

**SIMPOSIO REGIONAL SOBRE
Abastecimiento de agua y saneamiento —
un elemento de la atencion primaria de salud**

Guatemala, 10 - 14 de noviembre de 1986



**REGIONAL SYMPOSIUM ON
Water supply and sanitation —
an element of primary health care**

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RURAL CASE STUDY 'SAN CLEMENTE'



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SAN CLEMENTE'S PIPED WATER PROGRAM

This is a case study about a successful rural piped water program that is beginning to impact on primary health care efforts throughout San Clemente. By focusing on rural people's needs and their desire for more accessible, safer water a nationwide program has developed that is integrating sound community development methods, simple, easy to maintain engineering solutions, sanitation and hygiene education. As a result the community participation and increased health awareness generated by the water program over the past twenty years has helped lay the foundation for a strong primary health care program.

The piped water program in San Clemente had its origins in a community development project undertaken by the Ministry of Community Development and Social Affairs (MCDSA) in 1966 in the village of Alegre. It was found that the major problem facing the community was the lack of adequate water supplies, especially in the dry season when women and children were forced to walk several kilometers to collect water from a river bed. Working with the Alegre self-help project committee, MCDSA staff identified a permanent source of water and drew up a plan for an intake and gravity flow piping to the village. The committee agreed to provide self-help labor for the construction of the system and the ministry agreed to supply materials, which were financed with the assistance of an international donor. Within a year, and at a cost of only \$5000, 20 km of pipe were installed, 30 public taps were constructed, and 2500 people of Alegre were receiving up to 25 liters per capita per day of potable water.

This initial scheme proved so popular that within a year another larger project was begun in a near-by village. The project emphasized community involvement and decision-making in planning, managing and constructing the system. This pattern of community organization preceding design and construction has become the major characteristic feature of the San Clemente program.

Over the period of twelve years, thirty separate projects were constructed in San Clemente with populations totaling 500,000 people. Nearly 2000 kilometers of pipe were laid with 3000 public taps. Each project was funded with some outside donor support including church groups, PVOs, international agencies and bi-lateral organizations. In 1975 a government reorganization transferred the responsibility for the self-help water projects from the Ministry of Community Development and Social Affairs to the Ministry of Public Works (MOW).

In 1977 a large bi-lateral donor agreed to fund not just one project but an entire program to provide potable water to over 200,000 people through a series of 20 projects. The agreement called for training for MOW staff and on-going monitoring, evaluation and research and data collection. In addition to supporting these new activities and the Ministry of Public Works' construction costs for the projects, the program agreement specifically called for the active involvement of and coordination with the Ministry of Health.

The involvement of the Ministry of Health was suggested by a study which had found that although the piped water projects had brought clean water much closer to people, the water was not remaining clean prior to use and the health impacts of the projects were minimal. It was suggested that by combining a sanitation and hygiene education component to the water program, significant health impacts could be achieved. The Ministry of Health goals in the new program included: staff training, sanitation improvements in every village receiving piped water and health education for all potential users.

KEY CHARACTERISTICS

The San Clemente Rural Water Program, as it is now called, has four key characteristics including community participation, institutional setting, technical aspects and human resources development.

Community Participation

Community participation is the cornerstone of the entire rural piped water program. The tradition of active community involvement in rural development projects has its roots in the local customs where decisions were and still are reached by group consensus and full public debate. This tradition has been endorsed and built upon by religious institutions, political parties and village development committees, which have responsibility for all self-help projects. Committees for the rural piped water program are divided into two types--construction committees and maintenance committees. The construction committees include the main water project committees, section, branch and village committees. The maintenance committees include the main water committee, repair teams and tap committees.

The main water committee is composed of experienced and respected village leaders who oversee the period of construction and continue to oversee the operation and maintenance of the system. The section and branch committees perform similar functions for major parts of the system while the village committee takes responsibility for taps in a village. This network of committees provides workers for all of the trench digging, tank construction, movement of materials and tap apron construction.

Once the construction of the system is completed the main committee shifts its role to supervising repair teams and tap committees. The volunteer repair teams are composed of villagers who are given training in basic pipe repair and who carry out pipe repairs on all lines other than the main water line. The tap committee members are responsible for the operation, care and maintenance of a tap.

Institutional Setting

The institutions involved with the rural piped water program as it is operating today include the Ministry of Public Works, the Ministry of Health,

the Ministry of the Interior and the Treasury. The MOW has the major responsibility for carrying out this program. Its rural water staff includes eight engineers, eight senior technical field staff and over 100 onstruction and monitoring field staff. They are responsible for the initial community discussions, the design, the liason with the project committees, the management of equipment and materials purchased by the government and the technical construction supervision during the construction phase. Once the project is completed, MOW staff provide periodic maintenance checks, carry out major pipe and intake repairs, and monitor system performance and reliability.

The Ministry of Health, which was not directly involved in the piped water project until the beginning of 1977, has a senior public health officer assigned to liase with the MOW and promote training of MOH staff in hygiene education and sanitation. Specifically this health officer is responsible for developing materials and organizing and implementing workshops for public health inspectors, health assistants and village health workers on proper hygiene, water use practices and latrine and washing slab construction and use. In addition, the public health officer holds regular meetings with senior MOW's headquarters staff to review work plans, resolve administrative problems, and provide any technical public health advice.

In the field there are 50 MOH field staff assigned to work in areas where piped water projects have been or are being constructed. Their responsibilities include promoting and helping to set up village health committees, training village health workers, providing technical assistance as needed, and liasing with the MOW field staff and the water project committees. In recent years the two ministry field staffs have begun planning their work schedules together so that village visits can be coordinated and village committee meetings can have the benefit of both ministries' expertise.

The headquarters coordination and the increased collaboration in the field between the two Ministries have not gone without some communication and logistical problems. The engineers in the MOW have at times paid lip service to the sharing of schedules and information with the MOH staff. Having operated a "successful" program for a number of years, the MOW field staff have seen the involvement of the MOH staff as time consuming, often unnecessary and a hinderance in "getting the work done." The MOH staff have found the additional responsibilities of working with the piped water program just one more thing to do in an already overloaded schedule. However, the benefits of this closer working relationship are beginning to be felt and there is a growing acceptance to implementing it by the two ministries' staffs.

Two other ministries which are also involved in the program are the Ministry of the Interior and the Ministry of the Treasury. The Ministry of the Interior is responsible for coordinating all rural development projects. Each district in San Clemente has a District Development Committee which is composed of traditional village leaders, influential citizens and political party members. Districts are divided into areas which have Area Development committees and each area has village development committees which initiates rural development projects such as the piped water projects.

The Ministry of the Treasury has responsibility for liaising with the donor and approving and processing all budgets and major expenditures in the piped water program.

Technical Aspects

The three main types of water supply in rural areas of San Clemente are deep boreholes, protected shallow wells and gravity-fed piped systems. The San Clemente Piped Water Program deals with gravity-fed systems only. A government survey in 1965 estimated that 35% (2 million people) of the rural population of the country could be served by gravity-fed piped systems. By 1985 over 50 projects had been completed and 600,000 people served with piped water systems. It is estimated that an additional 500,000 people will be served when the present and planned projects are completed in 1990.

The gravity-fed piped systems are relatively simple weirs or dams, with no treatment or pumping equipment, with main water lines and distribution pipes, some sediment and storage tanks, and public stands pipes or taps. There are no house connections except for a few health dispensaries. The systems are designed for 25 liters per person per day and each tap is located no farther than 500 meters from the farthest house.

The technical feasibility studies, designs and supervision of the construction are handled by engineers and technicians of the MOW. The construction of storage tanks is done by local contractors with MOW staff supervision. All of the remaining construction activities are the responsibility of the various self-help committees and the people themselves with modest supervision from MOW staff.

Human Resources Development

From the outset of the piped water program there has been a commitment to expand the number of projects only as rapidly as it is possible to train competent MOW field workers and technicians. The initial selection of field workers is done by selecting the best participants from a two week pre-service training course. All MOW staff in the piped water program receive two to four weeks of in-service training each year during the planting season when no self-help labor is available for water projects.

The MOH staff are hired following the completion of their public health training in various schools. Most MOH staff receive two weeks of in-service training each year in improved methods for involving village committees, hygiene education, low-cost sanitation improvements, and training of trainers. Recently the senior staff of the MOW and MOH working on the piped water program participated in a joint training of trainers course which concluded with a two-day workshop on developing ways for the two ministries' staff to work more effectively together in the field and in headquarters. This was a great success.

HEALTH IMPACTS

The agreement in 1977 with the Government of San Clemente and a bilateral donor to expand the piped water program was made with the assumption that there would be positive health effects at the conclusion of the program. The active involvement and integration of the MOH in the project was proposed to insure this. In order to ascertain whether the water program was having any positive impacts on health, a research and evaluation component to the project was instituted.

The piped water and sanitation projects were expected to affect health in several ways. Direct impacts might include reductions in water-borne disease where the quality of water used for drinking and cooking is improved; reductions in water-washed diseases where personal hygiene practices are increased; reduction in water-based diseases where direct contact with contaminated surface water is reduced; and reduction in a range of fecal-oral diseases where excreta disposal practices are improved.

In addition, it was argued that some indirect effects could occur. First, by reducing the time women are required to fetch water, it is likely that they would undertake other time-consuming primary health care activities. Second, because of the improved community organization resulting from the successful self-help effort, the community might be better equipped to take advantage of health services. For example, following the construction of a water system the community might decide to build a clinic and request government to provide a nurse for it. Third, it was expected that the specific health and hygiene education activities undertaken in some areas would affect participation in other health care activities.

Over the last few years a number of epidemiologic studies have been carried out to try to assess what, in fact, the health effects had been. One study looked at the effect of improved water supply and sanitation on diarrheal diseases in children. The study concluded that use of piped water alone was definitely not associated with a reduction of diarrheal diseases. However, when improved piped water was combined with a latrine, incidence of diarrhea were 2-4 times less than that incidence of diarrhea associated with just one improvement in water or sanitation. For those children who had the additional benefit of being exclusively breastfed, thus having little bacterial contamination of food, the combined effect of piped water, latrines and breastfeeding reduced the incidence of diarrhea by 3-8 times when only piped water or latrines were available in the families of those breastfed children.

Another study dealt with trachoma. It concluded that the prevalence of inflammatory trachoma was strongly related to the availability of water (Table 1) and the frequency of face washing (Figure 1). The incidence of trachoma increased 40% when facewashing was reduced from two times a day to less than one time per day.

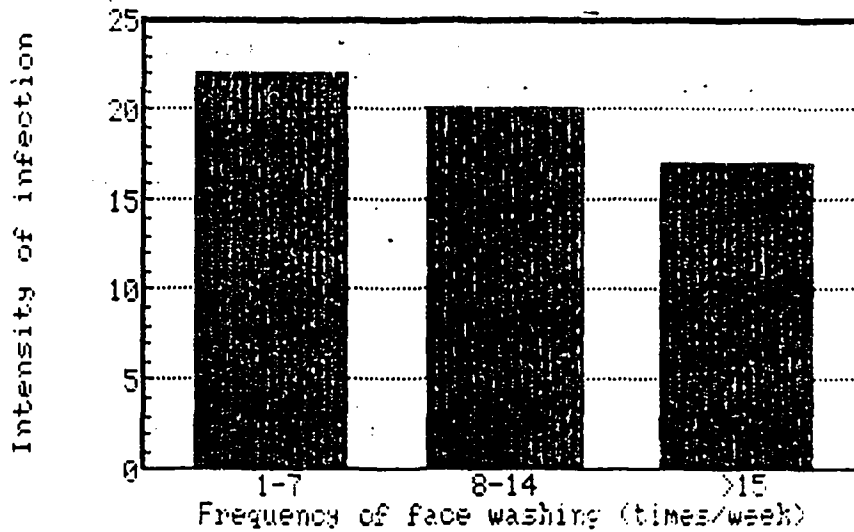
TABLE 1 PREVALENCE OF MODERATE-SEVERE TRACHOMA - BY DISTANCE TO RIVER IN CHILDREN LESS THAN SIX YEARS OF AGE

n = 5436 (1)

Location of Village	Total N	Number Affected	Prevalence	95% C.I.
East of River	River	1,498	247 16.5%	(14.6, 18.4)
West of River:				
- less than 1km	1,003	178	17.7%	(15.4, 20.1)
- 2 to 4km	476	107	22.5% (2)	(18.7, 26.2)
- more than 5km	2,447	719	29.4%	(27.6, 31.2)
TOTAL:	5,424	1,251	23.1%	(21.9, 24.2)

- (1) Twelve subjects are missing ocular exam results for inflammatory trachoma.
 (2) Test for trend among those on west side of river $Z = 7.28$, $p < .01$

FIGURE 1 SEVERITY OF INFLAMMATORY TRACHOMA AMONG CHILDREN UNDER AGE SIX, BY FREQUENCY OF FACE WASHING PER WEEK



The piped water program also had an effect on the utilization of other primary health care services. The measure used was the participation in the national expanded program on immunization (EPI): A study was conducted which compared immunization rates in areas served by the piped water program with rates found in areas not served by the piped schemes: In a second study three exposure categories were defined: no piped water scheme and no hygiene education program; a piped water scheme but no hygiene education; and a piped water scheme and a hygiene education program. The results of the two studies are presented in Figures 2 and 3:

FIGURE 2 EFFECT OF PIPED WATER ON PREVALENCE OF IMMUNIZATION

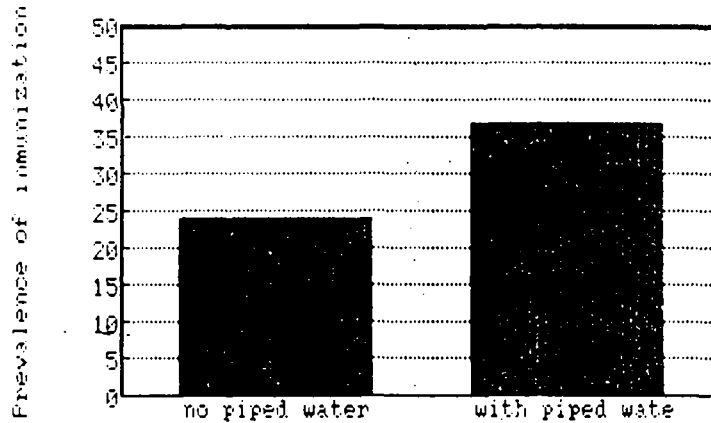
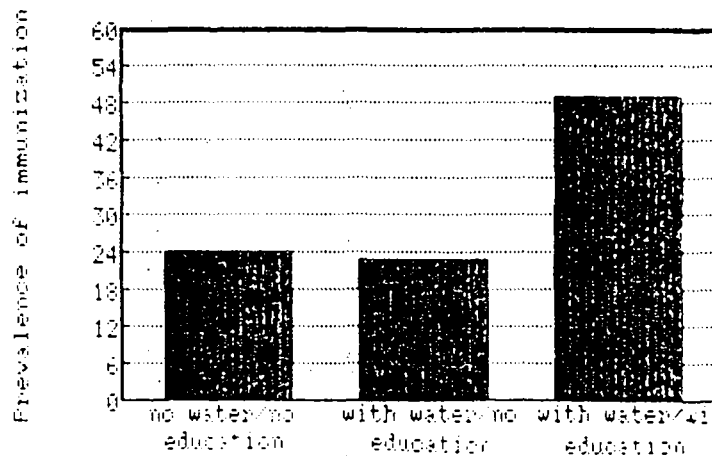


FIGURE 3 EFFECT OF PIPED WATER AND HEALTH EDUCATION ON PREVALENCE OF IMMUNIZATION



From Figure 2 is apparent that the prevalence of full immunization is over 50% higher in areas served by piped systems than in areas without such projects. From Figure 3 it is evident that the prevalence of full immunization is 100% greater in areas with piped water projects and health education and sanitation programs than in areas with no health education and sanitation with or without piped water. A question that was not answered is whether health education and sanitation activities carried out in the absence of a self-help water program would be equally effective in stimulating demand for immunization services.

Part of the reason for adding the health education and sanitation component to the project was that a successful water project provided an excellent entry point for the initiation of health education activities. One assumption that was made was that similar health education inputs in areas without such prior successful water projects would be less effective.

It was concluded that one of the joint effects of a piped system and health education and sanitation is a large increase in the use of EPI services. In addition, the EPI effect of each of the inputs (piped water and health education and sanitation) separately would be substantially less than the joint effect of the two. In other words, it appears that the effect of each intervention alone is small, but the effects of the interventions together are large.

In late 1985 the San Clemente Rural Water Program was evaluated by an outside evaluation team. The team concluded the following:

1. When health education and sanitation activities are undertaken in rural piped water areas, there are substantial direct and indirect health benefits.
2. The program is developing leadership and organizational skills within rural populations that is benefiting other rural programs.
3. In some areas the program has resulted in substantial time savings for women, but there is a need to involve women more in program activities.

FUTURE

The future plans for the San Clemente Rural Water Program call for the construction of fifteen new projects, extensions to five existing projects and rehabilitation (replacing pipes) on three old projects. The MOW and MOH staffs plan to increase their collaboration at all levels, although not all key decision makers in the respective ministries have recognized the need. The MOH plans to increase its staff working on hygiene education and a donor has expressed interest in supporting the expansion of the sanitation and hygiene education components to the Water Program.

The San Clemente Rural Water Program has been acclaimed as one of the best and most effective rural water programs in the region. The sound planning and management combined with outstanding community participation in the program make it the envy of much of the world.



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**WATER SUPPLY AND SANITATION AND
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A DISCUSSION BY

TERRY ELLIOTT

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THE PROGRAM FOR APPROPRIATE TECHNOLOGY IN HEALTH
(PATH)

INTRODUCTION

The purpose of this paper is to provide a starting point for discussions on water and sanitation and primary health care (PHC) in rural areas. This brief discussion focuses on some aspects of both water and sanitation and PHC as they relate to rural populations, and then touches on the issue of integration of these activities, presenting a few examples from Latin America.

At the outset of this discussion it would seem important to consider the meaning of a rural community. Most technical reports assume that cities evolved historically from rural communities and presume that the prevalence of rural communities in a given country is the reciprocal of the degree of urbanization. Most definitions and analytical tables, therefore, do not record what a rural community is but what it is not. For example, data from the World Bank's 1985 World Development Report on urbanization designate urban populations as percentages of total populations. These range from a high of 85% in Uruguay and Venezuela to a low of 22% in Trinidad and Tobago (see Table 1). The data suggest that those people not classified as "urban" are necessarily "rural." This approach is typical though hardly satisfying because it does not take into account populations living in "periurban" areas. In addition, as the technical notes accompanying the World Bank data warn, the figures are not comparable between countries because of the different cutoff points used in each country to define urban, and therefore rural, populations.

More important than the arbitrary numerical differences that are found in defining urban, periurban and rural communities are the real organizational, economic, social, and cultural differences that may exist between "rural" areas even within the same country. While it is necessary to divide the work of this symposium into manageable pieces and to keep in mind that there are some distinguishing characteristics of rural, periurban, and urban communities--perhaps best defined in terms of varying resource levels--it is important to remember that the lines between rural, periurban, and urban areas are not always clear, that between groups there are some common qualities, and that within each group there is a great deal of variability.

HEALTH INDICATORS AND HEALTH EXPENDITURES IN RURAL AREAS

Perhaps more important than defining the rural community are the following issues: how is health conceptualized and are curative and/or preventive health measures a felt concern? A second glance at the World Bank data in Table 1 indicates that percentages of total government expenditure on health in Latin American countries in 1985 range from 1% to 33%. These data do not distinguish between expenditures for urban populations and expenditures for rural communities, but they do reflect a significant concern, at least on the parts of government, to provide health care:

Still, family expenditure on curative health care probably exceeds government expenditure: Work done by Management Sciences for Health and the government of Haiti, for example, found significant expenditure for nonessential over-the-counter (OTC) drugs in even the poorest rural communities: When these amounts are added to transportation costs to government clinics, the opportunity costs of mothers waiting long periods of time at health facilities, and expenditures for private health care (either traditional or modern), there can be little doubt that rural populations place a high value on curative health measures.

The value of preventive care in rural communities is less manifest! This may be partially because of belief systems that consider illness to be caused by agents or conditions other than those accepted by modern medicine: The rural poor may also consider preventive health care a luxury that they cannot afford: These perceptions pose a serious challenge to those charged with designing, implementing, and monitoring immunization and water and sanitation programs in which the health benefits of the interventions are not immediately obvious to the beneficiaries.

There are health indicators and outcomes that are immediately relevant to parents living in rural communities: These are the growth, development, and survival of their children: For example, while water-related disease affect everyone in a community, infants and small children are especially susceptible to their ill effects and serve as a barometer of health in the community as a whole: Still, parents do not automatically associate sickness, stunting, or death with the presence or absence of a given condition: Among infants and children under five diarrhea is perceived to be a common, seasonal occurrence! It is more often associated, if at all, with the natural development of a child than it is with poor environmental conditions: To most rural communities, reducing or eliminating the diarrhea might appear unnatural or "unhealthy!"

WATER SUPPLY AND SANITATION, AND HEALTH STATUS IN RURAL AREAS

While data on infant and child mortality and nutritional status are collected by health information or surveillance systems--and reflect the effects of water supply and sanitation programs--the linkage is recognized by

the "health" professional, not necessarily the parents! At the same time, every health worker is aware that these data are also dependent on variables other than water and sanitation! Income, housing, food supplies, feeding practices, and access to health care and other variables may obscure the effects of water and sanitation conditions! It is clear that using morbidity data for specific water-related diseases or groups of diseases (such as diarrheal disease) avoids this problem, but these indicators are very costly and difficult to collect!

While the gross indicators of health status are relatively the same for urban, periurban, and rural populations, the causes of morbidity, mortality, and poor growth and development are often very different! Rural areas generally have lower populations densities, are without centralized water supply and sanitation systems, and usually live close to bodies of water that may be a source of water-based or water-related disease morbidity and mortality! On average, rural populations are more susceptible to and more afflicted by water-related disease than are urban and periurban populations!

Table 2 presents a commonly used classification system for water-related diseases that has four categories: water-borne, water-washed, water-based, and water-related insect vector! Diseases that are spread by fecal-oral routes, as are many of the diarrheal diseases, usually fit into both the water-borne and water-washed categories! These diseases are spread either directly by the contamination of drinking water by pathogenic feces, or indirectly via clothing, utensils, or other carriers that are improperly cleaned or stored!

In most countries the availability of health services differs with the degree of urbanization as well! Because many health systems do not segregate their statistics by rural/urban, and fewer still distinguish periurban from either of the above, it is difficult to determine the portion of national health resources that go to each group! Where statistics are available, differences in definition of rural, periurban, and urban often makes comparisons between countries impossible! In spite of these statistical problems, it is clear that rural populations in most developing countries represent an under-served group in terms of health facilities, personnel, and materials!

While modern medicine may be underrepresented in rural areas, these areas have other health resources that are less well documented! These include traditional birth attendants, healers, and unofficial sources of medical advice such as shopkeepers or chemists! These resources and the web of social interaction found at the village level suggest entry points for primary health care (PHC) interventions!

Like health services, the provision of water supply and sanitation services poses some challenges specific to rural areas! Again, the data on the availability of potable water or waste disposal facilities are hard to find broken down by rural/periurban/urban subgroups! Table 3 presents PAHO

data that are aggregated and give an indication of the severity of the problem only on a national level. In rural areas the percentages of the population served are undoubtedly much lower:

Beyond any quantitative differences in the percentages of persons served by water and sanitation services in rural, periurban, and urban areas, there is qualitative variation: Rural water systems are more likely to be smaller in scale and less centralized than their urban counterparts: Lower population density and environmental differences make different levels of technology feasible and appropriate in each of the three settings:

The importance of water and sanitation in relation to health can be seen by looking at the right-hand side of Table 3: Again, keep in mind that these data are not segregated by setting and only represent deaths due to enteritis and other diarrheal diseases in children aged one to four years: Too rarely are the morbidity and mortality for all water-related diseases and all segments of the rural population considered together: Data on malaria incidence or schistosomiasis are seldom analyzed along with statistics on onchocerciasis and trachoma: When this is done, the health significance of water and sanitation becomes even more apparent:

RURAL COMMUNITIES PERCEPTION OF THE VALUE OF WATER SUPPLY AND SANITATION SYSTEMS

While the relationship is obvious to health planners, the linkage is not always so clear in rural communities where water quality is more often judged by taste, smell, or color than by the presence of pathogens: Water systems are often viewed as labor-saving devices for households or agricultural inputs rather than necessary components for disease prevention and health promotion: Because there are no such obvious auxiliary benefits from latrines, sanitation programs are at an even greater disadvantage:

One author has suggested that the health benefits of a water and sanitation system are the difference between what the public is willing to pay for the system and its total cost:¹ When this theoretical calculation is carried out, no part of the systems remains unpaid for: This assumes that the health benefits are not perceived by the public as having any value at all: Too often this is the case: In order to gain community support for and participation in water programs, all linkages, including the relationship between water supply and sanitation and health, must be made clear:

The concept of linkage must not only exist in the minds of the target populations, but must be reflected in the design of the programs as well: For instance, a recent analysis of studies of the impact of water supply and excreta disposal on diarrhea morbidity and mortality² emphasizes the importance of excreta disposal in water and sanitation programs: In an analysis of water- and excreta-related diseases and the relative importance of

alternative measures for their control³ (summarized in Table 4), Feachem develops a scoring system and suggests the following approximate ranking for the overall importance of the prevention measures listed below:

Excreta disposal	24
Water availability	17
Personal and domestic cleanliness	17
Food hygiene	16
Excreta treatment	15
Water quality	11
Drainage and sullage disposal	6

This and other work makes the importance of linking water provision and excreta disposal very clear. Still, while the provision of safe water is essential to the prevention of water-related diseases and may provide an entry point for programs for excreta disposal and hygiene education, safe water alone will not prevent these diseases.

COMMUNITY PARTICIPATION, PHC AND WATER SUPPLY AND SANITATION

The linkages between the concepts behind primary health care and water supply and sanitation programs are important as well. As stated in the keynote address of the Alma Ata Conference in 1978, the watchwords of the primary health care movement are community participation, self-reliance, and self-determination.⁴ The address also states that all persons have the right and duty to participate individually and collectively in the planning and implementation of their health care.

Communities participate in primary health care programs in rural areas in a number of ways. For example, they provide labor to build clinics, choose community health workers (CHWs) for training, and in some programs pay fees either for treatment or for essential drugs. They are less often directly involved in the planning or evaluation of the services they receive.

In many water supply and sanitation programs the opportunities for participation are even greater. Communities can have direct involvement in the identification of sources, project design, construction, and administration--including the equitable distribution of costs among users, repayment of loans, and expansion of services, maintenance, and evaluation.

In addition, a newly developed, simplified test for water quality affords even greater opportunities for communities to participate in the monitoring of water supplies. This test has been used in India and Papua New Guinea and measures hydrogen sulphide, a gas produced by organisms associated with coliforms in drinking water.⁵ The test is simple, reliable, quick, inexpensive, and especially suited to testing water quality in rural areas where laboratory facilities are not available.

