARY	VERIFIABLE INDICATORS	RECOMMENDATIONS TO MOH
7. Elaboration of Manuals, including treatment norms and prescription guides available at each level.	6b. From 1987 to 1990 completed three spraying cycles per year (Propoxur), having obtained an average coverage of 95% of the intradomiciliary spraying planned for the year.	- for the operative decentralization and integration of control measures within the General Health Services.
	7a. Prepared the following Basic Lists: a) Drugs b) Medical-Surgical Supplies c) Odontology d) Laboratory e) Quality Control Laboratory f) Others (Transport, Cleaning, etc.)	- Support UTMIM as the Unit responsible for drug selection, administration, and use (Techno-Scientific Component development). - Strengthen the introduction of the MOH drug policy at national level.
3. Establish training programs for health promoters and health supervisors.	Inventory Control Manuals for drug transference and a Therapeutic Guide with standardized treatments were also prepared. (APSISA "B")	
9. Development of the Supply Management Information System (SMIS) with six operational systems.	9a. Procured and installed 13 microcomputers to support the Supply Management Information System (SMIS).	- Establish a policy for the elimination of obsolete computer equipment and its restoration according to priority needs.

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SUMMARY	VERIFIABLE INDICATORS	RECOMMENDATIONS TO MOH
<p>10. MOH personnel trained in the use of microcomputers and MIS.</p>	<p>9b. The subsystem programs were developed:</p> <ul style="list-style-type: none"> 1) Supplies (Inventory, Consumption, Shipments, Pending Reception Stocks) 2) Transport Cost Control 3) Inventory Control for Transport Spare Parts 4) Malaria Control 5) Biomedical Equipment Inventory 	<ul style="list-style-type: none"> - Identify GOES funds for the annual maintenance contracts for computer equipment. - Supervise the regional operation of the Systems. - A permanent training program for computer operation personnel.
<p>11. MOH capability for operational reseach.</p>	<p>10a. Training of 100 persons in microcomputer operation, at Central and Regional levels.</p>	<ul style="list-style-type: none"> - Establish a permanent training program for the System's technical and management personnel. Promote the use of information for decision-making at Central and Regional levels.
<p>12. Improvement of managers and supervisors in Health Policy and Program Planning capabilities.</p>	<p>11. (APSISA "B")</p> <p>12. (APSISA "B")</p>	

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ANNEX 2
HEALTH SYSTEM SUPPORT PROJECT "APSTSA A"
PRODUCT ACQUISITION PROGRAM NOT INCLUDED IN GSA CONTRACTS

ITEM No.	CONTRACT No.	DESCRIPTION OF PRODUCT OR SERVICE	TOTAL €	TOTAL US\$	DELIVERY DATE	CONTRACTOR	PURCHASING AGENT	APPROVAL /LETTER USAID
1		Nozzles, Set of 8; for the Diesel Laboratory, Transportation.	49,892.20	6,260.00	March, 1991	-	MSCI/USA	February 7, 1991
2		Two Physician's Desk Reference.	797.00	100.00	July, 1991	-	MSCI/USA	March 4, 1991
3		One Pick up F 250.	*	*	August, 1991	-	MSCI/USA	June 4, 1991
4	01/91	Equipment for Potable Water; instalation in 10 Health Facilities (Group No. 01).	406,146.45	50,959.41	May 6-July6, 1991	AQUA SYSTEMS, S.A.	MSCI/USA	March 13, 1991
5	02/91	5 Pamphlets print outs and one educational booklet for the Health Education Unit.	277,500.00	34,818.10	June 3-July 12, 1991	Artes Gráficas Publicitarias	MSCI/EL SALVADOR	January 25, 1991
6	03/91	Training services in Anesthesiology.	6,000.00	752.83	April 24-26, 1991	Dr. Pedro Barrera	MSCI/EL SALVADOR	April 5, 1991
7	04/91	Calibration of Diesel Laboratory, Transportation Department.	3,000.00	376.42	June 3-7, 1991	Sr. J. G. Melara	MSCI/EL SALVADOR	February 7, 1991
8	05/91	Purchase and instalation of Water Pump. Workshop/San Miguel.	25,754.00	3,193.73	May 27-June 28, 1991	REQUIPSA, S.A.	MSCI/EL SALVADOR	October 29, 1991
9	06/91	Equipment for Potable Water; instalation in 5 Health Facilities (Group No. 02).	447,350.92	56,129.35	June 10-August 10, 1991	REQUIPSA, S.A.	MSCI/EL SALVADOR	April 26, 1991
10	07/91	Training for Transportation Technicians (5 Cursos).	31,049.92	3,896.00	June 24-August 30, 1991	FEPADE	MSCI/EL SALVADOR	April 26, 1991
11	08/91	Print out of 5 Essential Drug Lists and one Manual de Transferencias para UTMIM.	11,910.75	1,494.45	August 1-Sept. 13, 1991	Editorial Ahora	MSCI/EL SALVADOR	May 16, 1991

