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RESEARCH REPORT:

APPROPRIATE TECHNOLOGY FOR WATER SUPPLY AND WASTE DISPOSAL

A Case Study: Guatemala--San Pedro de la Laguna

Research Project: World Bank

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CEMAT CENTRO DE ESTUDIOS MESOAMERICANO
SOBRE TECNOLOGIA APROPIADA

Solola

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CHAPTER I

INTRODUCTION

The subject of this research report -- "Appropriate Technology for Water Supply and Waste Disposal Systems" -- touches upon some key aspects of one of the experimental projects that CEMAT is now carrying out in the community to which this study refers. The project under way in San Pedro la Laguna, Sololá (Guatemala) includes a program for latrines producing fertilizer and/or bio-gas.

Specifically, this study is part of a crosscultural survey covering over 20 countries of Africa, Asia and Latin America, coordinated and sponsored by the World Bank under the title "Appropriate Technology for Water Supply and Waste Disposal."

The study on San Pedro presented here is also an in-depth case study within the worldwide framework of the research project mentioned.

The specific importance of this study lies in the undertaking of research concurrently with the actual project and the complex process of introducing technologies based on participation and the use of local materials, so that the community will use these technologies in moving toward self-sufficiency. In other words, it is not a static study which attempts to view the situation from the outside, but rather one the investigates the internal dynamics of the processes set in motion by social, economic and technical innovations.

The objective of the study is to describe the present practices of the population as regards water supply and waste disposal, the attitudes of the people towards these problems and the way they view them in relation to health. An attempt also is made to give a general picture of the dynamics of previous

development projects, especially those related to water supply and waste disposal, in order to learn from these experiences and to ascertain their impact on the community in terms of its present views.

The report is merely a first systematic presentation of the information compiled throughout the study in San Pedro, chiefly descriptive in form, in which some basic questions are posed regarding the continuity of appropriate technology projects in rural communities. The findings of this study have made it possible to refine and specify some hypotheses that will continue to be clarified as the work continues in the same community.

Since this case study is part of a worldwide comparative study, it is based on variables and points of interest indicated by the World Bank, investigated in a family survey for purposes of crosscultural comparison. Nonetheless, we include a procedural and qualitative methodology that permits a deeper understanding of specific aspects of our case study.

Chapter II situates the case study in a regional and microregional framework of the economic, demographic, educational, social and technical type, both in terms of the western highlands of Guatemala and of the community of San Pedro la Laguna.

Chapter III presents the general questions and the specific working hypotheses referring to the research objectives summarized above.

Chapter IV describes the methodology and the results of the instruments used for compilation of data in the study: family survey, open interviews with knowledgeable persons, secondary sources, and direct observation.

Chapter V briefly summarizes some descriptive conclusions.

The bibliography is followed by the responses and data as compiled in the field, in detail and disaggregated, in the following annexes:

Annex 1: Table of results of the survey applied to families: frequency distribution and percentages

Annex 2: Questionnaire for background information on the community

Annex 3: Interviews with knowledgeable persons.

CHAPTER II

LOCATION OF THE CASE STUDY

The following case study of a rural community of Guatemala is situated in:

1. The rural sector of Guatemala
2. The western highlands
3. Communities of Lake Atitlán.

1. Rural Guatemala and the western highlands

The western highlands of Guatemala are populated chiefly by campesinos of Maya-Quiché origin. Most of the rural population of Guatemala lives in this region, which comprises the departments of Sololá, Huehuetenango, Totonicapán, Quezaltenango, Quiché, San Marcos, Sacatepequez and Chimaltenango. These eight departments make up one-fifth of the area of Guatemala and have a total population* of over 2 million, 85% of which consists of campesino smallholders.

The predominance of minifundismo (dwarf holdings) is one of the most serious problems facing the indigenous rural population of Guatemala. Of a total of 371,039 rural properties in the country, 76% -- i.e. 281,406 properties -- have an area of less than 5 manzanas (3.45 ha). Most of these are located in the western highlands.

Population growth in this area is 38.7 per 1,000 inhabitants. The amount of arable land is small since this is a mountainous region with a significant proportion of steeply sloping terrain. During the rainy season this topography aggravates soil erosion. Added to this is the rapid deforestation, which is closely related to population growth. The end result

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* 1964

is very low yields of the land in the western highlands of Guatemala.

Incomes of campesinos in the Guatemalan highlands are quite low. Average per capita income in Guatemala is put at Q 118 per year (Q 1 = $1), but 83% of the rural population have incomes below the average. According to a study made in 1971 among 264 minifundista families -- the great majority of which were located in the western highlands -- average income per family was Q 258 while average annual expenditure per family was Q 266, resulting in an annual deficit of Q 8.