Community participation and program success are synergistic: A successful water and sanitation program can serve as impetus for community involvement in other programs that contribute to improvements in the quality of life: Because they are directly involved in household water collection and use, women are natural choices for membership on community water and sanitation committees: Their participation in these programs can enhance their political roles in other areas as well:

INTER AND INTRA SECTORIAL COORDINATION OF PHC INTERVENTIONS IN RURAL AREAS

It might be worthwhile to note that community participation is a concept most often associated with rural populations: In part this is because rural communities, unlike urban and periurban settlements, have an agricultural economy that requires close and effective cooperation: At the same time, the high degree of community participation in many rural water and sanitation projects suggests that government agency water and sanitation departments lack the personnel required to secure national coverage, as much as the belief that community involvement is paramount to success: Personnel limitations have benefited many rural development programs because water and sanitation agencies have had to develop inter and intrasectorial linkage to accomplish their goals: Indeed, as many projects in Latin America show, when these linkages have not been established, the prospects for long-term impact are severely jeopardized:⁶

As many successful water and sanitation projects have found, the most effective link to the rural community is through the community health workers (CHWs), the village-level volunteers or health-system employees who form the backbone of many primary health care programs: Community health workers can and do fulfill many functions: They can promote the idea of water and excreta disposal and educate local people to the health benefits of these systems: They can help organize committees to discuss the need for a project and serve as a liaison between the community and regional water and sanitation agency staff: Once systems are in place, CHWs can help promote and monitor their use: They can also be trained to assist with village administration or maintenance of systems: Because CHWs live in the villages that they serve they can provide the kind of community organization, education, and follow-up in a water and sanitation project that could only be duplicated at great expense by water and sanitation agencies:

While the sharing of personnel can result in economic savings, the coordination of multi-sectorial projects is often difficult: An example of some of the problems that need to be overcome can be found in the case of The Rural Water Supply and Sanitation Project (PRASAR) in Honduras, although the other rural water and sanitation projects could also be cited:^{7,8}

The AID project in Honduras was initiated to improve rural community health status through community participation in their own water supply and

sanitation systems in five northwestern departments of the country! The project was to be administered by a project committee (PC) composed of a project coordinator appointed by USAID and three project directors--one each from the National Water Supply and Wastewater Disposal Service (P/SANAA), the Ministry of Health (P/MOH) and the Office of Health Education (P/OHE), a subdivision of the MOH! Figure 1 is a diagram of the organization: P/SANAA was responsible for piped water and sewage systems; P/MOH was responsible for latrines, wells, and windmills; and P/OHE was responsible for health education and training inputs!

As might be expected when trying to integrate staff and procedures from three different departments, problems arose almost from the beginning of the collaboration! P/SANAA handled most of the administration for the project and government regulations held up disbursement of funds! None of the project directors had the authority to make project decisions! All issues had to be referred to each department's hierarchy! In addition, because the Office of Health Education fell administratively within the MOH, those charged with health promotion activities lacked the autonomy to be an equal partner in the discussions and negotiations! OHE also lacked the resources to carry out its assigned role fully!

An analysis made while the project was still in progress suggested how some of these issues could be resolved! Many of the problems were successfully addressed and the project moved more efficiently towards meeting its goals!

The problems encountered in the Honduras project are not unusual! Indeed, since it appears easier to define the product or end point of a given system--and in water supply and sanitation programs this is too frequently measured in installations, facilities, or systems--the process of designing, implementing, and monitoring the interventions and the institutions needed to sustain them is given less attention! For example, in a USAID rural water and sanitation project in Peru,⁹ there were similar problems with coordination, this time between the Dirección de Ingeniería Sanitaria (DIS) and the MOH! One consultant's analysis of the lack of coordination¹⁰ suggested that:

Part of the problem stems from the fact that the Rural water and Sanitation Program is seen primarily as an engineering activity staffed by engineers! As such, it has been relatively isolated from the medicine/health-oriented program and personnel of the Primary Health Care System! Communication between the two programs is limited! A task of the integration process is to bridge the information and communication gap!

Some of these issues were solved through a series of regional workshops that brought local agency staff from both organizations together for discussions on how they could work together more effectively! In addition, it

was suggested that the members of the DIS Regional Water Supply and Sanitation Offices and their counterparts in the MOH form a regional Water Supply and Sanitation Association that would meet periodically to discuss common problems and promote a closer working relationship between the two groups:

When plans were later drawn up for the decentralization of both the MOH PHC project and the Rural Water and Sanitation program, training units for regional staff for each agency were designed to complement one another! A plan was drawn up to encourage collaboration between programs whereby PHC personnel would train Rural Water and Environmental Sanitation staff in community organization and promotion skills, health education, and basic elements of PHC: In turn, DIS staff would develop modules on rural water and sanitation:

CONCLUSIONS AND COMMENTS

While the association between water supply and sanitation programs and better health status is widely accepted among health professionals, in rural areas especially this relationship is not well understood: Rural populations value water resources highly and any number of examples can be cited that indicate the lengths to which rural communities will go and the amounts each will pay to obtain a more accessible water source or to enhance the utility of an existing supply--but water in this context and without sanitation measures will not necessarily improve the health status of rural communities:

This improvement can only be done if the community is the participant as well as the beneficiary of the program, and a direct link of forged between PHC and water and sanitation programs: Since parents do place a high value on the viability of their children and do respect the community health worker, often the only health care provider at the village level, it is incumbent on those responsible for PHC and water and sanitation to define and establish and effective collaboration:

Current evidence suggests that this is not happening: The development assistance agency of the USA has made millions of dollars available for "Child Survival Programs," defined as Oral Rehydration Therapy (ORT) and immunization: None of these funds are available for water and sanitation programs: In part, as noted above, this is because water and sanitation programs have been presented or viewed as technological systems, products, or hardware and not as health and development interventions: Until those responsible for water and sanitation and those involved in PHC understand how water and sanitation improve the prospects for child survival--for example, how ORT without water and sanitation is at best a secondary intervention--and can convey that message to policymakers in governments and parents in rural communities, the existing situation is not likely to change:

This reality should not precipitate a sense of depression! Indeed, the current concern for ensuring the survival of the world's children, especially those living in rural areas, should provide an opportunity to involve PHC workers in water and sanitation programs, and make parents aware of an participants in these activities! It remains to be determined how this mission can best be accomplished! It is certain, however, that rural populations must be involved in all phases of the programs, that inter- and intrasectorial cooperation must be ensured, and that those responsible for health must view water and sanitation as an integral part of a comprehensive program, and not an auxiliary or independent program!

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TABLE 1 SELECTED INDICATORS FOR COUNTRIES IN LATIN AMERICA¹

COUNTRY	URBAN POPULATION AS A PERCENTAGE OF TOTAL POPUL.	% TOTAL GOV'T EXPEND. ON HEALTH	INFANT MORTALITY (AGED UNDER 1)	CHILD MORTALITY (AGED 1-4)
ARGENTINA	84	1.1	36	1
BOLIVIA	43	2.0	123	21
BRAZIL	71	7.8	70	6
CHILE	82	6.8	40	2
COLOMBIA	66	-	53	3
COSTA RICA	45	32.8	20	1
CUBA	70	-	20	1
DOMINICAN REPUBLIC	54	10.7	63	5
ECUADOR	46	7.7	76	7
EL SALVADOR	42	7.1	70	6
GUATEMALA	40	-	67	5
HAITI	27	-	107	15
HONDURAS	38	-	81	8
MEXICO	69	1.3	52	3
NICARAGUA	55	-	84	9
PANAMA	50	13.1	26	1
PARAGUAY	41	3.7	45	3
PERU	67	-	98	12
TRINIDAD & TOBAGO	22	5.9	28	1
URUGUAY	85	3.3	38	2
VENEZUELA	85	7.6	38	2

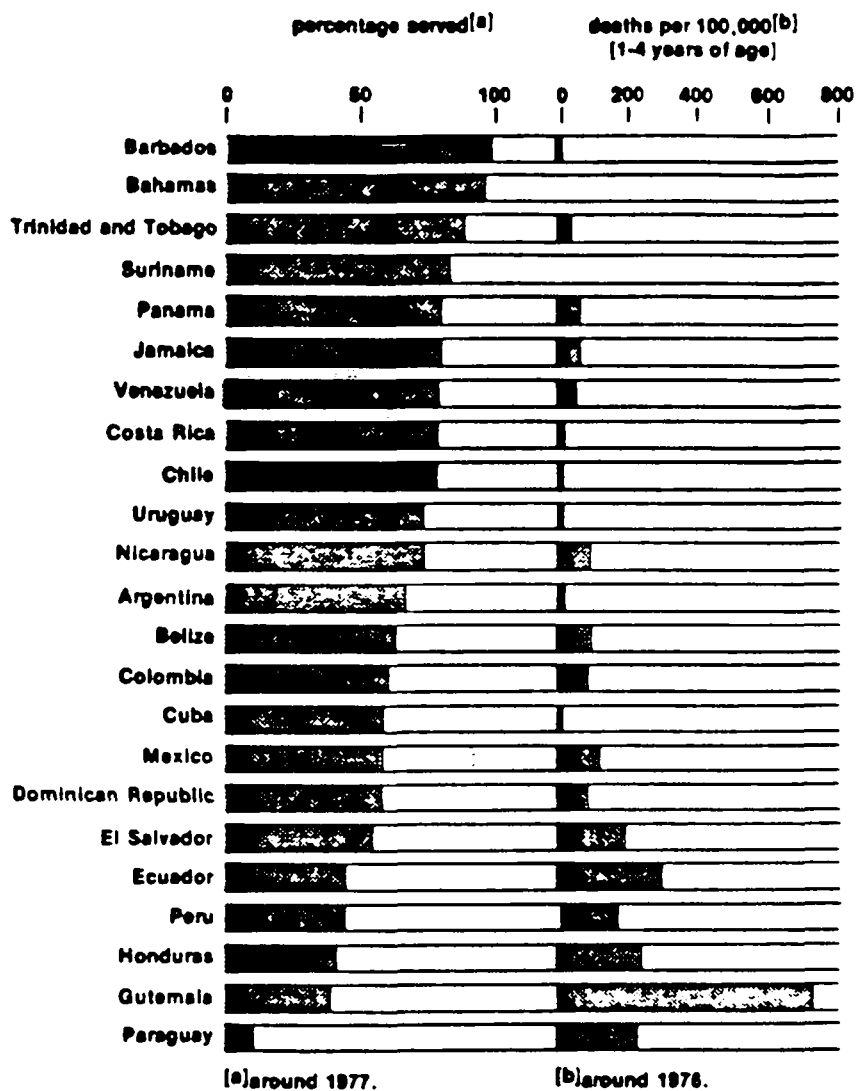
¹ Source: The World Bank, World Development Report 1985

TABLE 2 CLASSIFICATION OF WATER-RELATED DISEASES

<u>TYPE</u>	<u>COURSE</u>	<u>EXAMPLES</u>
Water-borne	pathogens in water consumed by humans	cholera hepatitis
Water-washed	lack of water for hygiene	louse-borne typhus scabies trachoma
Water-based	pathogens with part of the life style in an aquatic animal	guinea worm schistosomiasis
Water-related insect vector	insects that breed in or bite near water	malaria onchocerciasis yellow fever

TABLE 3 PERCENTAGE OF THE POPULATION SERVED BY POTABLE WATER AND DEATHS:††

Percentage of the population served by potable water and deaths from enteritis and other diarrheal diseases per 100,000 children ages 1-4 years, by country, 1977 or latest year.



Source: WHO. Strategies for Extending and Improving Potable Water Supply and Excreta Disposal during the Decade of the 1980s. PAHO, Scientific Publication No. 390 (Washington, D.C., 1979), p. 12.

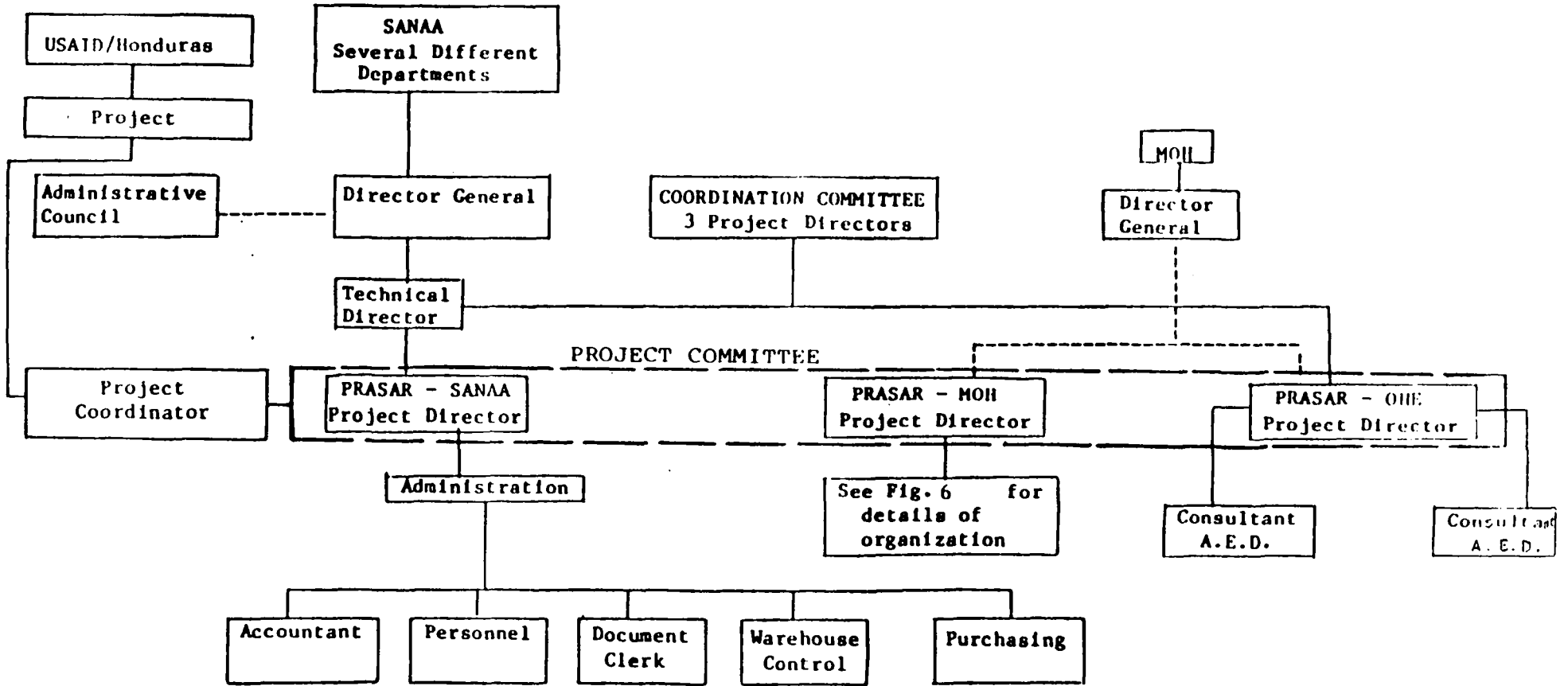
TABLE 4 THE DECADE-RELATED INFECTIONS AND THEIR CONTROL

Importance of alternative control measures¹

Infections	Water quality	Water availability	Excreta disposal	Excreta treatment	Personal and domestic cleanliness	Drainage and sullage disposal	Food hygiene	Public health importance
Diarrheal diseases and enteric fevers								
Viral agents	2	2	1	1	2	0	1	3
Bacterial agents	3	3	2	1	3	0	3	3
Protozoal agents	1	3	2	1	3	0	2	2
Poliomyelitis and hepatitis A	1	3	2	1	3	0	1	3
Worms with no intermediate host								
<u>Ascaris</u> and <u>Trichuris</u>	0	1	3	2	1	1	2	2
Hookworms	0	1	3	2	1	0	1	3
Beef and pork tapeworms	0	0	3	3	0	0	3	2
Worms with intermediate aquatic stages								
Schistosomiasis	1	1	3	2	1	0	0	3
Guinea worm	3	0	0	0	0	0	0	2
Worms with two aquatic intermediate stages	0	0	2	2	0	0	3	1
Skin, eye, and louse-borne infections	0	3	0	0	3	0	0	2
Infections spread by water-related insects								
Malaria	0	0	0	0	0	1	0	3
Yellow fever and dengue	0	0	0	0	0	1	0	3
Bancroftian filariasis	0	0	3	0	0	3	0	3

¹0 = no importance; 1 = little importance; 2 = moderate importance; 3 = great importance

FIGURE 1



PRASAR Project Organizational Diagram

Source: Pineo, CS and Van, H. Diagnosis and Recommendations for Rural Water and Sanitation System in Honduras. WASH Field Report No. 69 January 1983.



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**SIMPOSIO REGIONAL SOBRE
Abastecimiento de agua y saneamiento —
un elemento de la atención primaria de salud**

Guatemala, 10 - 14 de noviembre de 1986

**WATER SUPPLY AND SANITATION AND
PRIMARY HEALTH CARE IN URBAN AREAS**

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DR. C. VIEIRA, HSP



**REGIONAL SYMPOSIUM ON
Water supply and sanitation —
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INDEX

	PAGE
1. INITIAL CONSIDERATIONS	1
2. THE PROCESS OF URBANIZATION AND ITS REPERCUSSIONS ON HEALTH	3
3. ENVIRONMENTAL HEALTH PROBLEMS IN URBAN AREAS	6
4. POLITICAL AND ADMINISTRATIVE ORGANIZATION OF URBAN AREAS	7
4.1 Impact on Health Services	7
4.2 Impact on Water Supply and Sanitation Services	8
5. WATER AND SANITATION SERVICES IN URBAN AREAS	9
5.1 Water Supply and Sanitation	9
5.2 Solid Waste	10
6. ELEMENTS OF PRIMARY HEALTH CARE (PHC) RELEVANT TO URBAN COMMUNITIES AND ITS RELATION TO WATER AND SANITATION	11
7. COMMUNITY PARTICIPATION, PHC, AND SANITATION SERVICES	12
8. INTERSECTORAL AND INTRASECTORAL COORDINATION	15

WATER SUPPLY AND SANITATION AND PRIMARY HEALTH CARE IN URBAN AREAS

INTRODUCTION

Suitable drinking water supply and sanitary disposal of wastewater and excreta constitute an important component of the strategy of primary health care, together with: 1) health education; 2) food and nutrition; 3) maternal and child health; 4) immunization against the major infectious diseases; 5) prevention and control of local endemic diseases; and 6) supply of essential drugs.

In urban areas, there is still some uncertainty as to the relationship among these components and, even more, with respect to their application, where the necessary coherence is lacking. Hence, primary health care should be viewed as it was originally conceived: a set of basic actions to promote the health of the entire population, including the urban as well as the rural population.

As expressed in the objectives of the Regional Symposium on Water Supply and Sanitation--an element of Primary Health Care--, it is hoped that this meeting will formulate guidelines to better define the concept of and facilitate the integrated programming of primary health care and contribute effectively to the goal of Health for All by the Year 2000.

This presentation also includes solid wastes since this area constitutes, along with water supply and the disposal of excreta, an important factor of environmental health in the urban and metropolitan context.

1. INITIAL CONSIDERATIONS

One of the most important changes in the demographic evolution of the Region, especially in the countries of Latin America, is the geographical redistribution of the population.

In 1970, the urban population of the Americas, observing the definition established by each country, totalled 330 million inhabitants, constituting 64.8% of the total population. In 1980, the urban population was 430 million inhabitants, representing 70% of the total population. It is estimated that the population of the Region of the Americas will increase 26% between 1985 and 2000, reaching a total of 844 million inhabitants.

This increase will be clearly centered in the cities, whose total population will grow 35%, rising from 474 million to 642 million, while the rural population will show an increase of about only 4%, rising from 194 million to 202 million. Thus, of the 176 million people that will be added to the population of the Americas by the end of the century, 168 million will be located in the cities and eight million will be in rural areas. This means that, by the year 2000 in the countries of Latin America, an average of three

out of four persons will live in urban areas. As a result, the overall percentage of urban inhabitants will rise from 71% to 76%.

Urban growth in Latin America and the Caribbean will be much more accelerated in cities of over one million inhabitants: in 1985, these cities numbered 34, with a population of 119 million; by the year 2000, there will be 55 of them, with 204 million inhabitants. During this same period, the rest of the urban population will increase from 161 million to 215 million.

The observed growth of the urban population at a rate 4 to 5 times higher than the growth rate of the rural population is due mainly to net migration from the rural areas, rather than to natural growth. The phenomenon of urban attraction can be explained by three fundamental aspects that people see as advantages:

- a) Higher levels of personal income in urban areas.
- b) Inelastic demand for agricultural products in such a way that higher incomes increase the demand for nonagricultural products.
- c) Greater productivity of the population in urban areas, measured in terms of goods and services.

Of particular interest here is the fact that urbanization--and especially metropolitanization--has not been triggered by a process of economic development that would be able to absorb the population growth of the cities into productive activities. As a result, many of the new urban dwellers are involved in the tertiary sector of the economy, mainly the informal labor market.

The economic movement generated by urban growth creates, however, some negative implications for certain groups of the population, to wit:

- i. Increases in income do not show equitable distribution, since jobs in the formal sector grow at a lower rate than the expansion of urbanization.
- ii. Municipal funding systems are not able to provide the minimum social and service infrastructure for the growing needs of the population. Cities have grown without proportional expansion in their systems of housing, education, recreation, transportation, health, and sanitation. Frequently, the social groups that live in such conditions are also deprived of suitable channels of representation and, hence, their political participation in the decisions that affect them is limited and relatively ineffective. Moreover, expansion of unplanned services has reduced the quality of the planned services that are provided to the urban sector.

- iii. On the environment, especially the harmful effects of air and water pollution and densification of the population, and the increase in social tension associated with crime, noise, drug abuse, and increased possibilities for the spread of infectious diseases, related to all of the foregoing factors.

This accelerated process of urbanization has resulted in large nuclei of lower income groups relocating in the cities of the Region and, for the most part, growth has focused in this population group: an estimated 40% of the urban population belongs to this category. The low income areas are of different types, ranging from slums and improvised settlements to "almost legal" neighborhoods with varying degrees of complexity, different backgrounds, and a range of socioeconomic conditions. The factors common to these settlements are precarious dwellings, precarious or nonexistent services, and intermittent family income that is unequal and unstable. The low income areas are divided into three groups: 1) shantytowns, which include most of the rented dwellings that do not present characteristics of urbanization, capital investments, or substantial improvements in infrastructure; 2) invasions, where the occupants maintain some type of monetary value or exchange of the dwellings and the land; and 3) "almost legal" settlements, in which the Government gives a hand, by commission or omission in their foundation.

The following schematic map does not describe a strict scheme of what occurs, but rather seeks to guide policies in order to deal with such problems.

2. THE PROCESS OF URBANIZATION AND ITS REPERCUSSIONS ON HEALTH

The large cities of Latin America were already centers of political and administrative power and trade when the process of industrialization began in the first half of this century.

The point at which the process of urbanization began in the various cities has varied with the time period when it was initiated. The cities that began earlier developed a more adequate basis, as in the case of Buenos Aires, while those that began later are still experiencing periods of uncontrolled growth. In other cities, the process is beginning only now.

City size influences the characteristics of the migratory process. In Latin America, it seems that the larger the city, the higher the growth rate of its population. Thus, the estimated 40 million persons that make up the marginal urban population of Latin America reside in the largest cities, where they constitute a growing proportion of the population. There is, then, a general recognition that the marginal population tends to grow twice as fast as the urban areas in which they live.

The characteristics of the urbanization process tend to be manifested simultaneously and with greater intensity in certain sections of urban areas,

especially in the periphery of the cities, where slums and other forms of settlement arise--and in depressed central areas, such as shantytowns. Urban structure physically reflects these socioeconomic and political characteristics, constituting a mosaic of environments and situations depending on the location of the various social groups.

A fundamental expression of urban health is poverty, which is characterized by low employment or unemployment and which forces people to live in outlying areas and shantytowns where health problems are serious.

Since all of these characteristics are related to the health status of the population, the distribution of morbidity in cities tends to be compatible with the socioeconomic and political mosaic resulting from the process of urbanization. In the early 1980s, around 470,000 deaths per year (21% of the total for Latin America and the Caribbean) were caused by respiratory infections, diarrheal diseases, accidents and acts of violence, problems which are associated with the process of urbanization.

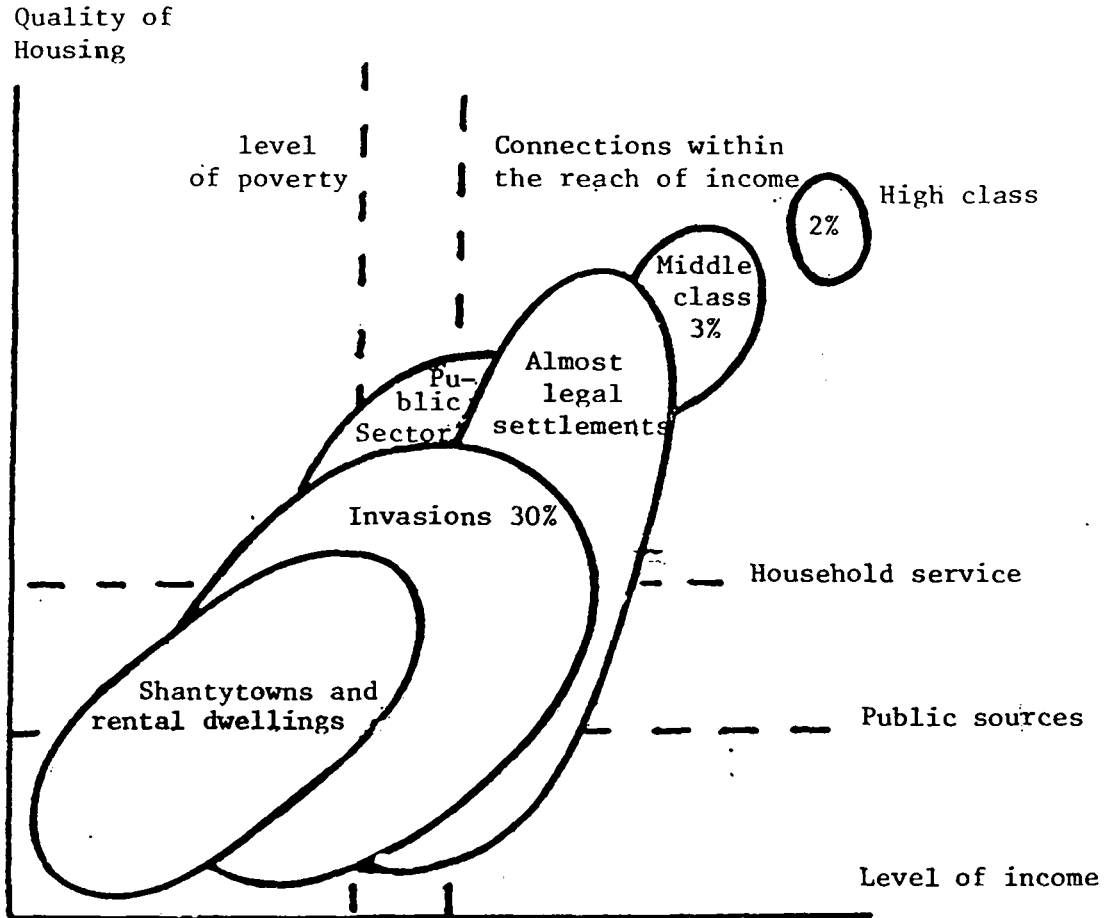
Although information available on the countries is usually in consolidated form, focal studies suggest that a high percentage of this mortality--as well as of the corresponding morbidity--can be attributed to these detrimental characteristics of the process of urbanization. In this regard, the respective rates of morbidity and mortality are proof of the inequities existing among urban social groups in terms of health status. So, the socioeconomic and political mosaic generated by urbanization is complemented by a coincidental and associated mosaic of health.