* Information still pending.

Anexo 2A
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ANNEX 3
LIST OF DOCUMENTS APSISA "A"

September/91

MEDICAL SERVICE CORPORATION INTERNATIONAL (MSCI)

- APSISA. RPTE. 1 "Análisis del Sistema de Adquisiciones e identificación de formas para modernizarlo". Glenn Black, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Octubre, 1988.
- APSISA. RPTE. 2 "Informe Anual, Octubre 1987 - Septiembre 1988." Proyecto: Apoyo a los Sistemas de Salud, APSISA "A". Contrato No. 519-0308-C-7651-00. Octubre, 1988.
- APSISA. RPTE. 2A "Annual Report, October 1987 - September 1988". Project: Health Systems Support Project, APSISA "A". Contract No. 519-0308-C-7651-00. October, 1988.
- APSISA. RPTE. 3 "Guía de Seguridad contra incendios". Ing. Ricardo Amaya, Jefe del Departamento de Almacenamiento y Distribución, MSPAS y José L. Azócar, Asesor Auxiliar de Adquisiciones. APSISA "A"/USAID/MSCI. Diciembre, 1988.
- APSISA. RPTE. 4 "Informe de la Asesoría realizada al Laboratorio de Control de Calidad de Medicamentos". Dra. María del Carmen Becerril, Asesora a Corto Plazo, APSISA "A"/USAID/MSCI. Diciembre, 1988.
- APSISA. RPTE. 5 "Manual de Organización y Administración de Almacenes de Transporte". Ing. Henry J. Weiss e Ing. José Armando Santamaría, Asesores a Corto Plazo de Transporte. APSISA "A"/USAID/MSCI. Enero, 1989.
- APSISA. RPTE. 6 "Comentarios al programa de Compras de UTMIM de 1988, medicamentos, y su evolución (incluye compras PIO/C)", Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Enero, 1989.
- APSISA. RPTE. 7 "Análisis de la Organización y Procesos del Sistema de Suministros". Lic. Arturo Waldron, Asesor de Logística e Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Mayo, 1989 (Resumen en Inglés).
- APSISA. RPTE. 8 "Registro de Proveedores. Diseño lógico". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Mayo, 1989.