Rural unemployment is high in the western highlands of Guatemala, especially in the more densely populated departments such as Totonicapán, Sololá, Quezaltenango, Hueuetenango and Quiché. In order to balance their family budgets, which are very low, campesino families in the region are obliged to seek seasonal work, emigrating to farms on the southern Pacific coast during the harvest to work as seasonal laborers. The supply of seasonal labor during the harvest season is such that the daily wage paid is less than the legal minimum wage of Q 1.90 per day; the wage actually paid averages Q 0.50 per day.

With the earthquake of February 1976, which affected mainly the departments of Chimaltenango, Sacatepequez, Quiché and Sololá, the incomes of campesino families in the stricken area were dealt an even sharper blow. Most of these families have been forced to devote much of their working time to obtaining materials to rebuild their houses. The existence of a comparatively large number of post-earthquake assistance programs has helped to stabilize some incomes, particularly by generating jobs in road construction, housing construction, carpentry, plumbing and related occupations.

The percentage of illiteracy in the western highlands is among the highest in the country. For the population 7 years of age and over the illiteracy rate is estimated at 70 to 90%, primarily among the female population.

Health indicators show serious problems, especially among the rural population. The infant mortality rate is among the highest in Latin America. The basic diseases of rural children in the western highlands are gastrointestinal diseases, bronchio-pulmonary diseases, and particularly, complications due to malnutrition. The infant mortality rate of Guatemala was 87.2 in 1972. Coverage of the health system at the national level is low -- in the departments of Sololá, Chimaltenango, Quezaltenango and Quiché it ranges from 12.56% to 16.90%. According to an INCAP survey, in 1964 there were 900,640 malnourished children under 5 years of age over half of which were of degree 1.

It is clear that one cause of the poor health indexes is contamination of the water and food ingested by the rural population. Furthermore, the amount of food is comparatively small.

2. The community of San Pedro la Laguna (cf. Annex 2, Background Information).

1. Special problems

The community of San Pedro la Laguna is situated in the western highlands of Guatemala and has the general characteristics stated above, i.e., a large number of minifundista campesinos, a comparatively high rate of population growth, soil erosion, low incomes, rural unemployment and seasonal labor on the coast, illiteracy and serious health problems.

In San Pedro la Laguna these general problems are aggravated by the fecal contamination of Lake Atitlán, which is one of San Pedro's water sources.

Morbidity and mortality indexes in San Pedro are high; malnutrition and infectious processes are considered to be the principal factors and infectious diarrhea is the leading cause of death. In this regard, fecal-oral transmission is the most frequent pathological process.

The geography and orography of the lake region suggest that improper disposal of excreta and sewage will irreversibly contaminate the lake. The extent of outdoor defecation is quite substantial. Moreover access to potable water is irregular, and the lake is regarded as the principal water source. Some communities have succeeded in tapping underground water, but the amount is insufficient and treatment is not adequately controlled.

Population density is high. From 1964 to 1973, population density rose from 124.5 to 129.9 per km^2. In the department of Sololá, (which is part of the western highlands of Guatemala and which includes San Pedro la Laguna) density rose from 284.7/km^2 to 336.1/km^2 in the same period; in San Pedro the population density increased from 474.2 to 603.6. But these indicators are even higher when expressed as density per km^2 of cultivated land, which rose from 572.1 to 728.2 in San Pedro.

The population of San Pedro la Laguna has grown rapidly, from 3,661 in 1964 to 4,872 in 1976, an average rate of 2.4% per year.

The distribution of the San Pedro population by age groups in 1976 was: 24.9% under 7 years, 26.9% 7 to 17 years and 48.2% over 18 years. In 1973 the percentage of young people was 28.5%.

2. Physical features

The community of San Pedro la Laguna is situated 1,564 km above sea level near Lake Atitlán. It is 160 km by road from the capital; about 40 km consists of earth road which can become impassable during periods of rainfall. The rainy season begins in May and ends in September with an average of 150 to 300 mm and 10 to 20 days of rainfall. In recent years there have been severe droughts in the microclimate of Lake Atitlán, which have had a serious effect on agricultural yields in the region. The temperature ranges from a minimum of 40°C to a maximum of 80°C; these variations are heavily influenced by the number of hours of sunshine and by the presence of strong winds.