However, overcrowding of social groups in the cities is not absolute nor restricted to the location of the home. The population is continually in motion within the city, at different times during the day and, perhaps, shows seasonal variations, mainly between the home and the workplace. In addition, although at longer intervals, economic activity as well undergoes changes, thereby modifying how urban space is used and, thus, the characteristics of the population, including health.

The trend in the process of urbanization towards primary focus on the larger cities has negative implications. In economic terms, this trend gives rise to factors favoring unemployment, environmental pollution, and poor distribution and deterioration of social services. As a result, various situations are created presenting risks to the health of the urban population.

These characteristics of the process of urbanization in the Region have substantially modified the social organization of the family, of the neighborhood in general, and of the poorer groups. The problem of family organization is further aggravated by the feminization of the work force due to the growing difficulty of maintaining a family solely on the basis of the husband's income. This factor has a deep impact on the conceptualization of public policy for social welfare. Such a situation has had an unfavorable effect on children and endangers traditional family stability. Changes in

SCHEMATIC MAP OF HOUSING AND SERVICE CONDITIONS
BY LEVEL OF INCOME IN URBAN AREAS



Source: Dr. Tim Campbell

family makeup and dynamics have clear repercussions on the relevance or adaptation of programming orientations that are based on the concept of the nuclear, established family.

3. ENVIRONMENTAL HEALTH PROBLEMS IN URBAN AREAS

Industrialization, the modernization of local transportation, and the influx of millions of people from rural areas to the already densely populated metropolitan areas have produced a number of new environmental health problems that have a very strong effect on urban dwellers.

These problems are related to overcrowding, high population density, economic activity, transportation, and others. Such poor environmental conditions play a major role in the processes of disease, exposing the urban population to well-known and identified pathologies and risks as well as to others, where knowledge and approaches, in the developing countries, require further development. Health risks in the urban environment can be separated into two categories:

- a) Traditional problems that are linked to biological contamination which gives rise to communicable diseases. The main ones are: unsuitable water supply, sanitation, poor waste disposal, deficient housing, food safety, and
- b) More recent problems of environmental pollution, such as chemical contamination, air, water, and soil pollution, and food contamination, which present cancerigenic, mutagenic, and teratogenic risks. In many cases, specific identification of the pollutants has not been determined; also, comprehensive efforts have not been made to monitor and control contamination. These new risks include air pollution from specific industrial sources and energy plants, air pollution and excessive noise from the number of vehicles in the cities, toxic compounds from industrial waste and runoff from precipitation that carries pesticides, organic waste, heavy metals, and other kinds of contaminants to water and food supplies.

An important aspect to be considered is that not only physical but also mental health is affected by environmental conditions. It has also been recognized that responsibility for solving these problems lies, in many cases, beyond the responsibilities of the health departments; as a result, specialized agencies have been set up for environmental management with power to investigate and monitor the resulting problems.

Besides technological control, proper promotion of health in urban areas should require that the planning of cities, neighborhoods, and dwellings

include the following considerations:

- i. Analysis of the environmental impact of industrial development projects as well as the construction of roads, streets, etc.
- ii. Zoning regulations for airports, roads, electric plants, industrial and commercial establishments, and others;
- iii. Analysis of meteorological and topographical factors in the planning areas; and
- iv. Transportation, including mass transportation, during rush hours, and vehicle emission control.

The variety and complexity of the factors that affect urban health make it imperative that an appropriate frame of reference be established to effectively incorporate the strategy of primary health care in urban development in such a way as to enable the preparation and execution of concrete plans and programs that complement national efforts toward the goals of Health for All by the Year 2000.

4. POLITICAL AND ADMINISTRATIVE ORGANIZATION OF URBAN AREAS

4.1. Impact on Health Services

The political and administrative organization of cities in Latin America and the Caribbean and the combination of agencies from different sectors (private, public, or under the social security system) and having different structures (national, provincial, municipal, and local) involved in the delivery of services generate an intricate network of interrelationships and responsibilities that are unavoidably reflected in the organization and financing of health services.

Although health resources are usually insufficient in relation to the needs to be met in the cities of the Region, the relationship between resources and needs shows considerable differences, particularly when analyzed in terms of the different socioeconomic groups of the population. The determinants of these differences include indiscriminate incorporation of technology that does not take into account the economic conditions of the population, excessive specialization of human resources, lack of organization in the services based on levels of care, efforts to provide easy access to specialized services, the public's association of the concept of care quality with higher levels of specialization and complexity, and excessive growth of the pharmaceutical and medical equipment industry without regulations to control the incorporation and marketing of these products.

The fact that the health systems in these cities are made up of relatively independent components, with varied coverage and financing, gives

rise to serious problems related to the duplication of efforts, lack of communication, and the competence of and conflicts between institutional interests which limit the process of coordination and integrated planning. However, efforts have been made, with varying degrees of success, to ensure greater cohesion and integration within the sector.

Although health care resources and services are concentrated in the large cities in Latin America, one characteristic they show is irregular spatial distribution. Such distribution creates areas that are more needy from a service standpoint. These areas should receive priority for special attention.

One of the principal restrictions to the expansion of health services that has been observed in the countries of Latin America is the trend toward increasing delivery costs, which are approaching almost uncontrollable levels. Some of the main causes of this trend are the steady increase in the unit prices of the elements that are used as well as the combination of them, and their indiscriminate and unlimited use. The different types of resources and their combinations present various technological options whose characteristics influence the cost of services.

The incorporation of expensive and complex technologies is due, among other factors, to the fact that few agencies analyze the experience and research of other countries prior to incorporating the technologies nor do they supervise them. This has sometimes led to the mass incorporation of equipment and/or devices that have been advised against in other countries or eliminated altogether due to their ineffectiveness.

4.2 Impact on Water Supply and Sanitation Services

In regard to water and sanitation services, the political and administrative organization of the cities is less complex than for health services. In addition, there have been substantial advances in this regard that have enabled the progress currently being experienced by the cities in relation to these services.

Over the last two decades, the countries have made considerable progress in this regard. A number of large cities and metropolitan areas have set up decentralized mixed-economy companies that are based on commercial principles. These companies have been established with a view toward accelerating the fulfillment of the goals of extended coverage through self-financing and the application of modern administrative techniques to ensure efficient management and operation and the effective delivery of services to the community.

Since most of these companies were formed from a variety of municipal agencies and, therefore, had to change from a public strategy to a more commercial one, they have had to overcome numerous difficulties. There are still many organizational problems that have to be overcome, such as the

marketing of services, which should take account of the ability of the user to pay for services through equitable rates. In general, communication should be improved between the company and the public.

Furthermore, sufficient attention has not been given to other phases of the system, such as operation, maintenance, and administration. As a result, these phases are lacking, project facilities suffer, and the purposes for which they were constructed are not fully met.

The agencies that handle solid wastes, in general, are the traditional municipal agencies that have a series of limitations which impede proper management of these services. There should be changes, such as those made in the water and sanitation agencies, if the desired goal is to make substantial advances.

5. WATER AND SANITATION SERVICES IN URBAN AREAS

Drinking water supply, disposal of excreta and wastewater, and sanitary solid waste management are the fundamental nucleus of the basic sanitation services in the cities.

5.1. Water Supply and Sanitation

The need to provide water supply and sanitation services was recognized some decades back by the Governments of the countries of Latin America and the Caribbean. In 1961, the Governments, under the Charter of Punta del Este, took on the commitment to provide water supply and sanitation services to 70% of the urban population. In 1972, the health ministers of the Americas examined the progress made up to 1971 and set new goals for the 1970s in the Ten-Year Health Plan for the Americas. The urban goals were to provide water supply services through household connections to 80% of the population and sewerage to 70%.

In 1980, the Governments of the Region agreed to participate in the International Drinking Water Supply and Sanitation Decade launched by the General Assembly of the United Nations (IDWSSD). This international movement is designed to promote the urgent need of extending coverage of safe water supply and sanitation services to the greatest number of persons possible, giving priority attention to the less privileged population groups in need of these services who mainly reside in urban and outlying rural areas.

In the five-year period between 1981 and 1985, which corresponds to the first half of the IDWSSD, the urban population that had water supply services increased from 186 million (83%) in 1980 to 226 million (86%) in 1985, and the coverage of sewerage services and private sanitation facilities increased from 132 million (59%) in 1980 to 156 million (60%) in 1985.

The progress made in extending coverage during the first five years of the Decade (1981-1985) has been less than what was hoped for. If the increase

in water supply coverage for the urban sector is kept at 3% for the next five years, it will not be possible to attain the goal of 91% by 1990. Concerning achievement of the goal of urban sanitation, the increase of 1% over the past five years means that, if this rate were to continue, it would be possible to achieve coverage of 61%, instead of the proposed 69%.

Although some achievements have been noted in water and sanitation services--including the general recognition that consumers should pay for drinking water services, specific legislation that assigns institutional responsibilities for water and sanitation services, the establishment and enhancement of institutions, greater availability of funds from external sources and internal mechanisms in order to extend, or at least maintain, the coverage of water and urban sewerage that has been reached (although with notable differences among the countries)--there are still some limitations that hinder more accelerated progress in this process in the urban sector, mainly:

- Lack of familiarity, on the public's part, with the relationship between poor water supply/sanitation and disease, and poor expression of its needs and aspirations in that sense.
- Insufficient knowledge, understanding, and motivation by political and administrative authorities as concerns the socioeconomic importance of drinking water supply, sewerage, and the disposal of excreta.
- Limited financial policies, infrastructure, and legal system for carrying out programs for water supply, sewerage, and disposal of excreta more rapidly and more efficiently.
- Managerial weakness and lack of effective programs for institutional strengthening, including manpower development.
- Frequent use of expensive technologies that are not always appropriate for the social, economic, and cultural conditions of the cities.

5.2. Solid Waste

The production of solid waste in the Region is generating a real demand for sanitation services with special characteristics that vary with the size of the city. The continuing rise in solid waste production is essentially a result of accelerated urbanization and an increase in the refuse produced per inhabitant.

The production of refuse per capita (PPC), which had been growing throughout the 1970s at an annual average of 2% by weight, has remained steady or has even fallen slightly over the last two years, coinciding with the stagnation or reduction of per capita income. Even so, this contribution is

already high and, surely, once the economy is reactivated, the PPC increase. Today, then, 160,000 tons of refuse per day should be handled in the urban sector in Latin America and that amount will probably double by the year 2000.

Management of this solid waste has become increasingly difficult within this process of urbanization. Higher density in the central areas and unplanned extension of marginal areas mean that activities such as collection, which did not used to be very complex, now require new approaches in their technological, financial, and especially community participation aspects.

It is estimated that approximately 70% of urban waste is collected in the cities of Latin America and the Caribbean. As is the case with drinking water, 30% of the population which is not served with collection resides mainly in marginal and slum areas of the cities. Concerning the final disposal of solid waste after collection, only 20% is disposed of in a sanitary fashion.

The common problems of the cities in regard to solid waste are:

- a) Increased generation of solid wastes.
- b) Accelerated urban physical marginality.
- c) Greater metropolitan population.
- d) Increased production of specialized solid wastes, including toxic substances.
- e) Lack of intersectoral and intersectoral institutional coordination.
- f) Limited community participation.
- g) Weak structures in public sanitation agencies.
- h) Problems in public sanitation agencies with respect to the planning, operation, maintenance, marketing, administration, and development of human resources and the financing of services.

In general, for water supply, sanitation, and solid waste, the challenge of the upcoming years will be to extend coverage and improve efficiency within the current economic situation of the Region which has imposed an acute crisis on the Governments and has affected social services.

6. ELEMENTS OF PRIMARY HEALTH CARE (PHC) RELEVANT TO URBAN COMMUNITIES AND ITS RELATION TO WATER AND SANITATION

The Declaration of Alma-Ata formalized the concept that Primary Health Care is the basic strategy in order to achieve Health for All by the Year 2000. It also indicated that PHC should be accessible at a cost that the

country and the community could pay, through methods that would be practical, scientifically valid, and socially acceptable. Each person in the community should have access to and be involved in that strategy, which, besides proper water supply and sanitation, includes health education, food and nutrition, maternal and child health, immunization, prevention and control of infectious diseases, and the supply of essential drugs.

In turn, the General Assembly of the United Nations launched the International Decade of Water Supply and Sanitation in November 1980 for the period 1981-1990 and resolved (Resolution 35/18) that during the Decade the Member States would assume a commitment to achieve substantial improvements in the standards and levels of water and sanitation services by the year 1990.

Although both recommendations share certain points which were presented for the first time in an integrating approach, the relevance of PHC in the cities and its relation with water and sanitation services are not always easily perceived or envisaged by government policies. This may be due to the fact that overemphasized specialization, both in the health field and in water and sanitation, particularly in the cities, makes it difficult to interpret the postulates of PHC that are compatible with the complex urban reality.

Hence, we see, on the one hand, that health services often tend to be concentrated in given areas within cities, where there is a predominance of establishments with high technological capacity. Water and sanitation services, on the other hand, often have to deal with other dimensions that may distract them from their concerns with the impact on health.

There is then a need for a special effort in both areas in order to overcome these conceptual, institutional, and technological difficulties and open the way for a common PHC approach that would be applicable to the cities.

Thus, the programs for water and sanitation can serve as a starting point to support the implementation of other components of PHC.

In addition to the technological challenges in properly handling these problems, it was necessary to devote special attention to the promotion of community participation and coordination, both intersectoral and intrasectoral, which, in the city, acquire characteristics that are quite different.

7. URBAN COMMUNITY PARTICIPATION, PHC, AND SANITATION SERVICES

Community participation in water and sanitation services in urban areas depends on location and socioeconomic level and, hence, responds to different risks to health. It is possible to identify three different groups which require, in turn, different forms of participation:

- Group of users that have services, mainly through connections to single or multi-family dwellings for water supply and sanitation.

- Group of users who live in shantytowns within the city and have limited health services which are used collectively by a great number of persons.
- Group of users in marginal urban areas who are covered only very partially with water supply and sanitation services.

Generally, there has been very limited community participation in the cities of Latin America and, even then, not in all three of the target groups. Municipal health and housing agencies, national organizations, and water and sanitation companies have done very little to encourage and take advantage of this potential.

In the culture of the countries of the Region, planning and construction are aspects in which urban dwellers are rarely involved. The community is not consulted in the planning stage on the type of service to be selected, the location of wastewater treatment plants, transfer stations, or sanitary landfills, or the location of storm-water sewers. Some of the countries of the Region have recently begun to seek community participation in marginal urban areas for the excavation of ditches for water pipelines and solid waste management, but these are still principally isolated small-scale test projects. Slum communities have even less experience in this regard.

There has not been any community participation, in these three urban population groups, in the operation and maintenance of water supply and sanitation services. Frequently, sewage and storm-water catch basins become clogged with solid waste; manhole covers and water meters disappear or are broken; in the marginal areas, faucets at public drinking water pumps disappear and fire hydrants are broken or vandalized. These and other facts are proof that the urban community does not identify with this service and, therefore, does not consider it important to ensure its operation and maintenance.

Community participation in the administration and financing of urban services continues to be very weak. The urban community is not familiar with or understand costs for services or why rates should be paid, the importance of metering water, how much water is wasted in the home, the need to pay for services on time, the harm caused to the administration of the service by clandestine connections, the importance of ensuring the honesty of service staff, or the possibility of financing the extension of the services to slum areas and to marginal urban areas, as well as other elements related to management of the services which have a major impact on efficient operation. In some cases, the board of directors of a sanitation company includes a representative of the users or neighborhood committees; he is usually appointed by the national or local government and is not, therefore, a true representative of the community.

There has not been any systematical encouragement of community participation in health education and the sanitary and rational use of water

supply and sanitation services. The recommendations that are formulated in some cases, such as in emergency circumstances, are welcomed with little enthusiasm and little sense of responsibility; so, the community underestimates them. Examples of such recommendations include: waste and loss of water within the house; deficient in-door sanitary facilities and possible cross-connections; overuse of water in gardens; installation of private swimming pools without recirculation of water; subterfuges in order to avoid water metering, and others.

In recent years community participation has assumed an increasingly important role in the development process. This is especially true in the health sector, where, within the structure of Primary Health Care, it has been established that the communities have the right, and responsibility, to be involved in the planning and implementation of its own health programs.

Furthermore, as concerns drinking water, sewerage, and solid waste management services, planners have arrived at the conclusion that community participation is an essential component for the success of programs and projects. This represents a radical change from previous procedure under which the community was seen as the passive receptor of services that were planned and provided by the local or national government.

However, projects which have traditionally been handled in a centralized manner cannot be expected to change overnight into a system with greater community participation. In many countries, this will require significant changes in policies along with the reorganization and reorientation of managers and institutions, especially a change in attitudes for everyone.

Some of the special problems of community participation that will have to be faced by urban primary health care are:

- a) The lack of homogeneity in many urban communities compared with the situation in rural areas.
- b) Individualism tends to be much higher in urban areas and the collective sense of responsibility is, as a result, lower.
- c) The poorest strata are those which frequently are the most difficult to reach, although their health needs in this case are the greatest.
- d) It will be difficult to maintain a volunteer spirit in order to reach long-term programs for primary health care.
- e) Coordination is consequently much more difficult.
- f) Resistance to fundamental changes in health care is greater in urban areas, where medical resources are concentrated.

8. INTERSECTORAL AND INTRASECTORAL COORDINATION

The new health strategy that was determined at Alma-Ata (1978) restructured the priorities of the health sector making primary health care the principal focus. This shifted health care from a perspective predominantly oriented toward disease and disease treatment to one that gives greater emphasis to disease prevention and the promotion of health. Conceived in these terms, the improvement of health would require not the delivery of services from the health sector alone, but a contribution from other sectors, in particular, agriculture, industry, education, housing, public works, communications, and other areas. Intersectoral cooperation, thus visualized, would tie health in with factors outside its area, but which have an impact on health. In this way, intersectoral cooperation emerges as a cooperative action to produce the best results in health at the lowest possible cost. Consequently, such cooperation will require broader forms of coordination among policies than those used so far in the health sector.

In recent years, it has also been recognized that improvements in health constitute a goal of development itself. Significant changes in the health status of a country will, without a doubt, provide the most relevant indicators of the type and quality of development that it has achieved. Health goals should of course be incorporated as part of the goals of other sectors that are involved, and the components of health-related policies in different sectors should be clearly articulated.

It should be recognized that primary health care is a comprehensive package of services, which includes water supply, sanitation, housing, nutrition, basic health services, employment, education, and others. In any case, it is important to recognize that it does not make any difference where the first step is made, since primary health care is a cycle of interdependent activities.

Urban primary health care will only be able to progress through the help of some fundamental changes in attitude and relationships with and within the health systems and sectors, since the services of some simply cannot be added to others. In order for primary health care to be successful in urban areas, there will have to be some changes in the approach of the government, particularly from that of providing assistance to one of urban development. Available resources should be mobilized, including the various levels and agencies of the government, the private sector, nongovernmental and international agencies, and others. Consideration should be given to the resources of the communities, regardless of how poor they may be--underserved communities are not always poor in terms of cash. Research undertaken in the less favored populations of some cities has shown certain types of informal industry and trade that provide good support and economic capacity.

In the urban environment, health problems related to water, sanitation, and housing along with employment and education definitely require intersectoral action in order to be handled fairly, efficiently, and

effectively. Such intersectoral action would consider the following points, among others:

- a) Collaboration and intersectoral action should be based on the needs identified in the city for community involvement;
- b) This action should be implemented through activities carried out jointly with the agencies whose responsibilities are related to the solution of specific problems faced by the community;
- c) The commitment and attitudes of health workers and the other sectors involved in this action play a crucial role without which intersectoral mechanisms would not be possible.

In regard to water supply and sanitation, the first area that requires intersectoral action is the recognition and acceptance that access of the entire population to these services is indispensable for their health and well-being. Although the public works sector frequently assumes responsibility for planning, carrying out, operating, and maintaining these services, this function maintains its important influence and its basic purpose, which is to promote health. However, the agencies responsible for performing these functions are not able to motivate changes in behavior or to provide relevant information to ensure that proper use of the services will promote the health of the population.

Moreover, it should be recognized that the health ministries have an important role to play during all the phases of development of the urban services, including planning, where priority would be given to care for groups at greater risk, promotion of resource allocation, establishment of engineering and construction standards to protect health, inspection and monitoring of service quality, health education of the community, and others.

Similar intersectoral ties should be maintained with the agencies that monitor and regulate the use of water, in conditions similar to those described above, so that water quality remains suitable for human consumption and so that it will be possible to estimate the amount of water that should be allocated for this purpose.

The ministries whose areas of action could involve harm to the environment, such as agriculture, industry, and others, should also share responsibilities geared toward the goal of water supply and safe disposal of waste.

Other expressions of the need for intersectoral action for water supply and sanitation with primary health care are:

Intersectoral action in the urban area and its development. It is desirable and necessary to establish ties between health projects, including those for water and sanitation, and programs for urban

development, especially large-scale ones. Health considerations frequently tend to be relegated to a level of insignificance and their impact is greatly limited. Urban development that does not take such a view may have a negative impact on health, if it promotes overcrowding, increased immigration, pollution, noise, and other risks to health. In these cases, frequently the poorest members of the community are the ones who pay the highest price for such development, and it is mainly their health that is affected.

Intersectoral action in housing. Many housing projects for low-income groups have been the result of geographical displacement and replacement with projects for families in relatively better economic conditions. In this regard, the poor are left to very precarious dwellings in need of services and this frequently increases their poverty. Aside from the advantage of the lower costs for these new dwellings, no research has been done to establish the relationship between health levels and the quality and cost of housing. Some programs to improve housing in outlying areas have placed the poor in situations where they are worse off than they were before, after having been forced to move to a new place, along with the social problems and greater distances between the home and the workplace, thereby increasing transportation costs and rents and reducing their economic capacity to cover their basic needs.

Intersectoral action in legislation. Legislation promotes and protects health, but changing circumstances, noncompliance with legislation, and the enforcement of standards that are no longer appropriate can limit progress or have a negative effect on community health. Zoning and building laws and regulations that were adopted 30 or 40 years ago cannot respond to the social and economic conditions of the present. Similarly, building codes that were designed often for more affluent times establish situations that are legally acceptable, but which exceed the abilities of people with more limited resources. This legislation should be reviewed and adjusted to the current situation. Legislation on property ownership is a fundamental topic for millions of people who live in outlying areas. Without legal status, these people, who are among the poorest strata, are frequently denied the social services that they would otherwise be entitled to. People who migrate to the city will continue to set up their dwellings anywhere that is desirable to them, in places where they might not have services and, in addition, where there may be risks, flooding, etc., which can create greater difficulties.

Intersectoral action in employment and income. Unemployment, low income, and health go hand in hand, because any attempt to improve the health of the poor strata will not have a permanent effect unless attention is also given to the problem of poverty. Hence, it is necessary to promote the development of income-generating activities.

Intersectoral action in education and literacy. There is conclusive evidence showing a tie between basic education and health status. Poor countries that have given greater attention to educational aspects have much lower death rates than those countries with higher income, but a less educated population.

The management of intersectoral action, in order to be effective, must be based on some kind of mechanism of coordination. The formal and informal contacts between the executives of the agencies and their top-level staff represent a step forward, along with the exchange of information on the programs and activities of each agency involved. The planning of each sector with the participation of other sectors should be set as a goal to be achieved; plans for water supply and sanitation for the cities would benefit greatly from this. Urban planning constitutes in itself a level of greater integration, provided that intersectoral action is outlined and implemented. Lastly, an attempt should also be made to plan primary health care which, coupled with urban planning, would strengthen the tie between health and urban development.

At the level of the municipal government, the mechanisms of coordination, such as councils, committees, and others, help to improve intersectoral action and constitute mechanisms that should be reviewed, when they exist, in order to open the way for integrated action in primary health care.

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Guatemala, 10 - 14 de noviembre de 1986

THE COMMUNITY - AGENT AND RECIPIENT OF PRIMARY HEALTH CARE

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REGIONAL SYMPOSIUM ON Water supply and sanitation — an element of primary health care

Guatemala, November 10 - 14, 1986

The opinions expressed in this paper are solely the responsibility of the author and its publication does not necessarily reflect the views of PAHO/WHO:

THE PEASANT COMMUNITY, OBJECT AND AGENT OF PRIMARY HEALTH CARE: FATALISM AND DYNAMISM IN ANDEAN COMMUNITIES

I.- General Context

Bolivia is located at the core of South America. It is a country historically determined by its landlocked status, by the Andean mountain range, by a central high plateau and by the valleys and low-lands that belong to the Amazon and de La Plata river basins. It is a complex territory where twenty odd culturally and racially different groups co-exist. Among these groups, the Quechua and Aymara nationalities are clearly predominant. In a little more than one million square kilometers, different cultures have settled generating a variegated pattern of ethnic groups, practices and traditions. There are 6.5 million people who inherited a mixture of pre-Inca cultures, the legacy of conquest, colonialism, subordination and, occasionally, incomprehension. In this context, it is painful to see that the country's population growth (2.76% per annum) is attained at the price of high fertility and mortality rates which produce a life expectancy at birth of barely 48.49 years. (1) In Bolivia infant mortality during the first year of life is 215 per thousand, often reaching some 300/1000 within the first five years of age, in the rural areas of the country. (2)

Despite such high infant and child mortality rates, Bolivia is basically a young country (more than 42% of the population is 14 years of age or less). It has a population scattered in the immensity of its own territory; and, precisely because of that disperse pattern of territorial occupancy, the population can barely expect a minimum of basic services in order to improve their precarious standard of living. For example, only 9% of the rural population enjoys piped water, and barely 1% of the rural population has electricity. It is a scattered group of people, to a great extent illiterate (37%) and malnourished, as it has a protein intake of only 52% of the minimum required. On top of all these deficiencies, the services for health, housing and for other basic needs are very low nation wide. (3)

II.- The Community

While the preceding data depicts the Bolivian population as a whole, it will be difficult to find, at a local level, one community with such characteristics. In each case, due to innumerable historic, economic and social factors, we will encounter specific local communities; each one with its own character, with peculiar histories and outlooks. Therefore, for the purpose of this presentation, we will refer ourselves to a group of Aymara and Quechua rural communities, inadequately integrated into the rest of the country, suffering conflicting processes of rural disintegration and rapid urbanization. They are groups of people that are experiencing the poverty of underdevelopment.