- APSISA. RPTE. 9 "Conceptualización del Sistema de Suministros". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Agosto, 1989.
- APSISA. RPTE. 10 "Seguimiento de Compras". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Mayo, 1989.
- APSISA. RPTE. 11 "Normas y Procedimientos de Recepción de Medicamentos e Insumos Médicos del Ministerio de Salud Pública y Asistencia Social de El Salvador". Ing. Ricardo Amaya, Jefe del Departamento de Almacenamiento y Distribución; Lic. Ana Isabel Granados, Jefe del Laboratorio de Control de Calidad de Medicamentos; Lic. David Castro, Unidad de Desarrollo Institucional (UDI) y Arq. José L. Azócar, Asesor de Auxiliar de Adquisiciones, APSISA "A"/USAID/MSCI. Julio, 1989.
- APSISA. RPTE. 12 "Informe Final". Félix M. Villamil, Asesor de Sistemas de Computación, APSISA "A"/USAID/MSCI. Julio, 1989 (Español e Inglés).
- APSISA. RPTE. 13 "Manual de Organización y Manual Descriptivo de Puestos del Departamento de Adquisiciones del Ministerio de Salud Pública y Asistencia Social". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Agosto, 1989.
- APSISA. RPTE. 14 "Informe Final de Monitoreo de Consumo Histórico de Medicamentos". Asistentes Técnicos de Salud, APSISA "A"/USAID/MSCI. Octubre, 1989.
- APSISA. RPTE. 15 "Proveeduría Específica. Plan de Capacitación 1990". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Octubre, 1989.
- APSISA. RPTE. 16 "Programa de Educación Continua. Departamento de Transporte. Plan de Acción, 1990". Ing. Henry J. Weiss, Asesor a Corto Plazo de Transporte, APSISA "A"/USAID/MSCI e Ing. Fermín O. López, Jefe del Departamento de Transporte, Octubre, 1989.
- APSISA. RPTE. 17 "Análisis de la Organización del Departamento de Almacenamiento y Distribución/División de Proveeduría". Ing. José Armando Santamaría, Asesor de Almacenes, APSISA "A"/USAID/MSCI - Octubre, 1989.

- APSISA. RPTE. 17A "Informe Anual, Octubre 1988 - Diciembre 1989 - Proyecto: Apoyo a los Sistemas de Salud, APSISA "A" - Contrato No. 519-0308-C-7651-00 - Diciembre, 1989.
- APSISA. RPTE. 17B "Annual Report, October 1988 - December 1989 - Project: Health Systems Support Project, APSISA "A". Contract No. 519-0308-C-7651-00. December, 1989.
- APSISA. RPTE. 18 "Cuadro Básico de Medicamentos". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI y Drs. Jaime Ricardo Rosales y Otto Rosales, Unidad Técnica de Medicamentos e Insumos Médicos (UTMIM) - Marzo, 1990.
- APSISA. RPTE. 19 "Cuadro Básico de Medicamentos. Especificaciones de Precios". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Diciembre, 1989.
- APSISA. RPTE. 20 "Cuadro Básico de Medicamentos. Especificaciones de Empaque". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Diciembre, 1989.
- APSISA. RPTE. 21 "Cuadro Básico de Odontología". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI, Drs. Jaime Ricardo Rosales y Otto Rosales, Unidad Técnica de Medicamentos e Insumos Médicos (UTMIM) - Abril, 1990.
- APSISA. RPTE. 22 "Cuadro Básico de Odontología. Especificaciones de Precios". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Marzo, 1990.
- APSISA. RPTE. 23 "Cuadro Básico de Odontología. Especificaciones de Empaque". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Marzo, 1990.
- APSISA. RPTE. 24 "Cuadro Básico de Insumos Médico-quirúrgicos". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Abril, 1990.
- APSISA. RPTE. 25 "Cuadro Básico de Insumos Médico-quirúrgicos. Especificaciones de Precios". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Marzo, 1990.