3. Economy and trade

San Pedro la Laguna is one of the most dynamic towns of the Lake Atitlán region in terms of its economic development. A key factor in this development was the opening of the Santiago-San Pedro road in 1954, which enabled trucks to transport agricultural products from the region. Previously, transportation was possible only by boat and daily trips were made between San Pedro and Santiago. The town of Santiago has an active market and was the point of sale for San Pedro's products. A boat running to Panajachel also carried some shipments.

With the opening of the highway large vehicles were acquired by San Pedro residents. At present seven trucks and two buses are owned by local townspeople.

The number and total production of commercial crops also increased substantially. The crops grown in San Pedro include garbanzos, peanuts, guaque peppers and green vegetables. In particular, the crops that have shown the

largest increases in recent years are onions -- which are grown on planks at lakeside -- and coffee. In 1962 half of the families of San Pedro grew coffee and maize. The town's total production ranges from 1,000 to 2,000 quintals of coffee in parchment generating income of Q 50,000 to Q 60,000. With the increase in the price of coffee to Q 110, the crop has produced a total income of about Q 250,000 per year.

In addition to coffee, the growing of avocados and onions generates some income for the population.

It is now possible to visualize the sale of these agricultural products of San Pedro both in the regional market and in the market of Guatemala City and even El Salvador.

In general, San Pedro has changed from a community with surplus production of maize to one in which that product is in short supply. This change has occurred in the last two decades (Paul, Benjamin, 1968).

With the expansion of commercial agriculture the circulation of money has also increased, as the number of stores per 100 families rose from one in 1941 to four in 1962.

There are also some household industries engaged in the processing of raw materials into manufactured goods for sale: soap, maguey products and textiles. The household manufacturing of native clothing for sale is continuing and is also generating income, especially for women, who are the principal weavers. Thanks to some development projects, rugs also are being made.

Despite a certain amount of economic growth in San Pedro, approximately half of the male labor force must emigrate in the harvest season to work on the farms of the Pacific coast. It is estimated that the number of seasonal

laborers has reached 700 in recent years. For these families the primary income is that earned from seasonal work which in many cases is only Q 100 per year. During the rest of the year they secure occasional jobs which can provide them with about Q 150 per year for a total annual income of Q 250.

About one fourth of the population, including truck owners, the most important merchants, and particularly coffee growers, have incomes of up to Q 20,000 per year.

It is extremely difficult to find skilled carpenters, plumbers, mechanics or electricians. When they are available they earn Q 3.50 to Q 6.00 per day. With the rise in coffee prices the owners of coffee plants have increased the demand for masons; at present a mason earns Q 3.00 per day.

There are 122 businesses in San Pedro. Among the lake towns this number is exceeded only in Santiago (182), San Lucas (139) and Panajachel (133).

4. Sociocultural data

A. Education

The number of grades in the primary school rose from three in 1941 to six in 1949. In 1962 San Pedro had more teachers and pupils than any other lake town except Panajachel. There were 279 pupils (about 40% of the school-age population) compared to 184 in Santiago Atitlán and 268 in San Lucas Tolimán, despite the fact that the latter are the largest towns in the lake region. Some San Pedro residents attend secondary and basic schools in Sololá, Quezaltenango, Antigua and Guatemala City.

In 1972 San Pedro had 13 full-time teachers, whereas Santiago, with a much greater population had only 12. There were 637 regular pupils in that year -- 381 boys and 256 girls.

B. Medical resources

In 1941 there was only one doctor for the entire department of Sololá,

and it was very difficult for a San Pedro resident needing emergency care to consult him. The usual practice was to call upon seers and/or folk practitioners, of which there were about ten. At present it is difficult to find seers, and there are only a few folk practitioners.

There are three pharmacies which do not cover the demand for services and medicine.

The number of midwives rose from two in 1941 to eight in 1977.

One of the greatest needs of the people of San Pedro has been to find a doctor to reside permanently there, so that he can serve the population and direct a broader health program.

The work of the San Pedro Committee, which was organized in 1977 mainly to meet this basic need, is described below.

C. Housing and construction

San Pedro la Laguna is situated on a promontory on Lake Atitlán. The population is concentrated in two square kilometers, which means that the number of houses per km^2 is rather high. Because of this fact, and owing to competition from commercial crops -- which make increasing use of surrounding land -- the price of land is quite high. In 1930 one cuerda* of land in San Pedro cost between Q 5.00 and Q 10.00; in 1962 the price was double that amount, and at present is ten times greater. At lakeside the price is over Q 5,000 per cuerda and there is virtually no land available.