For these communities the Andean habitat, the dwellings, the so-called services and the overall environment, play a major role in day to day life, and consequently in the health status of their

inhabitants. More than half the dwellings have dirt floors (57%); almost all of them have no bath-rooms (90%); 78.5% have no sanitary facilities; and more than 85% have neither potable water nor sewage facilities. (4)

According to UNICEF, the inadequate living conditions that affect these populations have two main origins: on the one hand, most of these people live in rural areas that are characterized by their scattered nature and the absence of basic infrastructure; and, on the other hand, the existence, nationwide, of accelerated migration/urbanization processes that (without the generation of the necessary urban employment) are producing major deficits in the provision of public services, infrastructure, construction and basic amenities. (5)

The precarious production processes of agricultural goods and the social tensions arising from urbanization and the progressive deterioration of the rural way of life constitute the scenario in which the day to day life of an Aymara-Quechua community unfolds. The agrarian structure that prevails among these groups contributes to the economic and social conditionings that directly affect the life patterns and regional fertility, morbidity and mortality rates. These biological phenomena shape the family making processes, the access to agricultural land, and the identification of communal and regional priorities. The basic agricultural production of the Quechua-Aymara communities is for subsistence and, simultaneously, for commercial purposes. Market production in the Andean communities varies from 13% on the average in the highland regions, to 70% in the Andean valleys and lowlands. (6)

The importance of non-agricultural activities in the Andean region is insignificant in an intra-community context. Local organization, on the contrary, is strong and democratic despite the fact that it is exercised through weak institutions (municipalities, "corregimientos" etc.). The stronger of these institutional frameworks are the agrarian unions and, in some cases, the water committees that will be discussed later. In general terms, the whole family participates in the rural work and attends to the meetings of their local institutions. Nevertheless, there is a wide perception that female participation is somehow restricted: according to the latest census (1976) women from urban areas have higher participation rates than rural women; the participation rate of women from 25 to 29 years of age -the most active group- is 36.6% for women in urban areas. vs 16.5 for women from rural areas. This is due to the fact that Andean women are erroneously defined as performers of household duties only, because a clear cut difference between domestic work and agricultural work is almost impossible, particularly in view of the fact that the entire family participates in both domestic and agricultural activities. (7) participates in both. (7)

The Aymara-Quechua family, despite its high fertility, remains a medium size family. Educational levels are very low (on the average 3.7 years of study) including an urban average of 6.3 years and perhaps as little as one year of study in the rural areas. (8) In synthesis, we can define the Andean communities where we are working by THE PRESENCE OF HIGH FERTILITY WOMEN WHO ENDURE TREMENDOUSLY HIGH

INFANT MORTALITY RATES, LIVE IN DISPERSED RURAL SETTLEMENTS, HAVE VERY LOW EDUCATIONAL LEVELS, AND SPEAK ONLY A NATIVE LANGUAGE -EITHER AYMARA OR QUECHUA. (9)

These last aspects are probably the clearest constraints to the development of water, sanitation and primary health care programs in the Andean communities. A major problem is the language, not only because of the communications barrier it creates, but mainly because the special logic and mental framework that its syntax and way of thinking generate. According to a UNICEF's study, the lack of knowledge of the Spanish language among the women of a given community is an accurate predictor of high levels of infant mortality, denoting deficient levels of integration of the Aymara and Quechua communities into the national society. That limitation also denotes limited access to public facilities and basic infrastructure such as water or health care.

In sum, these factors place these communities at high risk: areas where the environmental conditions, by themselves poor, are worsened by attitudes (result of deficient educational levels) that increase health hazards and the transmission of diseases. Moreover, the lack of education and orientation in regard to hygiene and nutrition, the absence of adequate foodstuffs, medicines and the like, make it impossible to maintain minimum levels of health and wellbeing. The Andean families in these areas are overwhelmed by their health problems and try to seek help in the "services available": public sector facilities that normally are severely understaffed, lacking minimum equipment and supplies, empirical practitioners, and itinerant salesmen of medicines. In such instances, and considering that public health facilities are not a real option for them, the population generally relies on dubious diagnostics and on the use of "well known" medications of doubtful effectiveness.

As a result of these conditions, some 40% of the main causes of infant mortality correspond to communicable diseases that can be prevented and entirely reduced through primary health care and other related interventions. (10) Maternal mortality rates among these communities are even more worrisome: 25% of the deaths during birth take place in the homes of the mothers without the presence of personnel having minimum health care training. Equally alarming is the fact that between 60% to 70% of the deceased mothers are women under 30 years of age. 81% of maternal deaths and 100% of deaths produced by complications of abortion are cases that could be easily prevented through basic health care, pre-natal orientation, nutritional and hygiene education, and, fundamentally, through better knowledge of and sensibility to the cultural habits of the Aymara and Quechua communities. (11)

III.- Community Perception

It is evident that the Andean community perceives this reality. Nevertheless, a series of cultural screens filter and distort this perception, allowing their anguish to be hidden behind fatalistic attitudes. The high infant and child mortality rates, for example, have generated special attitudes among the parents that can only be

comprehended in the framework of mythology and ideologies that veil reality. The parents of deceased infants often attribute such deaths to "a constellation of mythical diseases that reveal the highly volatile nature of the spirit of the children and which can be lost very easily." (12) Parents therefore try to convince themselves of the imminence of the death of their children. Because of this peculiar point of view, the birth of an infant does not represent the starting point of life, while the whole community expresses apathy in regard to a new life which could be truncated in any moment. Consequently, the attainment of two years of age is a major event that is celebrated with rituals and special ceremonies of baptism and "haircut" (here the guests present gifts in cash for the child; money that is placed under the custody of the parents for future needs of their son or daughter). This evidently indicates the importance of early survival and the almost magic conquest of the "two-year-barrier". (13)

Whereas reaching two years of age is certainly a mitigation of their anguish, especially for mothers, from then on children and adults have to cope with a series of diseases. According to the Aymara point of view all diseases have an external "living" source, that attacks the body in its externality, the inside of the body or the soul. (14) All diseases are accompanied by some form of pain, which can occasionally be pinpointed, but normally is very difficult to isolate in a given region of the mind, the soul or the body. A magical interpretation of diseases and death is consistently maintained, to the extent that it may be possible to classify diseases, according to the Aymara-Quechua perception, as magic or mythic diseases, and natural or real diseases. (15) The natural diseases are those that create bodily injuries from "outside" without leaving something in the "inside" or capturing the soul of the patient. On the contrary, the mythic or magic diseases have their origin in "hostile living environments" that produce permanent injuries in the spirit of the patients, taking away their soul and leaving them stranded while the bodies progressively lose their vitality. (16)

Under the Aymara-Quechua frames of reference, there is a clear distinction between cold diseases and hot diseases. In other words, illness is perceived as something that prompts a body reaction either through hot or cold temperatures. The "loss of the soul" is considered as a cold disease, while an infection with high fever is clearly a sign of a hot disease. Based on this difference, the use of balsams and medications is sought, considering the principle of contraries to mitigate the effects of any one disease. In the Andean milieu, there are generally more hot diseases than cold ones. Botanists and traditional healers are therefore concerned with different forms and different herbs to bring down high temperatures. Statistically, the cold diseases are less frequent, but more feared (most of the mythic diseases are the cold type). The specialists and native doctors have more or less credibility among the Aymara-Quechua population to the extent of their knowledge of the heating or cooling attributes of different plants available within the local or not-so distant area. (17)

Most types of healing, in the Andean regions, demand specific rituals

performed by "health agents". The Aymara-Quechua communities understand the virtues of plants and medications, but consider those virtues incomplete or insufficient if they are not accompanied by the will and actions of those agents that generate the necessary volition of the healing principles contained in the plants. In any Aymara or Quechua community there are always one or more ritualistic healers. (18) This healing system has not to date lost any validity, and has, in many cases, gained more confidence and respect as long as it is compared with the official rural health system that is irregular to say the least, and which makes the peasant its victim of abuse and speculative prices for basic medicines if they are in stock.

To cope with official neglect, the Andean communities attempt to resist disease; such resistance consists in not letting themselves be affected by illness or injury, to adamantly oppose being in bed and to maintain their normal activities. These attitudes are maintained until extreme conditions are reached, or until it is too late for any kind of remedy. Paradoxically, one of the factors that has generated such resistance is the ancestral fear of "white people hospitals" that are considered places "where their fat is sucked away" in the isolation which is imposed by the white men upon the sick Aymara. (19)

So far we have presented community perceptions of health. But, what about perceptions in regard to water and sanitation? In order to answer such a question we had to develop two surveys; one in all the major urban areas and a second one in the rural areas of two departments. (20) In both instances the perceived need for water is very high, but not so much for the purposes of sanitation. Despite this high priority, it is interesting to note that neither population group had a clear understanding of the benefits for their health that they can realize from the provision of water; neither was there a clear perception of the relation between contaminated water and any type of illness. It was quite revealing to note that those communities that do have some type of water system consider the government to be responsible for the construction, operation and maintenance of the system. On the contrary, those communities that do not have a water supply considered it necessary to contribute cash and personal efforts for the construction of the system, because after so many years of neglect "there is no other way". (21)

IV.- A Strategy for Basic Needs

Considering the magnitude of this problem, the dispersed nature of the rural population and the absence of minimal levels of education and sanitary orientation, the need for alternative ways of action was clear. From the very beginning we all agreed that the traditional "physician-based" alternative was not working, because in so many years not even one third of the total population had regular coverage. (22) Worse, large investments in clinics and health posts were literally abandoned shortly after their inauguration because of lack of human resources, equipment and medications. More than once the transfer of those facilities to the communities was tried, but the result was the same, given the poor attitude the Andean people have in regard to those facilities and the pervasive fatalism that exists among the population.

In such circumstances it was imperative to look for other options. We had to go back to the basics and critically review our past experiences in the areas of potable water, health, education and the so-called integrated rural development. It was an exercise in destroying myths and in self-criticism. It revealed to us a couple of points that were clear for all; none of them new but, as long as they were seen from a different perspective, they looked new: WATER, EDUCATION AND PRIMARY HEALTH CARE.

Water yes! but, not as an engineering project installed in the abstract; rather, a community effort based on local organizations, depending on local commitment to the maintenance and sustainability of the systems. Both aspects require community understanding about correct use of water and the regular maintenance of the different components of the water system.

Education yes! but, not as a generalized process of learning lists of things; rather, a functional effort related to the day to day demands of the individual and the community. In other words, a kind of learning conducive to changes in the regular behaviour of the local population in regard to health, water, sanitation and the community's work patterns.

Primary Health Care yes! but, not in the form of a vertical program under the distant control of a central and paternalistic institution; rather, under the immediate responsibility of the local community sharing the costs, the immediate requirements and the benefits that it represents.

In synthesis, what we wanted to establish was to work FOR THE COMMUNITY AND WITH THE COMMUNITY. It was finally clear that the ultimate success or the failure of any one project does not arise from the technical crews of any implementing agency, but outside those institutions: in the field, at the local levels. Therefore, we had to work with those communities in such a flexible way as to assume the dynamics of the community retaining and strengthening the overall orientation of the projects. In this sense, we began working under four operational concepts:

- Team Work.- The problem we were -and still are- coping with involves a whole gamut of disciplines whose points of view must be considered and coordinated in order to develop mutually supportive lines of action. This effort allows the analysis of the problems from different points of view including the point of view of the community.

-Confidence.- The project team must be sure of the capacity and potential of the team members, to begin with, and the community as a whole to obtain the changes and impact we all are looking for, even if the process required for this purpose is long, arduous and sometimes frustrating.

- Perceived Needs.- The team had to discipline itself in order to work first with the perceived needs of the local people, before "pushing for other improvements" that could be the most appropriate, but

are not yet perceived as community needs.

- Self-Governance.- The project team must be prepared to work -from the very beginning- with the community, aiming at the development and establishment of self-governance at the local level. In other other words, an approach whereby the community will assume responsibility for the project as early as possible in its planning and design phases, and especially in the subsequent phases of construction, operation, maintenance, etc.

Once these operational concepts were discussed and assumed by the project group, we all confirmed as an article of faith that the projects we were working on were "health projects". Therefore, what we wanted to do, at the bottom line, was to reduce those mortality and morbidity rates that arise from desperate conditions of life within the Andean rural communities. If that was clear, we could assume as a goal FOR AND WITH those communities, the fundamental human right of achieving a state of physical, mental and social well being, and not only the absence of illness and disease. (Alma Atta; PAHO/WHO 1978) (23)

To work FOR THE COMMUNITY AND WITH THE COMMUNITY is certainly easier to say it than to do. The big question was how to approach and enter into the community without repeating errors of the past and respecting the sensitivity of the Quechua and Aymara populations. Paradoxically, the answer was always within our reach: the most pressing problem for those communities is water! water for irrigation and for domestic consumption. 62% of those communities, according to a survey conducted by USAID/B and the National Directorate for the Environment, declared that their main concern is water, whereas health care as such was low in their priorities and in many cases not even perceived. (24) Moreover, we found out that among Andean people there is no direct mental association between poor nutritional levels and illness, between poor sanitary conditions and the transmission of disease. That information was very useful, because we understood that any preventive health program would fail if it was not "tied" to other activities that were solving perceived needs of the local population. In synthesis, THE GATE OF ENTRY TO THE ANDEAN COMMUNITY IS WATER, NO DOUBT ABOUT IT!; BUT, COMPLEMENTARY TO THAT WE SHOULD DEVISE A WAY TO INCLUDE SANITARY EDUCATION PROGRAMS IN ORDER TO COME CLOSER TO THE PROVISION OF HEALTH SERVICES THE MOMENT AT WHICH THE LOCAL COMMUNITY UNDERSTANDS AND ACCEPTS ITS PARAMOUNT IMPORTANCE.

IV a) Potable Water

Once the manner to approach the community was defined, it was necessary to establish an operational sequence: the creation of water committees in each community, the discussion at a local level of all the characteristics of the water system, and the agreement that once the construction was over the responsibility for the operation and maintenance was the responsibility of the community. The main tasks were to demonstrate and assume, within the project team, the following requirements:

1.- The water systems are not engineering works as such, but were instrumental for meeting health goals. In this regard, we had to overcome a technically abstract point of view and develop technical options accessible and comprehensible to the community. The first thing that comes to mind is appropriate technology. The development of appropriate technologies has to be something completely pragmatic from the point of view of all project participants, especially those participants at the community level. Precisely for this reason, all discussions in regard to technologies had to be restricted to practice and as little as possible to academic speculation. We had to convince ourselves that the technologies required in the rural areas are primarily low cost technologies; and, once they are accepted, then it may be possible to introduce other technologies based upon the pragmatic use of local resources, as the only form to guarantee the community's permanent use of the water systems. The project team had to understand that fact - a fact that any type of technology incorporates hardware and software components; that modern technology develops to the maximum extent possible the hardware, leaving to the bare minimum the logical aspects, commonly referred as software. On the contrary, in the case of technologies appropriate to the Andean regions, they will have to develop to the utmost the logical parts, simplifying them to common sense levels and avoiding the incorporation of large and complicated hardware components; not only because of the intrinsic costs, but mainly for the limited resources the project has for repairs, maintenance and reposition. (25) If this was not done, the inexorable use of the systems will end up in rendering large parts of the water systems un-usable, unless the community assumes the responsibility and develops its own local capacity to maintain, improve and even enlarge its water system using community resources and know-how.

2.- The regular operation and maintenance of a water systems is at least as important as the construction itself. Therefore, O&M considerations at the community level were included as design criteria and the basis for technology selection. Even more difficult in this area was the need to convince ourselves to abandon a "construction race" in order to cope with the less obvious task of laying down the grounds for the preservation of the systems already constructed. O&M at the community level is certainly a difficult endeavour, especially in regard to the establishment of fees and regular cost-recovery practices. The Andean population expressed ambiguous feelings about tariffs: whereas they assign the highest priority to water, they are not willing to pay the tariffs because, on the one hand, they consider it a government responsibility and, on the other hand, they claim a lack of financial resources that in most cases is not real. Different alternatives, some of them successful most of them not, were tried in order to convince community participants of this requirement. (26) What actually achieved better results was the establishment of supervised community responsibilities: this consists of promoting the local initiative in the solution of their own problems while making evident to them the importance and implications of such actions and decisions. Unfortunately, this method implies corrective actions that sometimes are painful, as long as -in the words of one community member- the good decisions came late, after the damage. (27) Nevertheless, there

are grounds for optimism; the situation will probably change little by little, and preventive maintenance and the anticipation of possible problems will probably be part of the day to day life in the Andean Communities in the not very distant future.

3.- Community participation involves project costs. Whereas in all projects there is some lip service to increased levels of community participation, popular committees, organization at the community level, etc., at the moment of approving projects' budgets those components are noticeably absent. (28) Here we have to consider costs not only for mobilization, but also for education and community promotion -components that imply design, pre-test and publication of audio-visual materials that are quite important, even more so if we consider the illiteracy rates that prevail in the Andean communities. But more than that, the largest cost in this area is the one related to the training and preparation of technicians, health promoters and community volunteers that will work with the water and health committees.

IV b) Education.-

The previous considerations on water have brought us to the educational component of this model; but, first, in order to immerse ourselves in this component, we had to define as our point of departure the fact that the main part of a water system is not the pipe and the accessories buried underground, nor the civil works built on top, but rather the people that will use the water system! Therefore, the success of a water system can be found less in the engineering and finishing touches, and more in the effective creation of the water committees, and, fundamentally, in the continuous good use the people make of the water services thus obtained. In other words, the success of a water system lay in the comprehension that the community may develop in regard to the processes that took place in order to choose water among other priorities, the construction process, and the subsequent process required for its correct utilization. Then, based on those processes, the community has to be aware that it has to perform some specific tasks and follow some instructions. Educational and promotional efforts are clearly required to encourage mobilization of the community and the performance of a minimum array of tasks is regularly by the community.

1.- Monitoring and control of trained promoters and volunteers.- Some time ago it was discovered that most of what people learn and retain is obtained through experience. (29) Thus, simple techniques such as oral rehydration can become major challenges in education. Any technique, as simple as it may be, in different cultural settings implies the action of social filters and cultural barriers. In the case of ORT, its diffusion through a gamut of promotional and educational programs was considered to be effective in only 4% of all diarrhea episodes among children of underdeveloped countries in 1983. Such an evaluation concluded that information about ORT was not transmitted adequately to the public. Moreover, the lack of information was exacerbated by the ignorance of the health promoters who frequently could not understand the diarrhea episodes they were

suppose to treat. (30)

On the other hand, when the health promoters and the community volunteers were adequately trained and the information transferred was controlled and revised periodically, the impact could be very high such as the 98%, reported by the UN, in regard to the population that could make effective use of oral rehydration salts after having been correctly trained. (31) For all these reasons, the educational strategy designed for our projects aims at the continuous training of promoters who will transmit messages to community volunteers; and at the subsequent verification of the messages and supporting practices that may be required for the development of a joint program in water and health. (32)

This educational program is based upon the training of promoters and health technicians who, in turn, will teach community volunteers in each locale. Beyond the formal transmittal of messages through talks and other media, the procedure selected concentrates efforts on the evaluation and verification of the transmitted messages and on the evaluation of the day to day practices prompted by the promoters and sanctioned by the community in its daily tasks.

2.- Women's participation.- According to a UN research study, hospitals, clinics and other health interventions produce a lesser impact on health than the combined efforts of all women, whose family role makes possible, a comfortable and secure dwelling, as well as adequate food and drinks for the family. Moreover, when any kind of illness affects a member of the family, it is the mother who initially identifies the symptoms and determines the kind of treatment needed. (33) Precisely because of those reasons, women are considered to be the principal target for educational campaigns designed for the promotion of health and sanitary practices oriented towards better conditions of life. These considerations are more important in the Andean context, if we remember that the areas of high risk in this region are precisely those rural areas where women -speaking one native language only and almost without any type of education- endure the highest rates of fertility and infant mortality.

Despite the potential importance of intensive training programs for community women, the results so far are not conclusive. (34) Strong cultural barriers in the Andean region do not permit immediate results. For instance, in our water projects, women participation in the water committees is minimal to date. Another concept that is not easily implemented in the Andean region is related to the role of transmitter of health messages and promoter of primary health care innovations in a door to door and woman to woman fashion. This approach is not evolving the way we thought it would. Despite those shortcomings, the project team remains optimistic and keeps its expectations high in regard to the role of women who, individually, are demonstrating higher levels of concern in regard to the health problems that are affecting their families. It is interesting to note, for example, that in our primary health care projects that require enrollment, women literally push their fathers and husbands:

into the programs, who explain their presence in our health offices and their intention to participate "not because they -the men- need health care, but rather because their women and children are in need for the health care services the project is offering". (35) Events like this and others peculiar to different communities reinforce the conviction that women have to have active roles in the development and transfer of the health messages, during a phase that can be defined as the pre-marketing phase of the health projects.

3.- Community Empowerment.- Once the pre-marketing phase is in progress another sequence is started, namely the slow sequence of community empowerment. Community empowerment involves the development for the community and with the community of the necessary local capacity required to cope locally with this and other projects in a self-sustained and self-financed manner. Project permanence and sustainability after the capital development phase rounds off conceptually the idea of community empowerment. During this phase there is a clear overlap between the educational components of the project and our main thesis: THE PROVISION OF SELF-FINANCED PRIMARY HEALTH CARE SERVICES.

Going a bit further than the marketing aspects and the definition of alternative financial plans for each community -aspects that will be discussed in the next pages- the training component of the Community Empowerment phase consists in the preparation of promoters, technicians and volunteers who, being born in those communities, could become the basic health care crew in each place. The training of these groups of local people AIMS AT the development of shared values and mutual confidence in the project and in the people working for it. It is a kind of introduction to the permanent support the promoter will receive, as well as the permanent control, monitoring and evaluation he or she will be subject to. Additionally, during this period, the training efforts will try to produce distinct attitudes in the "community contact groups" in order to open up communication channels for logistical support and to expediate consideration of their problems and initiatives. Thus, the community promoter or volunteer will become a link between the community and the health service to be established. In the final analysis, a health services program could be started in those areas where a water system exists and where the educational activities that follow the provision of water have generated a group of health agents elected by the community, who live in the area, and who are active participants in the different community activities that take place locally. These are people who are prepared to perform tasks as required for the improvement of the health and living conditions of their own communities. (37)

Once the educational process of the model is achieved, the most important step towards the provision of primary health care services is completed. Through this process, community people are prepared to undertake direct participation in the solution to their own problems. This has to be done, by building on local values and priorities, and on the intrinsic capabilities of the people living in each community. Under this option, the local community participates not only as the object of the primary health care services, but also as the active

agent for the permanent provision of those services.

IV.- Self-Financing Primary Health Care

The difficult conditions of life for the rural communities that do not have the most basic services and amenities, and the limited possibilities of almost all governments in the provision of health services to this type of population, have motivated the decision to establish primary health care projects in the private sector with self-financing requirements. The purpose of the primary health care projects initiated by USAID/Bolivia, for example is the demonstration of the technical and financial viability of non-government options in the provision of health care services in the rural and peri-urban areas of the country. In this sense, the financial self-sufficiency of the health services to be provided is a basic criterion for projects which can be real alternatives to public sector programs which are severely understaffed and lack the minimum stock of medications and equipment.

1.- Financing the Health Services.- The starting point for the provision of health services is the replication of the hierarchical and regional stratification of health outlets established by the Ministry of Health. The official authorization for project health activities is always required as is compliance with all the normative requirements of the Ministry. The problem, therefore, is less a matter of the way services are to be provided, and more a matter of research and innovation into ways of financing them. Since the very beginning in our surveys we were able to identify in the Andean region, that the rural population expends large sums of money in so-called health services, medications, etc. Further, we concluded that they were spending more than urban dwellers. (38) Consequently, the fundamental task for the success of our projects was to establish the necessary acceptability and credibility needed to introduce services for which the population had to pay. In other words, we had to demonstrate to the local population that they were already paying for health, but that they were getting less than what they were paying for.

2.- Administrative Support Technologies.- Parallel to the financial and marketing efforts, the development of administrative support technologies was necessary. These included means logistical support, procurement procedures, supervision and monitoring schemes for the field personnel, information systems, cost recuperation and cost containment procedures, the development of bio and epidemiological data, etc.; support technologies that have to be provided from a central administrative unit to the different health care outlets in rural and peri-urban areas. In order to develop these systems several pre-operational tasks had to be completed. During this preparatory phase the major problem we had to cope with was our recurrent impatience: we had to "hold our horses" and delay the provision of services until the support technologies were ripe and could provide the actual support needed. This was so because, once the communities are contacted and the local population starts to clarify their expectations, the logistical support required has to be adequate and

timely. It is the only way to guarantee credibility for the medical and field personnel deployed in the different communities, including credibility for those community members who had confidence in the project and were eager to try changes and new alternatives for their people.

3.- Marketing and Primary Health Care.- One of the main problems for the project was, and still is, the recruitment of a "critical mass" of participants: a number of people necessary and sufficient to reach a break-even point in the provision of health services. Our first option for this requirement was to work with "captive markets": all the registered members of unions and cooperatives. But, even though this was certainly a very valid alternative, the type of population coverage it represented was not precisely the challenge that our diagnostic had identified. In one single agreement hundreds of sugar cane growers, for instance, or all the rice producers of the region were included, and it was not too complicated to formalize financial forms based on the principal agricultural products of the region (surcharges, taxes, in-kind contributions, etc). The real problem was elsewhere: in the traditional peasant communities where the provision of health services would have to depend on personal and family registration and individual payment plans. That was the harsh reality for a large number of communities. Nevertheless, in the typically peasant communities THE GATE OF ENTRY WAS WATER, AS WE ALREADY MENTIONED. THE WATER COMMITTEES ALLOWED THE INTRODUCTION OF NEW IDEAS AND NEW ALTERNATIVES. MOREOVER, WITH THE EDUCATIONAL PROGRAMS ON THE USE OF WATER, BASIC SANITATION, ETC., NEW LEVELS OF EXPECTATION AND DISCUSSION WERE OPENED FOR THE COMMUNITY; THE NEED FOR HEALTH SERVICES COULD THEN BE MADE EVIDENT.

Begining with these findings, the approach to the local communities and the presentation to them of the idea of consumer-financed health services was easier. But we had to remind ourselves of the project's nature: coverage of all operative costs. In such circumstances it was certainly necessary to push for an extensive marketing of the product we had for sale: primary health care. This marketing effort had to be done in an ethnic milieu socially and economically different from the traditionally urban origins of our fellow project team members. This consideration demanded better understanding of the communities we were dealing with and lots of respect for the people and colleagues in the field. Our marketing plan in each community therefore has two components: A.- an organizational scheme to work with community members and depend on them; and B.- a financial plan developed and explained in detail to the whole community. The organizational development we are talking about here is just a continuation of the community empowerment efforts described earlier. But during this second phase it implies a series of activities and interactions that the community has to complete; a series of predictable events, that once they are completed, can determine the viability of the primary health care program on a self-financing basis. The financial plan -second component of this phase- begins once the results of the community empowerment chain are clear, and it uses the same information for the establishment of the potential number of participants, the different income levels, projections in the recruitment of patients and all the required data for the execution of an agreement with an individual community.