- APSISA. RPTE. 26 "Cuadro Básico de Insumos Médico-quirúrgicos. Especificaciones de Empaque". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Marzo, 1990.
- APSISA. RPTE. 27 "Cuadro Básico de Laboratorio". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Marzo, 1990.
- APSISA. RPTE. 28 "Cuadro Básico de Laboratorio. Especificaciones de Precios". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Mayo, 1990.
- APSISA. RPTE. 29 "Condiciones de Concurso de Medicamentos, Insumos Médico-quirúrgicos, Odontología y Laboratorio". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Marzo, 1990.
- APSISA. RPTE. 30 "Subsistema de Adquisiciones: Formularios, Estándares de Carteles, Cuadros de Análisis, Resoluciones de Adjudicación y Contratos". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Febrero, 1990.
- APSISA. RPTE. 31 "Manual de Normas y Procedimientos para efectuar Transferencias o Devoluciones de Medicamentos e Insumos Médicos". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Enero, 1990.
- APSISA. RPTE. 32 "Procedimientos de Recepción de Medicamentos e Insumos Médicos de Importación/APSISA-AID". Ing. Armando Santamaría y Arq. José L. Azócar, APSISA "A"/USAID/MSCI, en colaboración con personal de Proveduría Específica y UTMIM. Enero, 1990.
- APSISA. RPTE. 33 "Seminario: Desarrollo de Sistemas en Ambiente de Base de Datos". Ing. David Gustavo Soriano, Asesor de Sistemas de Computación, APSISA "A"/USAID/MSCI. Febrero, 1990.
- APSISA. RPTE. 34 "Manual de Organización, Normas y Procedimientos de Recepción de Medicamentos e Insumos Médicos". Ing. José Armando Santamaría, Asesor de Almacenes, APSISA "A"/USAID/MSCI. Marzo, 1990.
- APSISA. RPTE. 35 "Administración de Suministros. Conceptualización del Sistema de Suministros. El proceso de la Administración de Suministros". (Documento para el curso de Administración de

Suministros, MSPAS, Marzo, 1990). Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Marzo, 1990.

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- APSISA. RPTE. 37 "Análisis de Necesidades y Recursos Disponibles para la Adquisición de Medicamentos". Ing. Carlos Castaño, Asesor de Adquisiciones, APSISA "A"/USAID/MSCI. Mayo, 1990.
- APSISA. RPTE. 38 "Análisis y Proyección de la Compra de Medicamentos con fondos AID-PIO/C. Período 1987-1991". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Mayo, 1990.
- APSISA. RPTE. 39 "Normas e Instructivo para Actualización de Códigos y Artículos de Cuadros Básicos". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Mayo, 1990.
- APSISA. RPTE. 40 "Análisis de la Disponibilidad de Medicamentos para el bienio 1989-1990". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Enero, 1990.
- APSISA. RPTE. 41 "Laboratorio de Control de Calidad de Medicamentos: Situación Actual y Posibilidades de Oferta de Servicios a otras Instituciones del Sistema de Salud". Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI. Junio, 1990.
- APSISA. RPTE. 42 "Encuesta de Abastecimiento Secundario de Agua Potable y Alcantarillado en Unidades y Puestos de Salud". Ing. Ruben Worrell, Asesor de Equipo Biomédico, APSISA "A"/USAID/MSCI. con colaboración de los Inspectores de Saneamiento y Direcciones Regionales de Salud, MSPAS. Febrero, 1990.
- APSISA. RPTE. 43 "Sistema de Información Gerencial del Sistema de Suministros del Ministerio de Salud Pública y Asistencia Social (SIGS)". Lic. Arturo Waldron, Asesor de Logística, MSCI e Ing. David Gustavo Soriano, Asesor de Sistemas de Computación, APSISA "A"/USAID/MSCI. Mayo, 1990.

- APSISA. RPTE. 43A "Manual del Usuario del Sistema. Sistema de Información Gerencial de Suministros "SIGS". APSISA "A"/USAID/MSCI, Agosto 1990.
- APSISA. RPTE. 43B "Manual del Usuario y Operación del Sistema. Sistema de Información Gerencial de Suministros "SIGS". APSISA "A"/USAID/MSCI, Agosto 1990.
- APSISA. RPTE. 44 "Documentación Técnica del Subsistema Registro de Proveedores". Ing. Gustavo Soriano, Asesor de Sistemas de Computación, APSISA "A"/USAID/MSCI. Septiembre, 1989.
- APSISA. RPTE. 45 "Documentación Técnica del Subsistema Estimación de Consumos". Ing. Gustavo Soriano, Asesor de Sistemas de Computación, APSISA "A"/USAID/MSCI. Septiembre, 1989.
- APSISA. RPTE. 46 "Manual de Normas y Procedimientos para el Manejo de un Sistema de Apoyo a las Decisiones - (Microcentro de Cómputo" . Ing. José Armando Santamaría, Asesor de Almacenes, APSISA "A"/USAID/MSCI. Octubre, 1990.
- APSISA. RPTE. 47 "Manual de Procedimientos y Normas de Toma de Inventarios de Medicamentos" - Ing. José Armando Santamaría, Asesor de Almacenes, APSISA "A"/USAID/MSCI y Lic. Mario Martínez Pocasangre, MSPAS.
- APSISA. RPTE. 48 "Manual de Operación del Sistema de Inventario de Repuestos - Almacén Central El Matazano". Ing. José Armando Santamaría, Asesor de Almacenes, APSISA "A"/USAID/MSCI. Junio 1990.
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- APSISA. RPTE. 49A "Listado General de Medicamentos" (orden alfabético). Lic. Arturo Waldron, Asesor de Logística, APSISA "A"/USAID/MSCI y Dr. Jaime Ricardo Rosales, y Dr. Otto Rosales, UTMIM. Junio, 1990.
- APSISA. RPTE. 50 "Documentación Técnica del Subsistema de Adquisiciones". Ing. Gustavo Soriano, Asesor de Sistemas de Computación, APSISA "A"/USAID/MSCI. Junio, 1990.

- APSISA. RPTE. 51 "Documentación Técnica - Inventario de Repuestos. Almacén Central". Ing. Gustavo Soriano, Asesor de Sistemas de Computación, APSISA "A"/USAID/MSCI. Junio, 1990.
- APSISA. RPTE. 52 "Documentación Técnica. Inventario del Subsistema - Inventario de Productos". Ing. Gustavo Soriano, Asesor de Sistemas de Computación, APSISA "A"/USAID/MSCI. Junio, 1990.
- APSISA. RPTE. 53 "Selección de Medicamentos". Dr. Albin Chaves Matamoros, Asesor de Farmacología Clínica a Corto Plazo, APSISA "A"/USAID/MSCI. Junio, 1990.
- APSISA. RPTE. 54 "Plan Piloto de Farmacovigilancia del Ministerio de Salud Pública y Asistencia Social". Dr. Albin Chaves Matamoros, Asesor de Farmacología Clínica a Corto Plazo, APSISA "A"/USAID/MSCI. Junio, 1990.
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- APSISA. RPTE. 57A "Informe sobre el cumplimiento de las Recomendaciones de la Cia. Auditora Price Waterhouse. Revisión Marzo 1991. Ing. José A. Santamaria, Asesor de Almacenes, APSISA "A"/USAID/MSCI. Marzo, 1991.
- APSISA. RPTE. 58 "Listado General de Insumos Médicos". Lic. Arturo Waldron, Asesor de Logística, APSISA

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"A"/USAID/MSCI, Dr. Otto Rosales, UTMIM y Lic. Humberto Cruz, Jefe del Departamento de Almacenamiento y Distribución/ Proveduría Específica. Junio, 1990.

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Annex3
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ANNEX 3A

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Annex3A
RAC/egh

HEALTH SYSTEM SUPPORT PROJECT (APSISA) "A"