4.- Sustainability.- One of the basic criteria for the inclusion -or exclusion- of a community in the self-financing primary health care program is related to the actual possibilities a given community has to continue the services on a permanent basis. Considering that requirement, the project group had to consider different options in the level of services to be provided in each community. Thus, in one community the project may agree to provide an expansive package of health services, while in another community the service package would be more limited; in one community the services will be sold, whereas in another (a coop for instance, that already posses health facilities) the project will receive reimbursement for the managing costs only. At any rate, in the agreement documents, express these alternatives in the following clauses: A.- The participation in larger health systems where the community outlet is minimal; B.- The necessary involvement of the local institutions in the operation and maintenance of the health system; C.- The recuperation of costs and the necessary re-introduction of those funds into the health system and other development activities required by the community; and D.- the option to renew or cancel the agreement every 3 or 5 years. In all cases, the results of these agreements demonstrated that the sustainability of the program depends on: i.- who controls the day-to-day operations; ii.- who controls the logistics; and iii.- who (and how) achieves the integration of the local community health services outlet in a larger health system for referrals and support.

V.- Conclusion

The Bolivian experience in this field should not be considered as a recipe; on the contrary, it is not more than a series of efforts that are trying to break away from the fatalism of some ethnic groups, and to deal with the expectation of large rural sectors that do not believe anymore in central and paternalistic programs, and have seemingly lost the initiative to cope with the health problems that are overwhelming them. This is an alternative to work with the communities in those aspects that are priorities for them, and progressively evolve with them until the moment in which their health problems become real (perceived) needs, that require immediate action. It is a process of change at a local level, in which we are reluctant to undertake radical technological transformations because of the fear of rendering useless the local capabilities of the population. On the contrary, what is sought is to disseminate, one step at a time, simple technologies that for decades have proved their effectiveness. Finally, what these projects try to do is to determine under what institutional frameworks will it be possible to provide self-financed alternatives for health care -alternatives in which the community will be, not only the passive object for the provision of services, but the active agents of primary health care and overall development.

NOTES AND REFERENCES

(1) Instituto Nacional de Estadísticas: Proyecciones de población por áreas urbana-rural, sexo y edad; La Paz, 1980, 1983.

(2) Morales Anaya, Rolando: Desarrollo y Pobreza en Bolivia, UNICEF, La Paz, 1984. pp 88. En las regiones donde solo se habla el idioma Quechua, la tasa de mortalidad infantil en los primeros 5 años de vida llega a un 389 por mil nacidos vivos según el mismo autor.

(3) IBID pp 16; Morales Anaya determina solo un 6% con agua potable, OPS/OMS en un estudio reciente estima que es un 9.9% de la población rural que a 1985 ya tiene conexiones domiciliarias.

(4) IBID pp 105. De acuerdo con el Plan Nacional de Saneamiento Básico a la mitad de la década (1986) se establece que los servicios de agua potable alcanzan solo al 10% de la población rural, mientras que la disposición de excretas solo llega a un 3.7%. (COTEAS, pp A-5)

(5) IBID pp 105

(6) Consejo Nacional de Población: Tiempo de Vida y Muerte, La Paz

(7) Morales Anaya, Rolando; pp 98

(8) IBID pp 107

(9) Rolando Morales Anaya, advierte estas características, lo mismo que la Dirección Nacional de Atención al Medio Ambiente; Encuesta sobre la percepción de la comunidad en relación a la salud y el agua potable. Cochabamba, 1986.

(10) Morales Anaya, Rolando; pp 116. Aquí se cita informes anuales del Ministerio de Previsión Social y Salud Pública que identifican repetitivamente como causas de mortalidad infantil: a las enfermedades respiratorias(37%), diarreas(22%), causas perinatales(21), sarampión y otras enfermedades infecto-contagiosas(10%).

(11) IBID pp 112

(12) Aguilo, Federico; Enfermedad y Salud Según la Concepción Aymaro-Quechua; edit ACLQ, Sucre 1985 pp 15

(13) Morales Anaya, Rolando; pp 83

(14) IBID; Para comprender la interpretación que hacen los Aymaro-Quechuas de la enfermedad es necesario referirse a la concepción socio-cultural que tienen sobre el hombre. Su visión es tricotómica (contrariamente a la visión de cuerpo y alma), o sea, entre el cuerpo (orilla exterior del ser humano), y el alma (principio vital), existe el espíritu (ajayu o ánimo), ente volátil

que da un equilibrio estable a la relacion de cuerpo y alma. Aguilo, 1985:11.

(15) Segun Aguilo, se trata de enfermedades magicas por el aparato ritual empleado en su curacion y miticas por la concepcion mitica que prevalece en la conciencia campesina. pp 14

(16) IBID pp 11

(17) IBID pp 12

(18) IBID pp 14

(19) IBID pp 18

(20) Lowder McCann realizo una encuesta urbana a nivel nacional para la OPS/OMS, mientras que el proyecto de Saneamiento Rural efectuó el estudio a nivel rural; La Paz 1986.

(21) IBID

(22) Morales Anaya, Rolando; pp 111

(23) Es interesante notar que en esos momentos se desarrolla en el pais una campana de movilizacion permanente y se da pie a la constitucion de Comites Populares de Salud que se han convertido desde entonces en "el segundo pilar" del Ministerio de Salud.

(24) Los resultados de la encuesta realizada en comunidades rurales de los Departamentos de Cochabamba y Chuquisaca, muestran que para estas comunidades el agua para consumo domestico es tanto o mas apreciada que el agua para riego; situacion que difiere de otras comunidades andinas donde el agua para riego es valorada por encima de la destinada al consumo. En lo referente a los requerimientos de salud, es interesante notar que en comunidades sin agua potable la necesidad de una posta sanitaria es minima, frente a la necesidad de contar con un sistema de agua. Sin embargo, en comunidades que ya cuentan con sistemas de agua se advierte una mayor valoracion por los aspectos especificos de salud.

(25) Asociacion Nacional de Empresas de Agua Potable y Saneamiento ANESAPA, OPS/OMS; UNICEF; 1986

(26) Proyecto de Saneamiento Rural; componente de Educacion y Promocion & Lowder Maccan (pelicula Agua, Salud y Esperanza de la Productora Ukamau), La Paz 1985.

(27) Proyecto de Saneamiento Rural; desarrollo del componente de Operacion y Mantenimiento con la asistencia tecnica de WASH, 1985.

(28) Es interesante notar que en el Proyecto de Saneamiento Rural, por ejemplo, se hablaba en forma repeida de "mayor participacion de la comunidad", "educacion de la comunidad", etc, etc. Sin embargo, en el presupuesto de aprobacion del proyecto no se asignaba recursos para estas actividades.

(29) Development Communications Report. Summer 1986.

(30) IBID

(31) IBID

(32) CARE; Child Survival, and Health Services Project. La Paz 1986

(33) Development Communications Report; Summer 1986.

(34) Encuesta del Proyecto de Saneamiento Rural, Septiembre de 1986.

(35) Informe del Proyecto de Atencion Primaria de Salud Autofinanciable, Santa Cruz, mayo de 1986.

(36) Proyecto de Atencion Primaria de Salud Autofinanciable, Plan de Mercadeo, Santa Cruz marzo de 1986.

(37) Proyecto de Atencion Primaria de Salud Autofinanciable; El promotor de Salud: politicas y Estrategias de Seleccion y Formacion. Santa Cruz, marzo de 1986.

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PRIMARY HEALTH CARE - A REVOLUTION IN THE SOCIAL VALUES OF HEALTH

DR. DAVID TEJADA



REGIONAL SYMPOSIUM ON Water supply and sanitation — an element of primary health care

Guatemala, November 10 - 14, 1986

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PRIMARY HEALTH CARE:

A Revolution of Health Social Values*

Primary health care is a movement focused on reformulating the traditional approach of the people's health problems, within the framework of the cultural, social, economic and political reality of each country.

The primary health care concept has evolved from the accumulation of various experiences in different countries throughout the world, after a long process of analysis, reflection and dialogue. It reached momentum at the International Conference on Primary Health Care, held at Alma-Ata, U.S.S.R., in September 1978. In that conference, jointly sponsored and organized by WHO and UNICEF, the primary health care concept was legitimated while making explicit and revaluating its content. At that time a situation prevailed in which the commercialization of science and technology applied to the health field had caused to overlook the true notion of the concepts inherent in the people's health care.

* Abridged version of the conference presented by Dr. David A. Tejada de Rivero, Minister of Health of Peru, to the XX Congress of the Interamerican Association of Sanitary Engineering and Environmental Sciences, held in the City of Guatemala, Guatemala, on November 10th-14 1986.

The conceptual framework of primary health care responds to the direct recognition of any national, regional or local reality and the realization of the following verifications:

- Health is much more than the presence and treatment of disease.
- The multicausality and complexity of health problems demand the need to approach them by the adequate use of different and distinct scientific, technical and professional knowledge.
- The non-deferrable need of returning the responsibility of health care to the individuals, the families and the communities; that is, to the organized people.
- The great deficit and limitations of resources formally assigned by the society to deal with the health problems, and the prevalence of cultural, social, economic and political situations in different and singular social settings, be it country, region or community.
- The permanent neglect and violation of social values important to human development: social justice, democracy, participation, equality, freedom, solidarity, non-discrimination.

The declaration and recommendations of the Alma-Ata International Conference have not been sufficient to ensure that the concept of primary health care become operative without distortions or negations of its own sense and doctrinal content. The factors intervening in this impairment process are several:

- A professional education devoid of social content and with an individualistic and competitive orientation.

- The experience of the health worker within systems where social values of service to the community, human solidarity and social commitment have been almost absent.
- The fact that some interests may be or seem to be affected by the new primary health care concept.
- Bureaucratizing and centralization of health systems and their separation from the people they are supposed to serve.

Eight years after the Alma-Ata Declaration, the need remains -nowadays more than ever before- to reiterate very clearly the fundamental notions of the primary health care strategy. It is also necessary to elucidate those secondary elements, accessory or consequential, that taken outside the fundamental ones, cause the distortions in the interpretation and application of the concept.

In the face of situations like the previously described it is preferable to start pointing out distinctly what it is not primary health care. The list that follows it is not exhaustive, yet the most significant misconceptions are included as an example:

- It is not a response applicable exclusively to developing countries.
- It is not a primitive, empirical and elementary form of health care, nor is it based on technologies that exclude the scientific and technologic advances.
- It is not an exclusive action of the health services or the health sector institutions.

- It is not a level of health care within a health system, nor is it reduced to what it could be considered as the most peripheral level or levels of health care.
- It is not a program independent from and/or parallel to the rest of the health activities.
- It is not only the use of non-professional personnel, nor can it be circumscribed to the members of the community trained to provide elementary care.
- It is not a form of partial satisfaction of a community social needs, nor is it a palliative smoke screen tending to postpone social vindications in a society where great inequalities and injustices prevail.

On the positive side, it would be necessary to reiterate or to redefine very clearly the fundamental elements that, assuming the character of social values, characterize primary health care differentiating it from the traditional approaches such as those that emerged in past decades under the denomination of "basic health services". The main difference between these approaches and primary health care lies in the priority that the latter assigns to the following basic elements:

1. People's participation. Understood as an active, genuine, permanent and manipulation-free participation in all stages of the health development process of the society. That is, from the determination of felt needs by the people itself to the supervision, evaluation and social control of the health resources and programs, passing through the prioritization of such needs, the definition of strategies to approach the problems, the planning of the corresponding programs and the

participation in the production of activities. This participation should take place through the natural basic organizations, that is, organizations arising directly from the people itself as a natural reaction to unsatisfied needs and the neglect of this responsibility by the State and formal institutions.

This statement about people's participation is the cornerstone of the primary health care concept. Here lies the main difference between the so called "basic health services" and "primary health care".

2. The decentralization and deconcentration of responsibilities in the National Health System. There can not be primary health care within a highly centralized and bureaucratic system. Effective decentralization and reduction of bureaucracy are mandatory to make people's participation possible. Decentralization implies the deconcentration of responsibility at all levels of the National Health System. This entails reverting the historical trend of progressive hoarding of territories and responsibilities. To facilitate the delegation of duties one must use the mass media to inform and educate the bureaucrats and above all the people to facilitate their role as agents for change. Even in highly industrialized countries the majority of actions concerning health care and promotion can be carried out by the people within the family, by means of unsophisticated health services and through actions carried out by other sectors not only social but also economic.

3. Multisectorial action and joint efforts. One of the greatest incoherences and contradictions incurred by most health care systems is that, while accepting multicausality of health problems, they pretend to approach them almost

unidimensionally with resources and actions exclusively medical. Health care encompasses a multisectorial action, a multidisciplinary and multiprofessional participation and multiinstitutional joint effort. Health is too important to be left exclusively under the responsibility of a profession, discipline, institution or sector. It is necessary at this point to redefine the concept of "health team". A health team should be understood as a multidisciplinary and multiprofessional group, where the presence of each discipline is essential and where the hegemony of a profession, discipline or sector is not possible. It should be made clear that from this perspective, the terms discipline and profession include activities formally or academically not regarded as "professional". Implicit here is also the concept of "democratic team", where all the components are equal and where the leadership can not be permanent, but rather change off according to the problems and circumstances.

4. Ways to approach health problems. Health problems, however well known, are never the same whether referred to a country, region or community. Their nature and presentation are complex and determined by the moment, the context and many other circumstances. Therefore, the way to approach the health problems can not obey operative formulae of a universal or even national type. This means that each society, under any circumstance, must decide which are the most adequate and feasible ways to deal with health problems. This also entails the need to take into account the popular knowledge, so rescuing some traditional forms of approaching the health problems. By the same token, health technologies should be developed, selected, adapted and utilized properly, in accordance with the cultural, social, economic and political factors that condition a given

reality, and the availability -in quantity, quality, distribution and utilization- of the resources assigned by the society to deal with its health problems. Thus technologies must be "appropriate", term used here with a dual connotation. Appropriate technology has been confused with primitive, empirical and elementary technologies. On the contrary, appropriate technology must incorporate the most advanced scientific and technologic developments after conditioning them to each reality. The indiscriminate use of health technologies not matched to the possibilities and capabilities of a given reality, not even to the proper characteristics of the problems to face has resulted in the commercialization of science and technology. On the other hand, to the concept of appropriate technology must be added the concept of "appropriable technology", understood as the technology that, in addition to being appropriate to the reality, may be absorbed, understood and utilized by the people itself, so that it is no longer an exclusive and excluding resource for the bureaucrat, the technocrat or the professional working in the health system.

Few people have understood that the expression: "Health for All" connotes a social value within the context of a revolutionary change of the society. Primary health care has been proposed as a tool to make possible, albeit, resource limitations and complexity of health problems, a substantive reduction of existing inequalities both in the health level and in the assignment, utilization and effect of health resources. All of this implies a doctrinal content of primary health care as a fundamental factor for the "democratization" in health and henceforth the democratization of society at large. Thus, primary health care can not be understood solely as medical attention, even if it means universal coverage and access. It embraces all those elements closely linked with health, some of which could be more important than medical care. Included

in this strategy are: safe drinking water, basic sanitation, adequate food supply and nutrition, education, housing, protection against the physical and social environment. It is not licit to talk about democracy in a country where part or the great majority of the population does not enjoy the basic services, is undernourished, lives in sub-human conditions and suffers the consequences of a despotic regime.

In conclusion, primary health care, as conceived in this presentation and from the stand point of the inherent social values, is a concept that goes beyond the health field. It is a concept valid *-mutatis mutandi-* in other sectors and other fields of social activity. In the final analysis, primary health care is a spearhead in the democratization process and the revolutionary change that the developing societies demand urgently.



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Guatemala, 10 - 14 de noviembre de 1986

**NEEDY AREAS, WATER SUPPLY, AND HEALTH IN
THE INTEGRATED HEALTH PROGRAMS**

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**REGIONAL SYMPOSIUM ON
Water supply and sanitation —
an element of primary health care**

Guatemala, November 10 - 14, 1986

The opinions expressed in this paper are solely the responsibility of the author and its publication does not necessarily reflect the views of PAHO/WHO:

NEEDY AREAS, WATER SUPPLY, AND HEALTH IN THE INTEGRATED HEALTH PROGRAMS

SZACHNA ELIASZ CYNAMON

INTRODUCTION

1. SANITATION AND SANITARY RESULTS - CONSIDERATIONS OF THE EVALUATION OF WATER SUPPLY IN INTEGRATED HEALTH PROGRAMS

The basic objectives of the sanitary activities are the protection and the promotion of health. To protect and promote health means the prevention of sanitary risks whether of an infectious kind or not.

This means that health is the objective of the activities related to water supply, waste disposal, transport and treatment of wastewater and refuse, protection of dwellings, and protection and hygiene of work or recreation sites and also to control of pollution of the air, of the water, and of the soil.

If the objective of the sanitary activities is the protection and promotion of health, it is logical that in the evaluation of the results one should attempt to achieve that same objective by means of health indicators such as those of reduction of morbidity and mortality, for example, and more specifically, in the case of the water supply, mortality and child diarrhea.

However, that evaluation is difficult and often when it is done in the classical way it gives contradictory and even negative results.

Evaluation is difficult because sanitary activities for the purpose of conserving health do not exist in isolated form and the results influence not only the sociocultural and economic conditions but also the same health care activities whether classical medical or local traditional.

The socioeconomic and cultural aspects influence in a general way all the aspects of human presence and activity. Health care activity in particular is characterized by difficulty in obtaining information, mainly in the underdeveloped or developing areas and often in an attempt to avoid negative information.

There is difficulty starting from the moment when the sanitation services are separated from those of health.

On the other hand, when health data are available they do not refer to the same locality or to specific compatible sanitation periods and

that is still occurring in the health services that are integrated, that is to say those in which sanitation and health are under the same central administration.

The specific analyses are expensive and delayed and the information derived from them refers to sanitary conditions and is obtained through comparison of areas that benefited from sanitation measures with others that did not enjoy that benefit.

Another difficulty resides in the actual parameters of evaluation of the sanitary activity for which no specific methodology exists for the research to provide the data required for more conclusive results.

At the moment when one seeks systematic redefinition of sanitation and that which is properly called public health to facilitate comprehensive and integrated action for the health of communities and individuals, we judge it timely to present some concepts expressed in the work of S. E. Cynamon entitled "Saneamento Subsídios Para um Instrumental of Análise," presented at the VII Brazilian Congress of Sanitary Engineering in Rio de Janeiro in 1975 and again as an annex to the work of the same author in the Congress of AIDIS held in Buenos Aires in 1976.

In this work are stated four general principles of sanitation, whose observance is judged indispensable for obtaining sanitary results valued as measures of sanitation.

In the first place there is a systemic definition of sanitation.

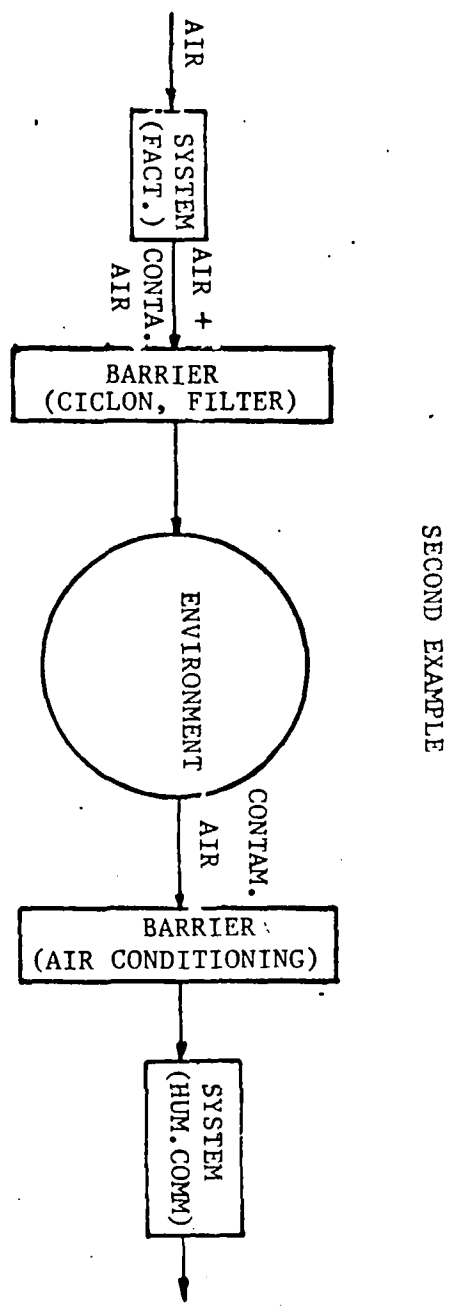
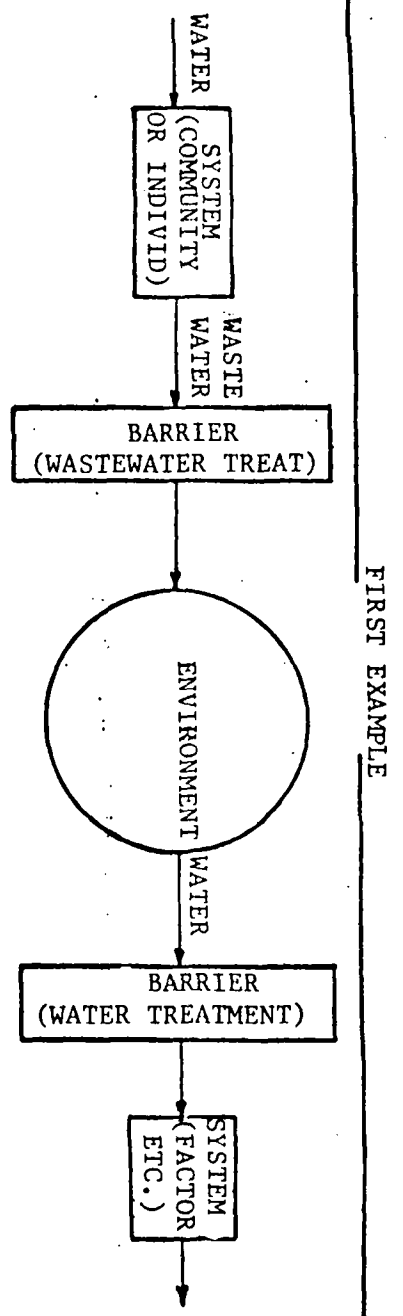
In simple words, sanitation can be compared with a set of barriers interposed between the systems and the environment.

Barriers are placed at the exit of a macrosystem in order to avoid environmental contamination and at entry of the microsystems (individually = man; collectively = the community or a factory, for example) for the purpose of defending the systems against the damage that harmful elements in the environment can cause them.

Neither the first barrier of defense of the environment, nor the second of defense of the system, nor the two together can give optimum results if in addition to the physical aspects, the human aspects and the changes of habits, uses, and customs are not taken into account and if awareness of the problem is not created.

Perhaps this aspect could be considered a first principle concerning sanitation.

Other general principles are also important for obtaining results and analyzing deficiencies that occur.



FIRST PRINCIPLE: THE IMPORTANCE OF HUMAN CONCENTRATION

The first principle would be to define the importance of human density.

The sanitary measures acquire greater importance the greater the density of human beings or their activities per unit area.

The presence of humans and their activities contaminate and have as counterpart natural self-purification, in accordance with the human concentration per unit area (including here not only their numerical presence but also that of the corresponding activities, for example, a factory, an outfall of wastewater, etc.), and that self-purification does not overcome the contamination rapidly.

That is what happens, for example, at the point where an outfall enters the sea. However large the evacuated volume of wastewater, what effect will it have on the volume of the water in the sea? However, at the exact point of the entrance the concentration of polluting substances is very large and in order to avoid damage it is necessary to take certain measures.

The application of the principle is more critical in the microenvironment: housing, the factory, the barracks, the school, the hospital, and the recreational areas where human concentration per unit area is also critical.

In certain sense, the sanitary measures are only really effective when they reach the microenvironment. That is the case, for example, with water supply, sewerage, the collection of refuse, etc.

It is common to violate that principle, which has natural consequences in cases of outfalls, water intakes, factory chimneys, etc.

Usually it is considered that the cities are cleaned up when 60 to 80% of the population has water supply service. But that is not true if 20 to 40% of it is concentrated on one neighborhood.

In the rural areas there is a problem of the microenvironment within and around which there should be sanitation, and also of the macroenvironment, where, for example, a factory for preparation of foods that produces great contamination can exist, as happens with sugar mills, factories for making alcohol and soluble coffee, or slaughterhouses.

Therefore there is a need to establish parameters in order to determine what is understood by numerical density and by density of activity and to record them so that the work advances.

SECOND PRINCIPLE: THE IMPORTANCE OF DETAIL

This principle is stated in the following way: obtaining results with sanitation depends on the observance of details that are sometimes quite small; in other words, the nonobservance of small details causes the loss of large investments.

- We could cite the case of the importance of the location of faucets in washstands and tanks in order to avoid cross-connections that contaminate the treated water.

- The lack of disinfection of storage tanks and water systems before use, as a cause of serious injury to the population.

- The recontamination of treated waters by the bad location of pipes in inverted filters.

Other examples of violation of the principle would be:

- The improper use of inverted domestic filters.

The errors are very common and are presented especially in the so-called appropriate technologies.

- One cannot label as appropriate technology the installation of drums that receive their water from the single faucet of the house, so that the water is level with the soil where it becomes contaminated by the presence of and use by animals and by the dust.

- One cannot label as appropriate technology the act of removing wastewater from the houses and transferring it to street drainways open to the air.

- Appropriate technology of less cost applied to the needy areas is technology and cannot escape the nature of the technique.

- It is not technical to use little water in sanitary discharges when measures for the satisfactory filtration of the wastewater have not been taken.

- In addition to being not technical, certain solutions labeled appropriate are demoralizing for the public service or to those for whom they are intended. We are in a time in which there are newspapers, radio, and television and while in the past the demand by the population of villages and towns from the politicians who gained their votes was for a simple public faucet, today many of these villages and towns demand a television receiver in the central plaza that amuses them and links them to the rest of the world. The people of the slums continue this and spend up to their last cent to have television in the house; in their

activities and daily work they are often among those who live better and that creates new demands.

- Hence, in addition to the strictly technical aspects it is necessary to observe certain socioeconomic, cultural, and even political details, whose neglect leads to the disuse of many supposed conquests in the area of sanitation.

THIRD PRINCIPLE: SCOPE-CONTROL

We state this principle from the technical point of view but indisputably it has socioeconomic and political repercussions. This is stated in the following way:

So that the sanitary measures themselves are really effective within a given geographical area they should be broad. To protect with sanitary measures only parts of an area within a broader context means exposing to a sanitary risk not only the whole area but also the presumedly protected area.

By their own nature the sanitary measures are barriers of protection interposed between individuals or communities and the environment and with time lead the individuals they protect to lose the natural immunity against the diseases that circulates in the unprotected environment.

The contact with individuals or nearby communities where, due to the lack of protection, there exist natural carriers or the sick or direct contact with contaminated environments, exposes the population to the serious risk of disease.

This is a principle that has immediate technical consequences for sanitary engineering. Our universe ceases to have only 30, 60, or at a maximum 80% of the population urban, for example; it may reach 100%.

In the case of water supply, for example, that implies the change of the parameters of population and of consumption, in accordance with the viability of available sources and evidently the consideration of a different dimension in regard to the collection, adduction, treatment and water distribution networks. It implies also the search for new calculations for sewerage and refuse collection.

It has economic repercussions because, in spite of all the possible paternalistic or other types of formulas, as the population and each of its members always end in paying for the execution and operation of the systems, a new factor arises from that principle which is the need for the system to serve the population with fewer economic resources in order to achieve economic viability.

That leads again to less costly appropriate technology, not only for the marginal population but for the population in general.

That principle has also social and political repercussions. As was said before concerning the possibilities of communication and information in the modern world, the lack of sanitation in the so-called needy areas is one of the most important factors to which the social imbalances may be attributed because the marginal population lives along side of and works with those with greater resources, and that increases the imbalance and the violence.

There are opened a new front and a new opportunity for work for the public health professionals who are the faculty of appeal before those in power and the class of greatest resources for the improvement of the needy areas, not as requestors but as proponents of an action of more immediate interest for the those in the seats of power and the segments of the population with greater resources for whom, in accordance with this principle, sanitation for the needy areas becomes a need and not an act of merit.

The neglect of this principle explains why in many communities that have been considered as having the services of water supply, sewerage, and refuse collection the desired results are not achieved, or rather, expected. On the other hand, perhaps it makes it possible to explain cases such as that of Rio de Janeiro, where the pattern of medical care has been invariable in the last 10 years and where there has been an important reduction of infant mortality as a consequence of the reduction of diarrhea, exactly in the period in which the provision of more water and sewerage services to the so-called needy populations (of the slums) is beginning, especially in the last three years.

The population of the slums of Rio de Janeiro is estimated at between 30 and 40% and evidently the greatest death rate for diarrhea has always been observed in these areas. However, infant mortality diminished, without which there would have been an important increase in medical care there.

The reduction of the number of deaths is due mainly to the reduction of diarrhea.

Another example of a recent study using a classical questionnaire in a needy area shows a discrepancy in the number of cases of diarrhea related to whether the houses had water supplied from the public network or were without that service. The result is not as important in the case of the removal of wastewater, as is explained in part by the fourth principle of sanitation stated below.

FOURTH PRINCIPLE

The period between the implementation of sanitary measures and the sanitary results is variable and depends on the morbid entities that should be controlled and on the sanitary measures applied.

- The result obtained in the control of typhoid fever with the disinfection of the network of public water supply or the decline of infant mortality when the water is supplied in reasonable and quantity quality are examples of a rapid response.

- The increase by 20 years of the average life expectancy at birth in Palmar, Pernambuco, in the homes with water supply in comparison with those that lack that service (study of Maceau cited further on).

- The prevalence of amebiasis or of schistosomiasis does not diminish rapidly with the introduction of water supply and sewerage systems if other measures are not taken at the same time. In the research project on parasitic diseases carried out by Professor J. Oliveira Coutinho there is an example of the distribution of amebiasis by age in the university city of Sao Paulo, where exactly the youngest, most vulnerable group presents few cases of amebiasis and the most resistant, least vulnerable group presents the greatest prevalence, because the latter were already infected when the improvement of sanitation was introduced and will only be freed of their infection slowly, unless other measures are applied simultaneously.

These are initial considerations that permit us to use information of great complexity, whose elucidation requires a deep interest in the separation of the sanitation and health data to be able to make cross studies. Without a methodology that appropriately defines the sanitation data in detail, which can vary from one area to other, and without the required study of nosological data, the conclusions derived can lead to gross errors or to a false euphoria that promotes or negatively affects the daily activities of life, health, and the quality of life. Below are offered some examples obtained in small communities or in needy areas in centers of greater size.

We hope sincerely that with the introduction of the new system of integrated health actions it will be possible to deal better with this problem also.

2. NEEDY AREAS, WATER SUPPLY, AND HEALTH IN HEALTH INTEGRATED PROGRAMS

The general conditions of life vary from one country or region to another. It is estimated that 30 to 40% of the urban population of Brazil lives in the areas labeled needy, peripheral or not, where there are deficiencies of urbanization, access, housing, water supply, sewerage

and other infrastructure, and health care services. The central urban areas and those at a higher economic level enjoy reasonably good coverage. A typical example is the data of CEASE that are repeated in all the states (data of CABES Catálogo Brasileiro de Engenharia Sanitaria y Ambiental - 1985) (Annex I).

Most of this population emigrates from the country in search of better living conditions and for those who remain in the city despite the misfortunes it is evident that in their places of origin the living conditions should be worse.

In a country of more than 130,000,000 inhabitants, 50,000,000 live poorly and perhaps more than 30,000,000 to 40,000,000 of the rural population lives worse.

In essence, among other factors it is the problem of lack of human solidarity and, as demonstrated by the third principle of sanitation stated, the problem of the irrationality of great power.

There has been progress, and today that power already is much more sensitive and active; it has urbanized various areas, permitted in them legalization of land tenure, provided drinking water, services of sewerage and infrastructure and sought to give better health care and sanitation by means of integrated health plans. It is an initial effort, promising if it has continuity.

This activity passes through some framework of analysis of which the first and most important is indisputably that of the solidarity and rationality of human relations.

So that there is change political decisions are necessary and this depends on power.

This change is being introduced in a gradual and peaceful way in Brazil and will continue to gain strength as it encompasses the professionals, the universities, the needy population and its twin sister, the non-needy.

It corresponds to technical direction with political support to mobilize the non-needy population and to give support and technical orientation to the needy.

2.1 General Solution

From our point of view from area to area one should think about a general solution, with technical directives discussed and negotiated with the needy population, and adopt it. The first decision refers to the technical, economic, and social capability to remain in the corresponding locality. If the response is positive, to be discussed with the

community through its leaders and associations is the general urban plan, that hereafter should become the framework of all the solutions, with the establishment of priorities by negotiation among the technical organs, the communities, and the participating institutions and consideration of what is possible and mobilizable. Nevertheless, from the beginning one should infuse in the community the need to decide and express what it thinks that its situation should be.

2.2 Institutional aspect

An important fact from the institutional point of view, but not indispensable to initiating the work, is the land tenure, it should not hinder the measures that can and should be carried out.

Actually, among us no official law has been promulgated to solve problems in needy areas nor are there technical standards or a clear policy, and the law is being molded to English law: there are measures that are carried out, becoming tradition until they are transformed into law. Thus for example, the inhabitants sell their huts or even their sites to others. When the moment of legalising the land tenure has arrived, it is already practically instituted.

2.2.1 Water supply

In one example the state companies of water supply and sewerage considered as clandestine the household connections to the water system in the needy areas, but that situation changed a little when the Governing Commission of the Association of Residents began to collect in each area the payment of a single rate, established by the same residents.

The most profound social initiative emanated from the electric company of Rio de Janeiro that not only implemented simplified electric systems in the needy areas but also made the household connections, hut by hut, and installed meters in each house, thus making each household connection official and taking an important step toward subsequent land tenure.

3. WATER AND HEALTH INTEGRATED PROGRAM

We can say without fear of erring that the integrated health program is the cherished dream of every true sanitarian of this country that wants to see and considers possible great improvement in the current levels of health. Each of us, in accordance with his political and social upbringing, has his own vision of the integrated health program.

In the political sense, the majority of the professionals considers health as a right of all human beings and, as such, a responsibility of the state.

The sanitary engineer includes sanitation among the indispensable ingredients for health. To that end we will discuss some aspects based on actual data.

By health we understood a modified version of the WHO definition: " Health is the most complete physical, mental, and social well-being, free of fear and not only the absence of disease."

The persons that accept health as a responsibility of the state do not exclude other aspects and understand that the action should be coordinated in the direction of the individual and the family; although the agents of that action can be related to the state entities of various organs or particular institutions, the important thing is to deliver health to the individual and the family.

In Brazil, starting from the 1970s a centralizing effort was made, by means of PLANASA and the National Bank of Housing (BNH), with respect to sanitary activities, water supply, and sewerage, mainly for the purpose liberating the process from the traditional health organs. Many things were done but that did not result in activity or centralization or liberation of the health organs. What was accomplished, at the expense of a better result for health, was termination of community participation and elimination of the sanitary objective from the health activities. Upon resuming the national discussion the centralizing process was brought up and the urgent need arose to give sanitation a social and sanitary character again and to promote community participation of the target population.

In order to understand the concept of community participation we use the words of Dr. Rosinha B. Dias, which Dr. Hevia Rivas transcribes in the work entitled "Algun conceitos de Comunidade" (Participación de la comunidad en la atención primaria de salud - Salud Públ. Mex 1985 27:402-409).

BASES FOR A STRATEGY FOR COMMUNITY PARTICIPATION IN HEALTH

- The individuals, the families, and the community groups participate effectively only if they are consulted and if they participate in their own decisions;

- One should have deep faith in the capacity of the community to understand and deal with its health problems and disease.

- Recognition and respect of knowledge of the people, of their human dignity, and of their individual potentiality are indispensable.

- The community should receive simplified technological and logistical support;

- One should use endogenous models, self-reliant and consonant with the cultural traditions and the local ecology;

- The creation of awareness is very important in order to create a critical conscience that makes possible the discovery of causal factors and training for the exercise of participatory democracy;

- There should be aware and organized participation in all phases of the process of development by the persons actually affected;

- Among the objectives of participation are knowledge by the population of the causes of its own problems and the search for possible solutions;

- The first task that should be implemented in a strategy of community participation is to locate the existing organizations, to identify them, and to establish contact with them in order to introduce a multiplier effect and a social projection.

The most common errors observed in the experiences of community participation and cited in the same work of Dr. Dias are the following:

- Employment of models copied from the outside with inadequate strategies;

- Manipulation or use of the community for ends alien to it;

- Lack of concrete models of participation in health;

- Promotion of paternalism and dependency;

- Actions imposed from the outside and above on those below;

- Ignorance of the organization and stratification of the communities;

- Temptation to apply pressure in order to organize groups around health, beyond community development;

- Requirement of contributions of labor and material resources exclusively ;

- Programs narrowly focused in order to diminish social conflicts.

The effective participation of the community should be:

- Active

- Aware

- Responsible

- Deliberated
- Organized
- Sustained

From the point of view of sanitary engineering, in addition to that of community participation, it would be necessary to add the need to work using appropriate technology. Once more, appropriate technology is simplified technology, adapted to the socioeconomic conditions but it is technology and the inexpensive kind has limited effectiveness.

We cannot use appropriate technology, for example, for the removal of wastewater from the houses through pipes leading to the open air and thus increase the population of flies and other vectors.

It is not appropriate technology to have a single faucet in the patio that pours water into drums level with the soil where it is contaminated and wasted.

It is not appropriate technology to deliver to the houses water with parasites that cause schistosomiasis however much cheaper these solutions are and however more attractive the professionals find them under the motto that is better to try a little and have it fly.

4. PROGRAM OF MINIMUM SANITATION IN THE ACTIVITIES OF INTEGRATED HEALTH PROGRAMS

Considering the current reality of the existing administrative discrepancy in the various countries in which the sanitary activities are subordinated most of the time to organs different than those of health, we judge that the minimum that should be done in a program of the health sector in any situation should be what is indicated below:

In the first place public health has to make its presence felt in the sanitary activities related directly to health. That means being present in the agencies that dictate the sanitation policies at federal, state and municipal levels, that is to say the Federal, State and Municipal Health Councils.

- To maintain or encourage the maintenance of an information system for the sanitary condition, in the country, the states, and the municipalities.

- To maintain an information system for nosology related to sanitary activities.

- To maintain programs for promotion of sanitary activities being anticipated in regard to the explanation of the works of sanitary

engineering, their follow-up, proper use, and preservation.

- Normative and establishment action.
- Action of sanitary surveillance.
- Supplementary and executive action in the needy areas in the villages, towns, and peripheral areas.
- Sanitary action in the residences especially in the needy peripheral areas and in the populated villages.
- Training of personnel.
- Direct local relationship with the local institutions of sanitation in order to attend to the problems that arise.

With the evolution and the experience of the past one cannot think of returning the direction of the sanitary services to the field of health. A mechanism different from the system of water supply and of sewerage indicates that that measure is inadvisable, except in specific cases such as that of the Foundation SESP and some voluntary agencies.

A fundamental point of the normative and establishment activities is the selection of priorities, for what should then be a common program.

In cases of a high rate of child diarrhea it is necessary to have water of good quality and in reasonable quantity. The public systems should have disinfected water.

When water supply in the areas affected by schistosomiasis is sufficient, the principal concern of the local health organs should be the treatment of the persons that suffer from that disease.

In the areas where hepatitis is common, the water supply services should be concerned with strengthening the disinfection of the water up to a desirable point.

These are obvious points but it is always worthwhile to point them out.

In Brazil, the integrated national plans, except those of the Foundation SESP that by definition is a comprehensive health organ, are barely being initiated and although the perspectives are promising still better results have not yet been obtained. Below we present some situations in which both positive and negative results have been obtained with the introduction of water supply services, which can be explained by analysis in light of the general principles of sanitation enunciated.

For example, in a study done by the Foundation SESP in various localities of the State of Paraíba (Division of Studies and Planning, "Abastecimento de water e niveis de saude em cidades of Paraíba," Revista de la Fundación SESP, Volume XXI, No. 2, 1976, in which the results of the increase in the number of household water connections and the trend of infant mortality are analyzed, contradictory results with an appreciable increase in that mortality are obtained. See Annex II.

To what is this attributed? Perhaps the explanation is in the fact that with the administrative change, upon closing the public faucets in a primary stage, the poor and needy population had to use the famous single faucet in the patio and has recontaminated the treated water upon improperly using the water stored in open tanks or drums, with unhygienic handling and water waste.

In the study titled "Diarreia Infantil e Condições Sanitárias do Meio Ambiente" (Boletín de la Oficina Sanitaria Panamericana, Seminario sobre diarrea infantil, septiembre de 1960) by J. N. Nanceau, Aníbal Albuquerque and Rainero Maroja, the influence of water in the interior of house on the reduction of infant mortality caused by diarrhea appears very clear. In a work by the same author an increase of 20 years in life expectancy at birth is observed upon analyzing the existing situation in Palmar, Pernambuco.

In an unpublished work of the Coordination of Scientific and Technological Development of the Foundation SESP entitled "Ensaio de estudo of custo - Efeito do saneamento," 1982, Rio de Janeiro, four localities of Rio Grande do Norte are studied: the first before and after improving the water supply and waste disposal systems; the second with good water supply service but poor waste disposal; the third with poor water supply service but good waste disposal service, and the fourth with poor service in both cases. In Annex III the positive result from water supply is presented clearly.

In an unpublished work of Maria and Coleg Carmo Leal entitled "Projeto de características epidemiológicas das diarreias infecciosas em comunidades de baixa renda no município de Rio de Janeiro," (project ENSP PAHO/WHO) the following results are presented on the incidence of diarrhea in children over one year old in the slum of Manginhos in Rio de Janeiro in 1984.

PUBLIC WATER SUPPLY	NUMBER OF EPISODES OF CHILD DIARRHEA PER YEAR
YES	4.8
NO	6.6

In a positive proportion 0.73

RESIDENCE CONNECTED TO THE PUBLIC SEWERAGE SYSTEM	NUMBER OF EPISODES OF CHILD DIARRHEA PER YEAR
YES	3.2
NO	5.4

In his publication entitled "Determinantes da mortalidade infantil na Area Metropolitana do Rio de Janeiro," prepared as part of the project ENSP-FINEP, Paulo Cagasteles Sabroza shows the decline of infant mortality specifically caused by diarrhea between 1976 and 1983 (see Annex IV).

It is interesting to point out that the program of water supply to the needy areas by means of public faucets began exactly 10 years ago and intensified in the last three years when it benefited from household connections to 515,000 inhabitants.

Also the data of infant mortality of the State of Espirito Santo are interesting.

Data of the IBGE and statistics of the civil registration.

YEAR	INFANT MORTALITY
1980	57.67
1981	51.10
1982	46.30
1983	53.82

The water supply systems handled by the State Company of Sanitation (CEASE) and the Foundation SESP in Espirito Santo are characterized by disinfection with chlorine.

Beginning in 1983 systems that do not follow the same criterion were introduced outside the area of these two institutions.

An interesting item of data that points out the continuing need for the presence of public health measures in the large cities is that which appears in the work titled "Controle de qualidade d'agua em sistemas de reservacao e distribucao predial na cidade do Rio de Janeiro" of Teófilo Carlos Monteiro and Carlos Albert Silva Miranda, presented in the II Luso-Brazilian Symposium on Sanitary and Environmental Engineering, Salvador, Bahia, 1986.

The water that leaves the treatment plant of Guandú that supplies to 90% of the population of Rio de Janeiro is of good quality; the verification of the water quality in the system made by FEEMA in

accordance with the established standards also has given good results, but in 20% of the water samples collected by persons that independently sought the services of FEEMA in 1985 a positive index of E. coli was observed, showing the bad existing conditions in the residences.

5. COSTS OF THE WATER SUPPLY SYSTEMS

The program of water supply requires large sums if it is considered as a whole. The current estimates of cost per inhabitant vary in accordance with the size of the cities, between Cz\$80,000 per inhabitant for the small ones and Cz\$1,000 per inhabitant for the larger ones.

The fees collected offer better data for evaluation and below there is a typical example from CEASE (in Espirito Santo) where the fee varies with consumption.

MONTHLY CONSUMPTION	Cz\$
0 to 10m ³ /monthly	1.156/m ³
11 to 15m ³ /monthly	1.599/m ³
16 to 20m ³ /monthly	2.207/m ³
21 to 30m ³ /monthly	2.569/m ³
31 to 45m ³ /monthly	3.922/m ³

It is important to point out the campaign against water waste that should encompass both the public systems and those to the residences.

6. CONCLUSIONS

1. Water performs an important role in the health of populations and hence concern for water supply and participation in that service should be present in all the integrated health programs.

1.1 The form of action will vary in accordance with tradition and the local administrative policy, but whatever that policy, public health should be represented in some way in the water supply system.

2. The distance that exists between the organs of sanitation and health is a negative factor. Reduction of that distance and exchange should be matters of interest for both sectors.

3. Among the continuing activities should be the collection and analysis of the sanitary results; they should be compared with those of water supply.

3.1 The sanitary results obtained from water supply are not reliable for various reasons explained previously; one basic factor is the lack of an adequate information methodology whose bases are suggested in the document.

4. There is a basic aspect that should be pointed out: in order to obtain sanitary results in regard to water supply it is necessary that that service be extended to the whole population of a given area.

The public health professionals should explore that fact in order to achieve the participation of the needy and non-needy population in its projects, not for charitable reasons but as something important for health itself.

5. Accordingly, one should provide special attention to the needy areas that are found in all the urban centers, since without the due attention to these areas a substantial improvement of their overall health will not be achieved.

6. The expansion of appropriate technology is recommended. In each case, that which is of low cost has limited effectiveness. Nothing is served by spending little and creating expectations in the population if no result is obtained.

7. In the case of Brazil, in addition to the needy areas (slums, huts linked by water extensions, etc.), it is necessary to consider also the towns, villages, and even the scattered population since the time has come for instituting programs there for rural sanitation in the terms explained.

8. The response to this challenge only can be found in the integration into the community work of the normal work of the participating institutions.

9. In the peripheral urban area and in the poor areas it is indispensable to carry out programs for installation of minimum equipment for water consumption in the residences.

10. Finally, the growing contamination of the water sources is reason for concern and deserves the necessary attention. The quality of the finished product depends on the quality of the raw material.

TABLE 1

GENERAL DATA ON WATER SUPPLY SYSTEMS IN ESPIRITO SANTO
AS OF 31/12/84

CLASSIFICATION	NUMBERS
1. LOCALITIES WITH SYSTEMS	
1.1 Municipal centers	58
1.2 Districts	134
1.3 Total (1.1 + 1.2)	192
2. INSTITUTIONS RESPONSIBLE FOR OPERATIONS	
2.1 Company (directly or indirectly)	55
2.2 Others	137
2.2.1 Municipal councils	69
2.2.2 Other agencies	68
2.3 Total (2.1 + 2.2)	192
3. MUNICIPAL CENTERS WITH SYSTEMS	
3.1 Companies	36
3.2 Total (3.1 + 3.2)	22
4. PRIVATE HOMES	
4.1 Company	252.326
4.2 Others	107.689
4.3 Total	360.015
5. SERVED POPULATION	
5.1 Company	979.809
5.2 Others	444.176
5.3 Total (5.1 + 5.2)	1.423.485
6. MUNICIPAL CENTERS SERVED (%)	100
7. TOTAL POPULATION SERVED (%)	63
8. TOTAL URBAN POPULATION SERVED (%)	88
9. MUNICIPAL CENTERS WITHOUT SYSTEMS	
9.1 Total	0
9.2 With works under way	0
9.3 With completed projects	0
9.4 With projects under way	0
9.5 Others	0

TABLE 2
 GENERAL DATA ON SEWERAGE SYSTEMS IN ESPIRITO SANTO
 AS OF 31/12/84

CLASSIFICATION	NUMBERS
1. LOCALITIES WITH SYSTEMS	
1.1 Municipal centers	21
1.2 Districts	23
1.3 Total (1.1 + 1.2)	44
2. INSTITUTIONS RESPONSIBLE FOR OPERATIONS	
2.1 Company (directly or indirectly)	3
2.2 Others	41
2.2.1 Municipal councils	20
2.2.2 Other agencies	21
2.3 Total (2.1 + 2.2)	44
3. MUNICIPAL CENTERS WITH SYSTEMS	
3.1 Companies	2
3.2 Others	19
3.3 Total (3.1 + 3.2)	21
4. PRIVATE HOMES	
4.1 Company	27.076
4.2 Others	46.352
4.3 Total	73.428
5. SERVED POPULATION	
5.1 Company	96.680
5.2 Others	214.972
5.3 Total (5.1 + 5.2)	311.652
6. MUNICIPAL CENTERS SERVED (%)	36
7. TOTAL POPULATION SERVED (%)	14
8. TOTAL URBAN POPULATION SERVED (%)	19
9. MUNICIPAL CENTERS WITHOUT SYSTEMS	
9.1 Total	37
9.2 With works under way	(+)
9.3 With completed projects	7
9.4 With projects under way	(+)
9.5 Others	30

TABLE 3

GENERAL DATA ON ESPIRITO SANTO AS OF 31/12/84

CLASSIFICATION	NUMBERS
1. Total area (km ²)	45,597
2. Total population: 1980 Census (1,000s of persons)	2,024
3. Planned total population: December 1984 (1,000s of persons)	2,243
4. Planned urban population: December 1984 (1,000s of persons)	1,610
5. Planned rural population: December 1984 (1,000s of persons)	633
6. Total municipal centers	58
7. Total districts (except centers)	156
8. Minimum wage (Cr\$)	166.560

TABLE 4

CEASE - HUMAN RESOURCES (AS OF 31/12/84)

CLASIFICACION		NO.	%
1.	Management	3	0.20
2.	TOP LEVEL	145	9.1
	2.1 Engineers	67	4.2
	2.2 Other professionals	78	4.9
3.	INTERMEDIATE LEVEL	534	33.7
	3.1 Technical Staff	201	12.7
	3.2 Others	333	21.0
4.	SKILLED, SEMI-SKILLED, AND UNSKILLED WORKERS	902	57.0
TOTAL		1.584	100
5.	TRAINING OPPORTUNITIES OFFERED IN 1984	1.481	93.5

TABLE 5

CEASE - BILLINGS/AMOUNTS COLLECTED
AMOUNTS IN CR\$1.000.000

	DISTRIBUCION	NUMERO
1.	Billing 82	2.994
2.	Billing 83	10.240
3.	Billing 84	29.464
4.	Billing 85 (Estimated)	97.497
5.	Amount collected 82	2.489
6.	Amount collected 83	8.269
7.	Amount collected 84	24.219
8.	Amount collected 85 (Estimated)	82.982
9.	Amount Collected/billing ratio 82 (%)	83
10.	Amount Collected/billing ratio 83 (%)	81
11.	Amount Collected/billing ratio 84 (%)	82

TABLE 6

CEASE - WATER SUPPLY SYSTEMS - OPERATION DATA AS OF 31/12/84

	1	2	3	4	5	6	7	8	9	10
Classi- fication	Served population (1.000 hab.)	Urban populat. total cities with system handled by CESAN (1.000 hab.)	Number of connections	Number of homes	Connections with meters	Extension of water networks	Volume - 1.000m ³ /daily			
							Produced	Treated	Micro metering	Billed
Capital	243	243	31.347	63.895	10.965	417	413(1)	349(1)	34	55
Interior	737	834	133.146	188.431	33.889	2.054	65	65	54	129
Total	980(2)	1.077(2)	164.493	252.326	44.854	2.471	478	414	88	184

N.B.: 1) Data for the Metropolitan Region (Vitória, Vila Velha, Cariacica, Viana, and Serra).

2) Does not include migrant population.