San Salvador, September 30, 1991

A D V I S O R S	A C T I V I T I E S	N A T I O N A L C O U N T E R P A R T S
A. <u>LONG TERM ADVISORS</u>		
RAFAEL A. CEDILLOS Chief of Party/Health Planner	Coordination and Supervision Health Systems Support	- Director, Planning Office - APSISA/MOH
ARTURO WAI DRON I. Logistics Manager/Systems Advisor	Supply Management (Drug and Medical Supplies acquisition, warehousing and distribution)	- Administrative Director - Chief, UTMIM - Chief, Institutional Development Unit (UDI)
CARLOS CASTAÑO Procurement Advisor	Strengthen the capacity and effectiveness of the MOH Procurement System (drug and medical supplies)	- Chief, Procurement Division
JOSE ARMANDO SANTAMARIA Warehousing Advisor	Reception, warehousing and distribution of drugs.	- Chief, Procurement Division - Chief, Warehousing Department
JOSE LUIS AZOCAR Procurement Support Technician	Logistic Support for shipping process and reception of drugs and medical supplies. Warehousing and distribution support.	- Chief, Procurement Division - Chief, Warehousing Department
RUBEN WORRELL Biomedical Maintenance Advisor (Thru September 30, 1990)	Inventory and preventive maintenance of Biomedical and Hospital equipment.	- Chief, Central Maintenance Department - Administrative Director

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ANNEX 4
PERSONNEL LIST - MEDICAL SERVICE CORPORATION INTERNATIONAL (MSCI)

HEALTH SYSTEM SUPPORT PROJECT (APSISA) "A"

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San Salvador, September 30, 1991

A D V I S O R S	A C T I V I T I E S	N A T I O N A L C O U N T E R P A R T S
DAVID GUSTAVO SORIANO Computer System Advisor	Automated information and processing capabilities (drug and medical supplies, biomedical equipment, procurement and transportation management).	- Chief, Informatic Unit - Chief, UTMIM - Chief, Procurement Division
MAURICIO SAUERBREY Malaria Advisor	Malaria control and surveillance.	- Chief, Malaria Department
B. <u>SHORT TERM ADVISORS</u>		
HENRY JOHN WEISS Transportation Advisor	Support Preventive and corrective maintenance programs * Implementation of Transportation cost administration system * Improvements to computer programs * Specify and program procurement required for fleet modernization.	- Chief, of Transportation
Improvement of Transport Warehouses.		
MARIA DEL CARMEN BECERRIL Drug Quality Control Laboratory.	Short term consultorship for the best operation of the Drug Quality Control Laboratory.	- Chief, Quality Control Laboratory
ALBIN CHAVES MATAMOROS Clinical Farmacology	Selection, acquisition and use of drugs. Farmacovigilance. Politics of drugs from MOH.	- Chief, UTMIM
OSWALDO RAMIREZ Potable Water Advisor	Improvement of Potable Water and Sewage Systems in Health Units and Posts.	- Chief, Service, Technical-Normative, Operative Division.
VICTOR MANUEL ALVAREZ Maintenance Advisor/Biomedical Equipment	Preventive Maintenance of Biomedical Equipment.	- Chief, Central Maintenance Department.
C. <u>HEALTH TECHNICAL ASSISTANTS (5)</u>		
MAURICIO ADALBERTO GUEVARA MARIA LUISA PACHECO JORGE MAZZINI MAURICIO MERINO	Support the warehousing system, distribution and use of drugs and medical supplies at the central, regional and local levels.	- Chief, UTMIM - Regional Health Directors - APSISA/MOH

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ANNEX 4
PERSONNEL LIST - MEDICAL SERVICE CORPORATION INTERNATIONAL (MSCI)

HEALTH SYSTEM SUPPORT PROJECT (APSISA) "A"

Page 3 of 3

San Salvador, September 30, 1991

A D V I S O R S	A C T I V I T I E S	N A T I O N A L C O U N T E R P A R T S
D. ADMINISTRATIVE PERSONNEL		
ROSA MARIA QUINTEROS - Grade 10/6	Administrative Officer	
SILVIA PATRICIA FIGUEROA - Grade 6/4	Head Secretary	
EMMA GERALDINA DE HERNANDEZ - Grade 3/2	Recepcionist/Secretary	
CIRO EDGAR CHAVEZ - Grade 2/1	Driver	
JOSE ANTONIO VILLANUEVA - Grade 2/1	Night Guard	
DELHY ACEVEDO	Cleanning Maid	

ENG-MSCI.PER
RAC./cgh

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