TABLE 7

CEASE - SANITARY SEWERAGE SYSTEMS
OPERATIONAL DATA AS OF 31/12/84

	1	2	3	4	5	6	7	8
Classifi- cation	Served population (1.000 hab.)	Urban populat. total cities with system handled by CESAN 1.000 hab.)	Number of connections	Number de homes	Extension of water networks (km)	Volume - 1.000m ³ /daily		
						Collected	Treated	Billed
Capital	28	243	2.723	12.039	14	(+)	(+)	11
Interior	69	112	10.938	15.037	136	(+)	7	8
Total	97	355	13.661	27.076	150	(+)	7	19

TABLE 8

CEASE - SOME INDICATORS (AS OF 31/12/84)

CLASSIFICATION	NUMBER	CLASSIFICATION	NUMBER	CLASSIFICATION	NUMBER
1. Population served/urban population cities with system handled by CEASE (water) (%)	90.99	8. Margin of operating expenses and maintenance: operating expenses and maintenance/operations revenue ... (%)	37.99	13. Margin of expenditures for operations expenditures for operations/operations revenue ... (%)	64.65
2. Population served/urban population cities with systems handled by CEASE (sewerage) (%)	27.32	9. Margin of staff expenditures: staff expenditures/operations revenue ... (%)	45.19	14. Average cost of operations: expenditures for operations/average number of homes (water + sewerage)Cr\$/home	73.979.25
3. Index of treatment (water): volume treated/volume produced ... (%)	86.61	10. Annual average cost per employee total staff expenditures/average number of employees per yearCr\$1.000/employee	9.033.17	15. Average cost per m3 cost of service/volume billed Cr\$m3	262.85
4. Index of treatment (wastewater) volume treated/volume collected (%)	(+)	11. Margin of expenditures for material: expenditures for material/operations revenue (%)	7.08	16. Profitability of equity capital: available profits/average equity (%)	(160.32)
5. Index of micrometering: volume micrometered/volume produced (%)	18.41	12. Margin of expenditures for services from third parties: expenditures for services from third parties/operations revenue.. (%)	16.63	17. Degree of indebtedness: average receivables/net average equity	5.97
6. Volume billed/volume produced (%)	38.49			18. Current liquidity: current assets current liabilities operations (water + sewerage)/volume billedCr\$/m3	2.83
7. Average rate: operations revenue (water + sewerage)/volume billed ...Cr\$/m ³	406.53				

TABLE 9

CEASE - SOME INDICATORS OF THE PERFORMANCE OF THE SYSTEMS (AS OF 31/12/84)

CLASSIFICATION	NUMBER	CLASSIFICATION	NUMBER	CLASSIFICATION	NUMBER
1. Municipal centers with water from companies/total municipalities of the Unity of the Federation (%).	62.06	9. Consumption of sulfate/volume of water treated (g/m ³)	7.31	17. Total volume billed/total homes ... (m ³ /home/day)	0.729
2. Municipal centers with sewerage systems from companies/total municipalities of U/F/... (%)	3.44	10. Consumption of lime/volume of water treated ... (g/m ³)	5.61	18. Total volume billed/total connections(m ³ /connection/day)	1.120
3. Municipalities with sewerage systems/municipalities with water supply system (companies) (%)	5.55	11. Volume of wastewater collected/volume of water produced (%)	(+)	19. Water billed/total billed....(%)	97.86
4. Extension of water networks/water connections (mg/conn.)	15.02	12. Population supplied/water connections.....(person/conn.)	6.36	20. Sewerage billed/billed total...(%)	2.14
5. Extension of sewerage networks/sewerage connections ... (m/conn.)	10.96	13. Population supplied/homes with water (person/home)	4.2	21. Number of water and sewerage connections/number of employees as of 31/12/84...(conn./emp.)	112.47
6. Volume of water produced/population supplied (m ³ /person/day)	0.456	14. Homes with water/water connections	1.5	22. Number of homes with water and sewerage connections/number of employees as of 31/12/84 ... (homes/emp.)	176.4
7. Volume of wastewater collected/population served with sewerage system ... (m ³ /person/day)	(+)	15. Homes with sewerage/sewerage connections	2.0	23. Average number of water and sewerage connections in 1984/average number of employees in 1984...(conn./emp.)	111.67
8. Consumption of chlorine/volume of water treated... (g/m ³)	1.10	16. Stream gauge connections/water connections	27.3	24. Average number of homes in 1983 with water and sewerage/average number of employees in 1984 (home/emp.)	174.69

TABLE 10

CEASE - GENERAL DATA - TRENDS OVER THE LAST THREE YEARS

CLASSIFICATION	SITUATION TO		
	DECEMBER 1982	DECEMBER 1983	DECEMBER 1984
1. Municipal centers with water system	33	33	36
2. Localities with water system (municipal centers - districts)	43	47	55
3. Municipal centers with sewerage systems	2	2	2
4. Localities with sewerage systems (municipal centers + districts)	3	3	3
5. Number of connections (water)	125.135	148.008	164.493
6. Number of connections (sewerage)	7.126	12.302	13.661
7. Supplied population (1,000s of persons) (water)	767	883	980
8. Population served (1,000 of persons) (sewerage)	55	79	97
9. Extension of the water network (km)	1.532	2.221	2.471
10. Extension of the sewerage system (km)		142	150
11. Number of water treatment plants handled by CEASE	40	40	43
12. Number of sewerage treatment plants handled by CEASE	3	3	6
13. Stream gauge connections	19.292	31.723	44.854
14. Total number of employees	1.171	1.413	1.584
15. Number of fluoridated systems	21	36	43
16. Population covered with fluorination (1,000s of persons)	601	789	1.047
17. Investments - water (1,000 UPCs)	3.833	1.660	1.283
18. Investments - sewerage (1,000 UPCs)	0	1	20

N.B.: UPC (Standard Unit of Currency) = Cr\$17.867 (4th quarter of 1984)

TABLE 11

CEASE - PROGRAMMED ACTIVITIES

WATER PERIOD: 01/01/85 AL 31/12/88			
CLASSIFICATION		UNIT	NUMBER
1. Studies and special reports		u	74
2. Projects for systems		u	74
3. Collection - dams		u	(+)
4. Collection - wells (drilling)		u	(+)
5. Pumping stations		Nº/HP	(+)
6. Water treatment plants - compact - new		u	(+)
7. Water treatment plants - new - non compact		u	(+)
8. Water treatment plants - expansions		u	(+)
9. Deposits		u	85
10. Primary and secondary aqueduct channels		km	(+)
11. Distribution networks		km	556
12. Stream gauges (estimate)		u	123.731
13. Connections		u	50.000

TABLE 11

CEASE - PROGRAMMED ACTIVITIES (CONTINUATION)

SEWERAGE - PERIOD: 01/01/85 AL 31/12/88

CLASSIFICATION	UNIT	NUMBER
1. Analysis and studies	u	8
2. Special reports	u	8
3. Projects for systems	u	8
4. Networks	km	384
5. Outlets - with pumping	km	(+)
6. Special outlets	km	(+)
7. Sewage treatment plants - compact	u	(+)
8. Sewage treatment plants - new - noncompact	u	(+)
9. Sewage treatment plants - expansions	u	(+)
10. Pumping stations	N ^o /HP	(+)
11. Connections	u	29.000

TABLE 12

CEASE - INVESTMENTS CARRIED OUT AND PROGRAMMED

	INVESTMENTS DONE (1984)		INVESTMENTS PROGRAMMED (PERIOD 5/88)	
	IN 1.000 UPC	IN MILLONS OF CRUZEIROS	IN 1.000 UPC	IN MILLONS OF CRUZEIROS
1. WATER SUPPLY SYSTEMS- (SUBTOTAL)	1.283	22.923	7.570	135.253
. Capital	1.077	19.243	5.428	96.982
. Interior	206	3.680	2.142	38.271
2. WATER SUPPLY SYSTEMS (SUBTOTAL)	20	357	4.121	73.630
. Capital	13	232	2.979	53.226
. Interior	7	125	1.142	20.404
TOTAL:	1.303	23.280	11.691	208.883

N.B.: 1 UPC (Standard Unit of Currency) = Cr\$17.867 (4th quarter 1984)

TABLE I
 PERCENTAGES OF THE PREDIAL CONNECTIONS TO THE WATER SUPPLY SYSTEM
 GUARABIRA, PB - 1962/1974

PREDIAL COVERAGE	YEARS												
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
ACTUAL (a)	26.9	27.4	27.8	28.2	28.6	28.9	30.4	31.7	32.9	55.3	53.6	57.2	58.8
APPARENT (b)	26.9	27.4	27.8	28.2	28.6	28.9	30.4	31.7	35.4	63.7	65.5	68.9	69.6

(a) Ratio of the total number of connections in operation and the number of existing properties

(b) Ratio of the total number of connections and the number of existing properties

TABLE II
 EVOLUTION OF INFANT MORTALITY AND ACTUAL PREDIAL COVERAGE
 GUARABIRA, PB - 1962/1974

INDICATOR	YEARS												
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
INFANT MORTALITY	578	614	584	491	408	397	320	378	261	287	218	285	175
ACTUAL PREDIAL CONVERAGE	26.9	27.4	27.8	28.2	28.6	28.9	30.4	31.7	32.9	55.3	53.6	57.2	58.8

TABLE III

ANGULAR AND ADJUSTMENT COEFFICIENTS - REGRESSION EQUATION
FOR INFANT MORTALITY OF GUARABIRA, PB (+)

COEFFICIENTS	PERIOD		
	1962 - 74	1962 - 70	1971 - 74
ANGULAR (Average annual variation of infant mortality)	- 35.5	- 43.4	- 26.8
ADJUSTMENT - R ²	0.91	0.89	0.91

(+) See graph No. 1 of gross data and adjustments in the annex.

TABLE IV

PERCENTAGE PARTICIPATION OF THE WATER-BORNE DISEASES AND
DIARRHEA IN THE DISCHARGES FROM THE HOSPITALS AND ACTUAL
PREDIAL COVERAGE, GUARABIRA, PB - 1969/1974

INDICATOR	YEARS					
	1969	1970	1971	1972	1973	1974
Water-borne diseases in the discharges from the hospitals.	2.3	2.3	2.9	5.4	7.6	6.9
Diarrheal diseases in the discharges from the hospitals.	1.8	2.0	2.1	3.8	6.2	6.2
Number of diagnosed diarrheal diseases.	39	44	47	79	159	177
Actual predial coverage.	31.7	32.9	55.3	53.6	57.2	58.8

TABLE V
 PERCENTAGE OF PREDIAL CONNECTIONS TO THE WATER SUPPLY SYSTEM
 ESPERANZA, PB - 1968//974

PREDIAL COVERAGE (a)	YEARS						
	1969	1970	1971	1972	1973	1974	
ACTUAL	-	11.7	30.3	33.7	37.7	40.8	
APPARENT	-	11.7	31.2	36.1	40.0	43.2	

(a) See the definition in the footnote of Table I

TABLE VI
 EVOLUTION OF INFANT MORTALITY AND ACTUAL PREDIAL COVERAGE
 ESPERANZA, PB - 1962/1974

INDICATOR	YEARS												
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
INFANT MORTALITY	502	428	473	433	356	312	284	382	251	204	213	174	158
ACTUAL PREDIAL COVERAGE	-	-	-	-	-	-	-	-	11.7	30.3	33.7	37.7	40.8

TABLE VII

ANGULAR AND ADJUSTMENT COEFFICIENTS - REGRESSION EQUATION FOR
INFANT MORTALITY OF ESPERANZA, PB (+)

COEFFICIENTS	PERIOD		
	1962 - 74	1962 - 70	1971 - 74
ANGULAR (Average annual variation of infant mortality)	- 28.6	- 26.5	- 14.7
ADJUSTMENT - R ²	0.94	0.75	0.79

(+) See graph No. 2 and table No. 2 of gross data and adjustments in the annex.

TABLE VIII

PERCENTAGE PARTICIPATION OF THE WATER-BORNE DISEASES AND
DIARRHEA IN THE DISCHARGES FROM THE HOSPITALS, MEDICAL CLINICS
AND ACTUAL PREDIAL COVERAGE. ESPERANZA, PB - 1968/1974

INDICATOR	YEARS						
	1968	1969	1970	1971	1972	1973	1974
Water-borne diseases in the discharges from the hospitals.	6.4	6.4	8.4	10.5	9.4	9.4	13.0
Diarrheal diseases in the discharge from the hospitals.	6.4	6.4	8.1	10.5	9.2	9.4	13.0
Water-borne diseases in the clinics.	...	13.7	12.6	15.1	18.6	14.7	13.2
Actual predial coverage.	...	11.6	10.8	13.4	16.2	13.1	12.0

TABLE IX

PERCENTAGES OF PREDIAL CONNECTIONS TO THE WATER SUPPLY SYSTEM
CATOLE DO ROCHA, PB - 1962/1974

PREDIAL COVERAGE (+)	YEARS												
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
ACTUAL	29.0	29.6	29.6	29.3	29.3	28.4	29.5	29.7	29.4	36.2	43.8	45.6	48.7
APPARENT	31.1	29.6	33.2	29.3	32.9	32.4	32.0	31.7	33.5	42.2	50.3	54.4	55.8

(+) See the definition in the footnote in Table I

TABLE X

EVOLUTION OF INFANT MORTALITY AND ACTUAL PREDIAL COVERAGE
CATOLE DO ROCHA, PB - 1962/1974

INDICATOR	YEARS												
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
INFANT MORTALITY	218	172	148	88	66	90	74	193	136	101	104	110	114
ACTUAL PREDIAL COVERAGE	29.0	29.6	29.6	29.3	29.3	28.4	29.5	29.7	29.4	36.2	43.8	45.6	48.7

TABLE XI

ANGULAR AND ADJUSTMENT COEFFICIENTS - REGRESSION EQUATION OF
INFANT MORTALITY OF CATOLE DO ROCHA, PB (+)

COEFFICIENTS	PERIOD		
	1962 - 74	1962 - 70	1971 - 74
ANGULAR (Average annual variation of infant mortality)	- 41.3	- 16.1	- 3.9
ADJUSTMENT - R ²	0.97	0.78	0.99

(+) See graph No. 3 and table No. 3 of gross and adjusted data in the annex.

TABLE XII

PERCENTAGE PARTICIPATION OF THE WATER-BORNE DISEASES AND
DIARRHEA IN THE DISCHARGES FROM THE HOSPITALS, MEDICAL CLINICS
AND ACTUAL PREDIAL COVERAGE. CATOLE DO ROCHA, PB - 1970/1974

INDICATOR	YEARS				
	1970	1971	1972	1973	1974
Water-borne diseases in the discharge from the hospitals	3.1	9.7	13.5	9.8	10.6
Diarrhea in the discharges from the hospitals	3.1	8.6	13.5	9.8	10.6
Water-borne diseases in the clinics	11.3	10.9	11.8	15.7	19.1
Diarrhea in the clinics	9.7	8.4	8.4	11.8	14.9
Bacillary dysenteries and amebiasis in the clinics	1.6	2.5	3.3	3.7	3.8
Actual predial coverage	29.4	36.2	43.8	45.6	48.7

TABLE XIII

PERCENTAGES OF PREDIAL CONNECTIONS TO THE WATER SUPPLY SYSTEM
SOUZA, PB - 1962/1977

YEARS													
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
PREDIAL COVERAGE													
ACTUAL	25.4	23.9	33.7	37.4	42.3	42.4	48.6	45.9	41.9	54.7	57.8	61.2	59.6
APPARENT	25.4	23.9	33.7	37.4	42.3	42.4	48.6	45.9	50.6	67.1	71.2	71.7	70.0

(+) See the definition in the footnote in Table I

TABLE XIV

EVOLUTION OF INFANT MORTALITY AND ACTUAL PREDIAL COVERAGE
SOUZA, PB - 1962/1974

YEARS													
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
INDICATOR													
INFANT MORTALITY	124	133	231	153	123	169	65	75	69	98	72	101	102
ACTUAL PREDIAL COVERAGE	25.4	23.9	33.7	37.4	42.3	42.4	48.6	45.9	41.9	54.7	54.8	61.2	59.6

TABLE XV
 ANGULAR AND ADJUSTMENT COEFFICIENTS - REGRESSION EQUATION
 OF INFANT MORTALITY OF SOUZA, PB (+)

COEFFICIENTS	PERIOD	
	1964 - 68	1969 - 74
ANGULAR (Average annual variation of infant mortality)	- 31.4	5.9
ADJUSTMENT - R ²	0.67	0.66

(+) See graph No. 4 and table No. 4 of gross data and adjusted in the annex.

TABLE XVI
 PERCENTAGE PARTICIPATION OF THE WATER-BORNE DISEASES AND
 DIARRHEA IN THE DISCHARGES FROM THE HOSPITALS AND ACTUAL
 PREDIAL COVERAGE. SOUZA, PB - 1969/1974

INDICATOR	YEARS					
	1969	1970	1971	1972	1973	1974
Water-borne diseases in the discharge from the hospitals	6.9	12.8	16.3	10.7	16.1	14.4
Diarrheal diseases in the discharges from the hospitals	6.1	12.7	14.8	9.6	11.6	14.3
Number of diagnosed diarrheal diseases	31	119	71	18	23	108
Actual predial coverage	45.9	41.9	54.7	57.8	61.2	59.6

TABLE

DESTINATION OF THE WASTES FROM THE RESIDENCES IN
FOUR LOCALITIES - RN 1980/1981

LOCALITIES	REMOVAL BY ANY TYPE OF PIT	EXPOSED (%)
Mangabeira - 1980	-	-
1981	94.6	5.4
Coqueiros	96.7	3.3
Rego Moleiro (1)	27.8	72.2
Laranjeiras dos Cosmes	98.1	1.9

(1) Subsequently benefited from the project for control of schistosomiasis.

TABLE

- DISTRIBUTION BY TYPE OF WATER SUPPLY IN THE RESIDENCES
OF FOUR LOCALITIES - RN 1980/181

LOCALITIES	TYPE OF SUPPLY		
	GENERAL NETWORK	PUBLIC SOURCE	WELL, SPRING, RIVER AND OTHERS
Mangabeira - 1980	0.0	0.0	100.0
1981	88.2	7.2	4.6
Coqueiros	100.0	0.0	0.0
Rego Moleiro	96.8	0.0	3.2
Laranjeiras dos Cosmes	0.0	0.0	100.0

In the analysis and interpretation of the cases of diarrhea, the state of health in the four localities should be considered, namely:

Mangabeira - 1980	- without improvement
1981	- with adequate coverage of water supply and waste disposal
Conqueiros	- with adequate coverage of water supply and waste disposal
Rego Moleiro	- with adequate coverage of water supply and a deficient system of waste disposal
Laranjeiras dos Cosmes	- without water supply and with an adequate system of waste disposal.

TABLE

NUMBER OF PERSONS AFFECTED BY DIARRHEA, TOTAL CASES
OF DIARRHEA, AND CONCENTRATION OF CASES PER PERSON IN
FOUR LOCALITIES - RN
1980/1981

LOCALITIES	CASES OF DIARRHEA		
	SICK PERSONS	TOTAL OF CASES	CONCENTRATION PER PERSON
Mangabeira - 1980	389	1.154	3.0
1981	172	359	2.1
Coqueiros	269	475	1.8
Rego Moleiro	243	508	2.1
Laranjeiras dos Cosmes	389	792	2.0

This table confirms the previous data and indicates the least number of days of the episodes of diarrhea in the localities where there is a water supply system: Mangabeira (1981), Coqueiro, and Rego Moleiro.

The average of number of days of diarrhea per person was the following:

Mangabeira - 1980	-	10.4
- 1981	-	6.3
Coqueros	-	6.2
Rego Moleiro	-	7.1
Laranjeiras dos Cosmes	-	7.4

The average number of days of the episodes of diarrhea per person was less in Mangabeira, in 1981, and in Coqueiros.

ANNEX III-III TABLE

RELATIONSHIP BETWEEN THE RATE OF INCIDENCE OF DIARRHEA, THE CONDITIONS OF SANITATION IN
FOUR LOCALITIES, AND THE COST OF THE CARE
1980/1981

LOCALITY	CONDITIONS OF BASIC SANITATION	POPULATION	CASES OF DIARRHEA		No. OF CASES OF DIARRHEA TREATED	COST OF CARE FOR DIARRHEA Cr\$
			No. OF CASES	Index/10,000		
Mangabeira-1980	Without water supply and without waste disposal.	796	1,154	14,497.5	112	149,611.60
1981	Adequate water supply sistem and waste disposal	573	359	6,265.3	59	73,576.00
Coqueiros	Adequate water supply system and waste disposal.	1,093	476	4,355.0	23	8,637.20
Rego Moleiro	Adequate water system and inadequate waste disposal	710	508	7,454.9	123	36,802.40
Laranjeira dos Cosmes	Without water supply but with an adequate system of waste disposal	718	792	11,030.6	102	47,979.20

ANNEX IV

TREND OF THE NUMBER OF DEATHS IN CHILDREN UNDER ONE YEAR,
FROM VARIOUS CAUSES, IN THE METROPOLITAN REGION OF
RIO DE JANEIRO FROM 1976 TO 1983

AREA	PERINATAL	DIARRHEA	PNEUMONIA	MALNUTRITION
1	1.7	-16.6	-12.4	-9.3
2	5.6	-18.3	-13.7	-10.5
3	3.2	-18.5	-13.2	- 9.6
4	4.0	-23.3	-14.9	-13.6
5	-1.2	-26.6	-12.8	-16.0
6	5.5	-18.2	-14.0	- 0.7
7	1.3	- 8.3	-15.2	5.2
8	3.5	-14.8	- 7.1	- 5.2
9	8.2	- 2.7	- 5.1	7.8
10	-0.9	-19.8	-15.8	- 1.4

ANNEX IV-I

PROJECT: DETERMINING FACTORS OF INFANT MORTALITY IN THE
METROPOLITAN AREA OF RIO DE JANEIRO

PAULO CHAGASTELLES SABROSA - FINANCING - FINEP

DEATHS OF THOSE UNDER ONE YEAR REGISTERED AND
PREDICTED IN RESIDENTS OF THE METROPOLITAN REGION OF
RIO DE JANEIRO IN THE FIRST QUARTER AND IN MAY 1986

AREA	TOTAL OF DEATHS		PNEUMONIA	
	JAN/FEBRUARY/MARCH OBS/ACTUAL	MAY OBS/ACTUAL	JAN/FEBRUARY/MARCH OBS/ACTUAL	MAY OBS/ACTUAL
1	59/58.2	26/19.1	7/5.3	2/1.7
2	110/126.3	40/41.4	7/13.7	9/4.4 *
3	180/155.1	78/50.8 *	17/17.2	17/5.5 *
4	125/123.3	60/40.3 *	21/13.3	3/4.3
5	116/94.5 *	48/30.8 *	13/11.32	5/3.7
6	100/110.0	62/3.2 *	12/10.1	13/3.3 *
7	190/230.0 *	82/75.5	25/26.9	17/8.7 *
8	610/701.4 *	299/230.2 *	85/132.4 *	77/43.4 *
9	81/153.9 *	55/51.2	9/15.6	6/5.1
10	18/29.0 *	11/9.4	3/3.3	2/1.1
TOTAL	1589/1781.7	761/585.1 *	161/249.1 *	151/81.1 *

* p less than 0.05, Poisson distribution assumed

PROPORTIONAL MORTALITY BY AGE GROUP IN
 THOSE UNDER ONE YEAR, BY AREA IN THE METROPOLITAN
 REGION OF RIO DE JANEIRO, IN THE FIRST QUARTER OF 1986

PROPORTIONAL MORTALITY BY AGE GROUP				
	TOTAL	LESS THAN 1 MONTH	FROM 1 TO 5 MONTHS	FROM 6 TO 11 MONTHS
1	59	74.6	10.2	15.2
2	110	75.5	18.2	6.4
3	180	69.4	21.1	9.4
4	125	64.8	28.0	5.0
5	116	68.1	25.0	6.9
6	100	72.0	23.0	5.0
7	190	63.2	26.8	10.0
8	610	57.2	28.7	14.1
9	81	35.8	35.8	18.5
10	18	66.7	27.8	5.4
TOTAL	1.589	63.0	25.9	11.1

MATRIX OF CORRELATIONS BETWEEN INDICATORS
OF INFANT MORTALITY AND VARIABLES RELATED TO LIVING CONDITIONS

	AGE	INCOME	INSTRUCTION	WATER	SEWERAGE	TELEVISION
INFANT MORTALITY (Y1)	0.71	-0.74	0.81	-0.80	-0.72	-0.68
REDUCTION IN THE NUMBER OF DEATHS (Y2)	-0.42	0.33	-0.45	0.43	0.62	0.44

Y₂: AVERAGE ANNUAL PERCENTAGE REDUCTION IN THE NUMBER OF DEATHS OF CHILDREN UNDER ONE YEAR BETWEEN 1976 AND 1983.

INDICATORS OF INFANT MORTALITY BETWEEN 1976 AND 1983
IN AREAS OF THE METROPOLITAN REGION OF
RIO DE JANEIRO

AREAS	INFANT MORTALITY RATE			REDUCTION % ANNUAL AVERAGE BETWEEN 76/83
	1976	1980 (Y ₁)	1983	
1	29.0	22.7	18.0	6.0
2	66.2	57.3	39.6	7.2
3	47.8	37.2	31.6	7.5
4	50.0	43.5	29.2	7.8
5	41.6	33.4	23.6	9.4
6	59.4	30.5	40.3	5.8
7	68.8	56.3	44.5	6.7
8	72.4	62.1	46.7	6.1
9	60.7	79.0	63.9	0.3
10	69.5	63.4	36.0	9.9



**SIMPOSIO REGIONAL SOBRE
Abastecimiento de agua y saneamiento —
un elemento de la atención primaria de salud**

Guatemala, 10 - 14 de noviembre de 1986

PERIURBAN CASE STUDY 'LOS OLIVOS'



**REGIONAL SYMPOSIUM ON
Water supply and sanitation —
an element of primary health care**

Guatemala, November 10 - 14, 1986

PERIURBAN CASE STUDY "LOS OLIVOS"

In January 1985, a water and sanitation program in the urban community of Los Olivos was started as an integral part of a program of primary health care. The general objective of the program was the improvement of the health conditions of the population through the application of a methodology of progressive development of basic sanitation, from simple technology, immediately applicable, to the implementation of sanitary services adequate for the socioeconomic conditions of the population group.

SPECIFIC OBJECTIVES

- A) To apply a program of basic sanitation in the community "Los Olivos" that would permit, if the results were found favorable after evaluation, their adaptation to other popular urban areas with similar conditions.
- B) Improvement of the quality of the water that is provided to the community by tank cars through the resulting disinfection, control by the community itself, and permanent surveillance by the health sector. The only effective measure to reduce diarrhea and other water-related diseases caused by consumption of water of bad quality.
- C) Preparation for the use of ventilated dry latrines for the disposal of excreta, within a framework of adaptation of appropriate methodologies, comparable to several systems existing in other places, taking into account the building materials found at the site or easily acquired at low cost. Another efficient form to reduce diarrhea and parasitic diseases.
- D) Alternatives for management and disposal of solid wastes, establishing an appropriate system of collection of refuse prior to selection for final disposal in sanitary landfills whose dimensional and technical characteristics should be defined in later studies.
- E) To develop a strategy, on the basis of the cultural, economic and social characteristics of the inhabitants of the place, in order to achieve their active participation in the sanitation programs as an essential part of the health conditions of their dwellings. To identify leaders-instructors in the community who later will be the promoters of this program in other popular urban areas, thus developing horizontal cooperation between communities.
- F) Preparation of educational material that makes it possible to improve the health education of the inhabitants related to the nature of the environment and personal hygiene, taking into account the characteristics of the population.
- G) To seek participation of universities and technical schools, utilizing students to act as transmitters of technologies and agents of change of attitudes, so that they (the students) face the pressing problems of the society to which they belong.

H) To evaluate the impact on community health by means of epidemiological studies.

I) The training of technical personnel in sanitation activities.

The strategy followed was that of achieving an immediate impact without having to resort to significant investments that, given the crisis, would reduce the possibility of implementation. Thus appropriate techniques for immediate application that permit the utilization of water for human consumption under safer sanitary conditions were proposed. To achieve correct disposal of excreta through sanitary latrines, involving the community in the solution of both problems.

PROGRAM OF DISINFECTION OF WATER THROUGH CHLORINATION AND DISPOSAL OF EXCRETA

The settlement Los Olivos is located east of the city of San Juan, on the left bank of the Damiji River. Its area is 461.8 hectares and it is located in a ravine, not cultivated.

The settlement is located in the highest part where it is estimated that 18,000 inhabitants currently live. It is expected that there will be around 120,000 inhabitants in the next several years. It is organized into seven areas, which in turn are divided into 60 lots of approximately 90 square meters each.

Water is supplied by tank trucks from which it is sold to the whole community. This system obliges the inhabitants to store volumes of water in household cylinders (200 L) exposed to surrounding environmental pollution and to the daily handling by the users when removing it. These conditions demand a rapid and effective solution that is easy for the people to understand and manage. The lack of a system for disposal of excreta in the community further increases the risk, already high, to the health of the inhabitants.

The problem requires a program of immediate improvement of the principal elements of environmental sanitation (water, disposal of excreta and solid wastes) and application of technologies that are appropriate and easily managed by the inhabitants, with use of materials and resources from the area itself in most of the solutions.

PROGRAM OF PROGRESSIVE IMPROVEMENT OF THE WATER

This program was divided into three basic stages of work, beginning with the current conditions of the distribution system and progressively incorporating new elements to the system until arriving finally at household connections and the installation of the basic sanitary unit integrating the toilet, washbasin, shower, and kitchen.

FIRST STAGE OF THE PROGRAM

Drinking water system - improvement of the water quality

- The location of the sources from which the tank trucks are supplied was determined in order to install continuous sampling of the quality and carry out sanitary inspections.
- As water was supplied by sellers it becomes necessary to determine the number of tank trucks that serve the locality and the number of trips that they make daily in order to quantify the chlorine that should be prepared for the disinfection.
- Permanent control by the community of the residual chlorine in the tank trucks (cylinders) before its sale and control at the proper points in the locality in order to confirm the rechlorination.
- Evaluation of the water quality (physical-chemical and bacteriological) at the sources and at the sampling points in the locality.

SECOND STAGE OF THE PROGRAM

Drinking Water System

- Replacement of the tank trucks by storage tanks is planned; some with 15 m³ capacity have already been constructed to supply each CHA (Community Housing Area). These tanks will feed strategically placed public reservoirs in order to provide easy access to consumers in the dwellings.
- These reservoirs will be fed from simple networks that are supplied from the storage tanks. In turn the tanks for each CHA will receive the water, in the first stage, from the tank trucks, and subsequently will be fed by lines of pipe from conventional systems. Thus the vulnerability of innumerable domestic cylinders will be reduced.

In a later stage, once the capacity of the public system has been increased to respond to the household demand, a network of simplified distribution that feeds the respective household connections will be constructed.

To each housing unit there will be programmed a minimum sanitary unit consisting of a shower, a toilet, a washbasin, and a kitchen, utilizing plumbing fixtures of low consumption and reducing the waste of water.

First Stage: Disposal of excreta

- Evaluation of different types of latrines previously installed in other places so that the families select the type of unit most appropriate for their conditions. For this decision there is cooperation in the construction of latrines that are better adapted to the actual requirements of the land

(groundwater level, consistency of the soil, etc.) and that facilitate adequate maintenance. Preparation of plans for the latrine, indicating the details and the materials for its construction, so that the community itself, with adequate orientation, is responsible for the production of the basic parts.

- Simultaneously there was initiated the preparation of technical-educational material: flip charts, posters, instructive primers, covering the following aspects: water quality, adequate maintenance of the latrines, and collection of refuse, with the purpose of achieving not only community participation but also proper use of the sanitary installations. All this material prepared with the assistance of specialists of the health sector as part of primary health care.

Second Stage: Drainage systems - Solution by each CHA

As the proposed solution is for gradual development, and the ventilated dry latrine is the first step, a study was initiated of a system for collection of wastewater, with pipes of reduced diameter that can collect liquids clarified after sedimentation in individual or collective absorption wells in each CHA, for households with water connections. Obviously the need is recognized for development of the infrastructure for the periodic and systematic cleaning of the absorption wells in order to guarantee the proper operation of the reduced diameter piping in the wastewater collection system.

Drainage system - Comprehensive community solution

Subsequently one should design the comprehensive drainage system of the community of Los Olivos in order to collect the clarified waters from all the CHAs in order to define the solution that will be provided for the digested sludge extracted from the absorption wells and the treatment that will be given to the clarified waters to facilitate its recycling in agriculture with the minimal risk to the health of the workers and to those that consume the food produced. Naturally it is necessary to point out the need for a study of the compatibility of the proposed "in situ" solutions: latrine (first stage) and septic tank with an absorbent well, so that they do not cause deterioration of the underground waters of the area utilized.

SPECIFIC OR PRINCIPAL ACTIVITIES OF THE PROGRAM

1. Disinfection of the water. The disinfection of the water is envisaged in two stages: the first stage consists of disinfection of the water from the source that supplies the tank truck by means of chlorination (chlorinated lime); the second stage consists of several chlorinations or household rechlorinations with the application of sufficient quantities of chlorine to the household storage cylinders, guaranteeing in this way safer water, from the sanitary point of view, at the moment of its consumption.

2. Control of the chlorination of the tank trucks through the daily determination of the residual chlorine at the point of entry to the community and systematically to the household cylinders, following the community structure, to be carried out by the voluntary health promoter trainees.
3. To provide the health promoters with a list of buyers of chlorine prepared with community support, so that the cost of the control is feasible.
4. Control of the bacteriological quality of the water through weekly determination of fecal coliforms and presence of residual chlorine, under the responsibility of the health sector and as part of primary health care.
5. To promote, as part of the primary care activities of the health sector, the creation of community workshops for the construction of the elementary parts for construction of latrines and to provide molds, new construction techniques, and latrine designs more acceptable from the sanitary point of view.
6. Health education through talks, audiovisual media, flip charts, etc., to the population in order to elevate the understanding of sanitation, under the responsibility of the health sector.
7. Determination and analysis of the information on the registration of the cases of acute diarrhea in children under five. Data taken from the health post and supplemented with that collected on household visits. In this way those responsible for public health are seeking the evaluation of this component of the PHC and its impact on the reduction of water-borne diseases and others that may be reduced by improving personal hygiene.

INSTITUTIONAL, ECONOMIC, FINANCIAL, POLITICAL, CULTURAL, AND EPIDEMIOLOGICAL ASPECTS

In order to develop and carry out the program the participation and approval of the following were considered: the municipality, central government, governing board of the community, company administering the water supply, Ministry of Public Health (its national coordination group and the health area) and the Ministry of Housing through its Bank of Materials.

STATE PARTICIPATION

To draft the policy to develop the project of the community "Los Olivos" that consists of providing the basic services of sanitation (water, disposal of excreta and refuse) to all the inhabitants of the community, as well as the urban and social development of the community as a fundamental part of primary health care.

For this one had to: coordinate and promote the project of drinking water supply and sanitation in Los Olivos; coordinate the action between the company and the support agencies at the state level and in the community; promote the acquisition of the necessary resources through the Bank of Materials in such a way that a recovery of the investment proportional to the capacity of the users to pay is obtained through the Bank of Materials; and to apply and to establish pertinent legislation that facilitates the development, the execution, and operation of the works.

COMMUNITY PARTICIPATION

This program is based primarily on active community participation. The volunteers to be trained in basic sanitation have been grouped following the organization and structure of the community, taking as a basis the CHAs; they are called "health promoters." In addition they participate in:

- Negotiation and finding best alternatives for supplying drinking water and sanitation.
- Follow-up of the execution of the work that is carried out under the program.

Especially in the improvement or disinfection of the drinking water, since the chlorination is not done on a large scale through dosification apparatus but family by family, without the family's effective participation there are no positive results, that is, there is no reduction of diarrhea.

- Participation in the construction of latrines and the social work of the community. Participation in the operation of its installations.

The educational work, the health talks, and the training of the promoters in each area, have permitted the community to understand the importance for health of the improvement of the drinking water quality through disinfection with chlorine. The health promoters of the community have learned the techniques for determining the residual chlorine and to control the chlorination of the tank trucks and the household rechlorination.

Latrine building has been accepted by the community as the most desirable form of disposal of excreta in the first phase of this program and latrines are constructed in the different CHAs by their inhabitants using the materials and resources of the area. The use of community latrines has been rejected and the family unit has been widely accepted.

The community has understood the need to solve the most pressing problems of water supply and latrine building and to this end community workshops have been developed in which the indispensable parts, bricks, planchas vacinetas, latrine rings, etc., are made.

EPIDEMIOLOGICAL ASPECTS

PERFORMANCE AND IMPLICATIONS OF THE PROGRAM

The effect on health is being evaluated with data and information compiled beginning in March 1986 and following the methodology of a project of epidemiological evaluation supplementary to the work plan for basic sanitation. As the initial objective an epidemiological analysis of morbidity from acute diarrheal diseases was made, in groups most affected (separated by ages) and their location was associated with the basic conditions of sanitation in each area. Also the bacteriological quality of the drinking water has been evaluated; simultaneously the disinfection by chlorination has been evaluated by carrying out determinations of residual chlorine.

There have been difficulties in the epidemiological study because previous statistical data on reports of acute diarrheal diseases in the community do not exist. Since January in coordination with the physician of the health center a form for registering the cases classed as diarrhea has been in use. Despite the multiple organizational drawbacks such as lack of a physician and lack of control, a marked underregistration, represented by the reporting of approximately 25% of the cases of diarrhea seen in the health post each month, was confirmed.

The statistical behavior of the data compiled in these first six months does not make it possible to make a comparative analysis of the water quality and the reports of consultations in which acute diarrhea is presented. However, it has been possible, on the basis of the information compiled, to establish the age groups for those who appear for consultations principally because of this disease and the areas with the highest rates of incidence. In the graphs 1 and 2 (Annex 2) are presented the rates of morbidity from acute diarrhea by area. One can see that areas A, B, C, and E, which coincide with the areas of better basic sanitation, have similar behavior while areas F and G on the contrary have higher rates of diarrheal diseases and are the areas with poorer sanitation.

Drinking water quality has been related to chlorination. One can confirm on the graph the direct relationship between the presence of residual chlorine and the water quality (graph 2, Annex 3).

Within the program of sanitation the program of latrine building has been being developed progressively. A total of 17 ventilated dry community latrines and 18 ventilated family latrines have been constructed. There are 38 under construction; of these, only 18 lack the superstructure. It is envisaged that the utilization of local building materials will make the installations more economical.

Not included are the solutions for the disposal of excreta carried out by the residents themselves without taking into account the sanitary parameters. There are 22 of the family type and 6 of the community type.

The area having the greatest coverage of latrines is A, with 15 latrines constructed. This is followed by areas C and E with 5. They present a better sanitation situation and better morbidity rates for similar acute diarrheal diseases, which is not the case in the remaining areas where latrines do not exist or are being constructed.

OTHER PRIMARY HEALTH CARE ACTIONS UNDER DEVELOPMENT IN THE HEALTH CENTER OF LOS OLIVOS

The Ministry of Health has developed basically, as part of primary health care, programs for oral rehydration, family planning, epidemiological surveillance of malaria, control of tuberculosis, nutrition, and vaccination (in campaigns). These programs are served by the personnel of the health center, which is very limited. The community participates in some programs such as that for oral rehydration and that for nutrition through glasses of milk. It can be said that except for the aforementioned health elements, the personnel of the health post devotes a large percentage of its time to tasks of assistance and for recuperation, that is, vaccination of children under five, the glass of milk program, and water and basic sanitation, the most efficient extramural PHC tasks that the Center carries out to prevent the diseases prevalent in the marginal area of Los Olivos.

PERCEPTION OF THE COMMUNITY WITH RESPECT TO HEALTH

1. Importance that the community assigns to the health services

In April 1986 the inhabitants of Los Olivos carried out their first Health Encounter in order to make an analysis of the participation and experiences of the population organized within the actions of these services.

The design and establishment of a UNIQUE HEALTH PLAN were proposed as a purpose of the Encounter since in accordance with them:

"The governments never have had a just health policy for the people; all the governments have promised health, but the only thing that they have done is sell us expensive harmful drugs, and autopsies of our dead."

"We need an adequate health policy that overcomes the sterile and incapable care."

2. Diagnosis of the health situation

In accordance with the conclusions of the first Encounter, the community of Los Olivos indicated:

Most common diseases

The acute economic problems of the population in Los Olivos, the lack of employment or the low incomes, the lack of adequate feeding and of education, and the lack of basic services (such as water and disposal of excreta and refuse) affect the many diseases that are presented. The most affected are the children and the pregnant mothers.

The most common diseases presented are:

- Contagious diseases, in a survey carried out in the month of April of this year, we have found 96 verified cases of TB and 3 cases of typhoid in 15 CHAs.
- Bronchopulmonary diseases, bronchitis, pharyngitis, grippe, etc.
- Diseases of the skin, rashes, allergy, etc.
- Cases of malnutrition.
- Diarrhea and dehydration, mainly in summer.
- In addition we have cases of conjunctivitis, hepatitis, etc.
- These diseases need to be treated through educational campaigns, in the school, in the CHAs, and in the home; vaccination campaigns, despistajes, and treatment of detected cases. But, the comprehensive solution will depend on continuation of economic, social, and educational responses in the entire population.

Needs of Basic Sanitation

- In 18 CHAs there are only 34 public latrines. They are very few individual family latrines.
- The refuse is dumped on the sand lands or in the hills; some burn it. These forms of eliminating the refuse are not the most desirable and influence our health greatly.
- Water supply is another great problem. The water reservoirs are not in use and most of time the water we consume is not potable.

General Objectives of the UNIQUE HEALTH PLAN

1. To improve the level of health of the Association of the Inhabitants of Los Olivos.
2. To promote the participation of the population organized for prevention, primary care, and promotion of health.

3. To utilize adequately the human, material, and economic resources of Los Olivos.
4. To coordinate effectively the work and/or support of the state and private institutions, related to the problems of health.
5. To strengthen and develop the organization through training of human resources with a comprehensive vision of the phenomena of health and disease so that it becomes an efficient instrument of local government.
6. To plan, supervise, and evaluate the actions for the health and development of our people, in a coordinated fashion in order to avoid duplication of effort.

SOCIAL, CULTURAL AND ECONOMIC ASPECTS OF THE POPULATION

Illiteracy

83.35%	Respond that they know to read and to write
13.79%	Respond that they are illiterate
1.94%	Do not respond
15.73%	Are illiterate with respect to the sample

Educational Level of the Population

58.78%	Declare they have an educational level equal to or lower than the 5th primary grade, 8,766 inhabitants
33.12%	Have some secondary education
16.00%	Have completed secondary education, and of these,
2.00%	Have completed higher education

Composition of the Population by Sex

50.65%	Masculine sex
48.04%	Feminine sex

Age Distribution of the Population

62.00%	Of the population from 0 to 25 447 persons are estimated in the population of 10,808 inhabitants
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31.00% Are between 21 and 35 years of age - age of procreation - 5,465 inhabitants = 2,700 women in the age of maximum fertility.

Marital Status

44.2% Reported as single

42.3% Married or cohabitating

Personal Income

If we consider a distribution of the frequencies in intervals of income of 250 Intis, 1,500, 1,000 up to 7,000 per month we will have:

35.39% Of the population earn between 250 and 500 Intis (equal to US\$15 to US\$30)

17.77% Of the population earn between 0 and 250 Intis (equal to US\$0 to US\$15)

11.30% Of the population earn between 1,000 and 7,250 Intis (equal to US\$57 to US\$414)

It could be assumed that approximately 53.16% of the population receive less than the minimum living wage.

Although the calculation is made taking 540 Intis as the base wage and at the time of the census the minimum living wage was 360 Intis, 17.77% of the sample state they earn less than 250 Intis, which represents a minimum total concerning the settlement of Los Olivos of 3,068 persons, a figure which is similar to the 3,214 unemployed identified as the point of labor stability.

The average monthly wage in Los Olivos reaches 478 Intis or US\$27.30.

COORDINATION AMONG THE DIFFERENT SECTORS

The special program of the community of Los Olivos is an alternative experience of democratic management and technological innovation for the popular dwellings in which the following have been involved:

- Ministry of Health
- Central Government
- Company for Administration of Water
- Ministry of Education

- Ministry of Housing/Bank of Materials
- Municipality
- Community Governing Board

Intersectoral coordination has been developed by the different entities. There has been observed a lack of coordination and support of the Ministry of Health for the basic activities of sanitation, with the greatest effort being devoted to the programs for assistance medical care.

The lack of sufficient funds for financing the program has been an important limitation. Loans by the Bank of Materials to each family were foreseen but they were not possible due to lack of title to their lands. In addition, for low-income families the voluntary work of the health promoters is not continuous since they stop participating each time that there is an opportunity to earn some money.

The programs for health education of the population have not been given priority by the health sector, and thus the lack of continuity has affected the active participation of the community.

ANNEX 1

CHRONOGRAM OF ACTIVITIES

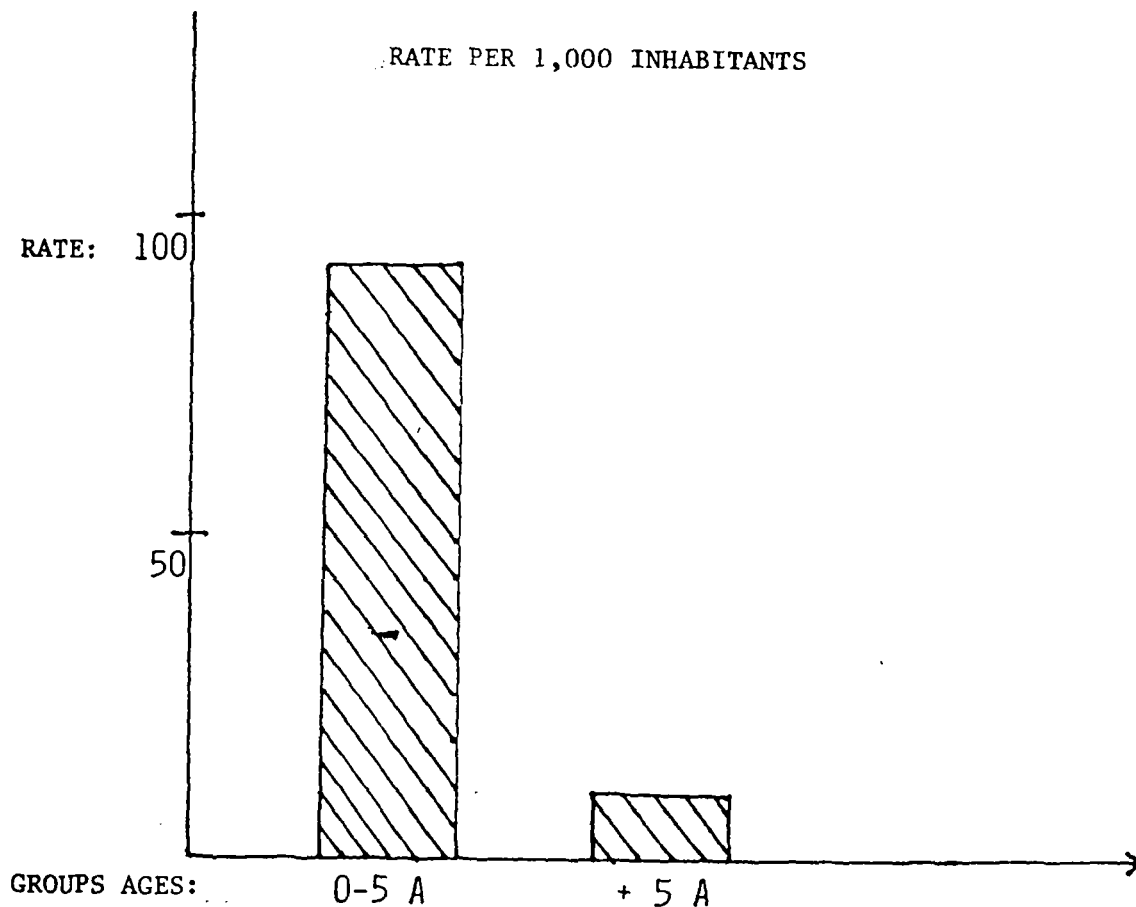
1. Coordination with the Municipality, the Management Committee and the leaders or representatives of the CHAs.
2. Organization of working groups in community housing areas that are going to support the Program of Basic Sanitation in:
 - a) Water quality
 - b) Construction and maintenance of latrines
 - c) Management and final disposal of refuse
3. Enlistment of female volunteers, especially for the Committee of Mothers so that they act as inspectors of the operation of the Program of Sanitation and also so that they collaborate in the different aspects of the Program.
4. To participate in the meetings of the community where the aspects related to sanitation are treated.
5. Preparation of technical-educational material, flip charts, posters, instructive primers, audiovisual aids, etc., in each of the aspects indicated in regard to basic sanitation.
6. Training technicians in sanitation, directed toward:
 - a) Knowledge of the activities of basic sanitation, mainly control and management of water, excreta and refuse;
 - b) Group techniques
 - c) Exhibition and orientation techniques
7. Training for voluntary auxiliaries and promoters of basic sanitation with priority for:
 - a) Disinfection of the water
 - b) Chlorination, fundamentals and practical application
 - c) Determination of the residual chlorine in the consumed, stored, and preserved water
 - d) Construction, uses, and maintenance of the latrines

- e) Adequate system of collection of refuse and final disposal
- 8. To program and give talks and technical-training conferences to the population in the various areas of work on basic sanitation.
- 9. Implementation of the basic sanitation program in the schools with participation of governing boards, professors, and parents of students.
- 10. Integration of brigades and/or clubs in the school area for the dissemination of the techniques of disinfection and handling of drinking water.
- 11. Implementation of the Water Disinfection Program:
 - a) Chlorination of the tank truck
 - b) Household rechlorination (daily chlorination of the cylinders)
 - c) Daily determination of the residual chlorine in the household cylinders
- 12. Development and application of the simple method to measure the residual chlorine using a technologically simple comparator.
- 13. Permanent control of the residual chlorine in the cisterns that distribute the water to the residences.
- 14. To establish a network of systematic surveillance and water quality control in the community that includes persons from the community and local health authorities.
- 15. Study of the alternative solutions for providing safe water to the population in each one of the successive stages of implementation of the program, up to the final stage with household connections and installation of the individual household basic units.
- 16. Disposal of excreta. Selection of 24 lots for installation of 24 latrines for collective use as a test, provided by the Ministry of Health with coordination with and approval by the respective community management committees.
- 17. Visits to the families where the latrines will be installed, for the purpose of instructing them in their construction, design, materials used, uses, preservation, and maintenance.
- 18. To promote the creation of community workshops for the construction of the different parts for the latrines.

19. To prioritize the installation of latrines in the schools of the community.
20. Preparation of a practical manual for construction of latrines, as part of the teaching material offered the inhabitants of the community.
21. Implementation of a manual system for collection of refuse at the following levels:
 - a) family
 - b) CHA
 - c) area
 - d) the whole community
 - e) recycling of refuse
22. Location of small sanitary landfills at the CHA and area levels in the first stage.
23. Location of the area for the community sanitary landfill for integrated service (final stage and final solution).
24. Arrangements with the program of ecological and environmental protection for the planting of trees in Los Olivos with recommendations and instructions from the technical personnel of that institution, to provide incentives to the community to work in support of the sanitation program.

ANNEX 2 - ILLUSTRATION 1

RATES OF ACUTE DIARRHEAL DISEASES
ATTENDED AT THE HEALTH CENTER OF LOS OLIVOS
JANUARY - JULY 1986

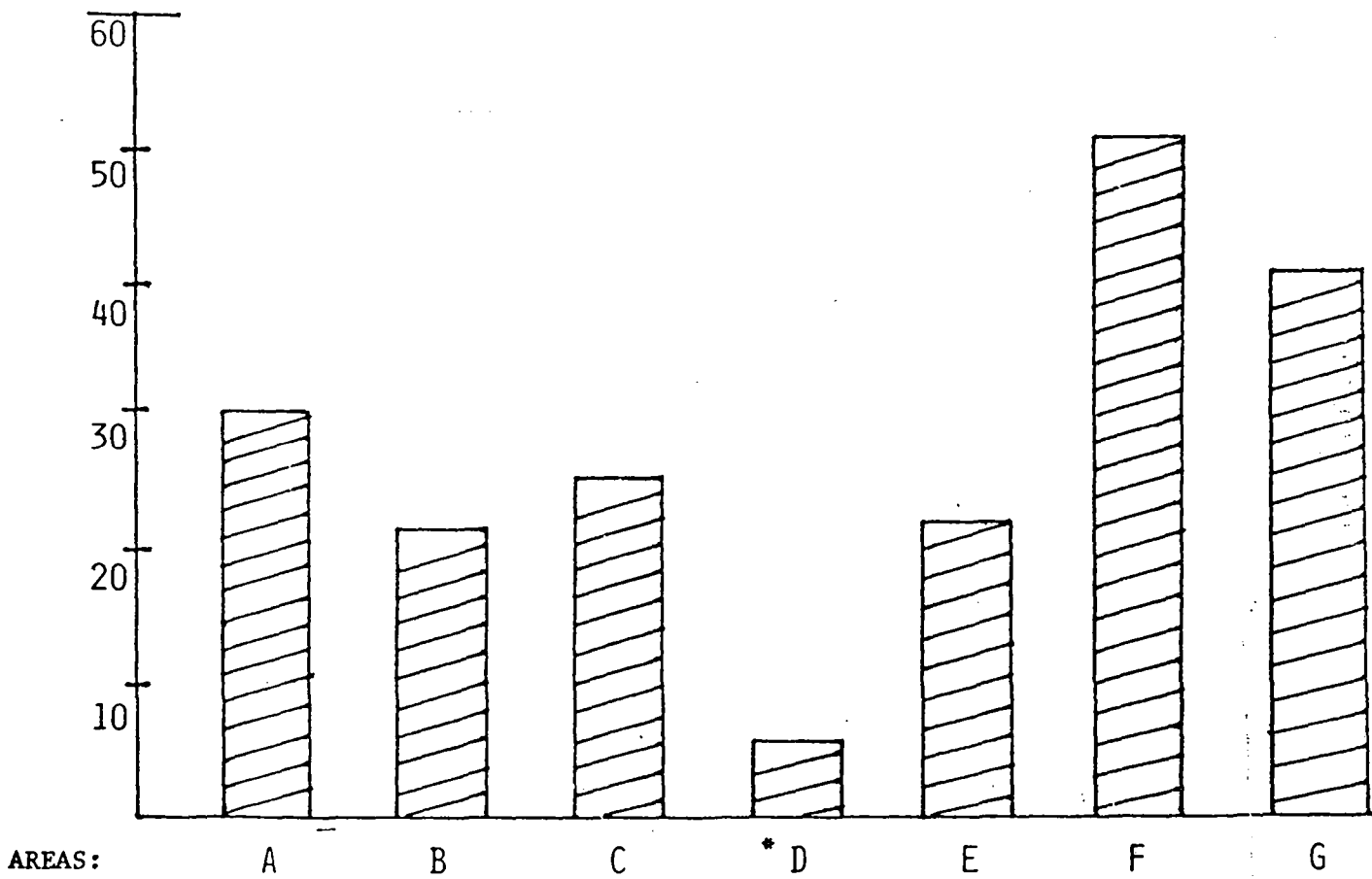


SOURCE: STATISTICS OF THE
HEALTH CENTER OF
LOS OLIVOS

ANNEX 2 - ILLUSTRATION 2

RATES OF MORBIDITY FROM ACUTE DIARRHEAL DISEASES
IN THE AREA OF LOS OLIVOS
JANUARY - JULY 1986
LIMA, PERU

RATE PER 1,000 INHABITANTS



* AREA D IS NOT REPRESENTATIVE

SOURCE: DATA OF THE HEALTH CENTER OF LOS OLIVOS

CHLORINE / COLIFECAL CORRELATION