It is difficult to find masons for housing construction; masons must often be hired from outside the town, with consequent higher building costs. Most masons are employed on the coffee plantations and in the construction

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* 1 cuerda = 625 square varas.

of villas for wealthy persons.

Another element that increases the cost of housing construction is the price of cement. With the demand generated by construction in Guatemala, and because of the need to transport cement to San Pedro, the price rose from Q 1.60 to Q 3.50 in a period of two years. This also raises the cost of producing blocks and other cement materials. Lime, which has traditionally been used to make mortar, also has increased in price and is difficult to obtain. It now costs Q 2.00 per quintal.

The most commonly used durable materials in the region is cut stone, but with the shortage of stonecutters and masons, the price of this material has risen to Q 20 per 100 when it can be found. Finally, owing to construction on land near the town, it is very difficult to obtain sand, and the price is Q 2.00 per m^2 when transportation is available.

In most of the western highlands of Guatemala the campesinos build their houses of adobe, a material that has certain heat retaining qualities and is easy to obtain. But the earthquake of February 1976 showed the vulnerability of adobe buildings without reinforcing structures. In San Pedro it is hard to find earth for making adobe, but most of the houses are nonetheless built of adobe and stone.

Construction of a one-room house of these traditional materials, with a full-time builder erecting the walls and roof, takes one month. If the builder is a mason he is normally paid Q 90 per month and his helper one-half that amount. The materials for such a house would cost about Q 600 if purchased. The problem of supply is added to the high price of construction materials.

CHAPTER III

STATEMENT OF THE PROBLEM AND OF THE WORKING HYPOTHESIS

As already seen in the preceding chapter, the community of San Pedro has the general socioeconomic and cultural features of the Guatemalan highlands. But this community also has specific features that frame the problems we studied. We shall limit our consideration to three of these problems:

1. Those referring to water supply
2. Waste disposal systems
3. Problems and experiences of development programs related to water supply and waste disposal systems.

With regard to the first problem we found a high index of gastrointestinal diseases, and we asked the following questions:

- Is the water contaminated? What could be the sources of contamination? How does the population perceive these problems? What possible low-cost solutions might exist?
- In this regard, we stated the following hypothesis:

(a) The water is contaminated.

(b) The existing system, which combines carrying water and public or private taps, is accepted because it provides the essential minimum water supply needed.

(c) One possible source of contamination is extensive defecation on the ground.

(d) The role of women is important in the supply of water.

(e) The people attempt to establish a makeshift system to mitigate the effects of contaminated water: using piped water for drinking and cooking and lake water for bathing, boiling water for drinking, covering receptacles, cleaning water jugs, etc.

(f) The people perceive that the water is contaminated.

(g) The lack of a system for disposal of waste water is not a priority problem.

(h) The expansion of water sources is a necessity but also is not given priority by the community.

With regard to the waste disposal system, we asked the following questions:

- Is outside defecation widespread? Is this a major focus of contamination? Why does San Pedro lack a waste disposal system? Have there been previous latrine building programs? How many, and why were they not continued? Does the population perceive the increase in defecation on the ground as a danger that must be controlled? Do they associate it with health? Are they interested in finding alternatives to the present system provided they are low-cost? Would they be interested in latrines producing fertilizer and bio-gas?

- With regard to this problem we stated the following hypotheses:

(a) Most of the population defecates outside.

(b) This is one of the principal foci of contamination.

(c) There is no waste disposal system in San Pedro because it is expensive.

(d) There were latrine building programs in the past, but they did not succeed in generalizing the use of latrines (one third of the families will be considered as a minimum).

(d) The obstacle to the widespread introduction of latrines at the family level is the lack of space and the difficulty of digging the pit.

(e) The obstacle to the widespread introduction of latrines at the technical level is that they fill up quickly and contaminate underground water.

(f) The problems at the community level conflicts among leaders and a lack of agreement on the problem and its solutions.

(g) There is increasing concern in the community regarding improvement of the waste disposal system.

(h) The connection between defecation on the ground and health problems is indirect and difficult to visualize.

(i) There is interest and motivation in the community as to learning about and building fertilizer-producing latrines.

(j) At present the population does not have sufficiant information on the preceding point.

(k) The traditional system of steam baths (made of local materials) as a bodily health practice is being lost.

With regard to the problems and experiences of development programs that have been undertaken in connection with water supply and waste disposal systems, the questions are:

- Is San Pedro a favorable place to begin appropriate technology projects for the improvement of water supply and waste disposal systems? What other development projects have been undertaken in the last 30 years? What experiences can be drawn from these projects? What major obstacles were encountered in their implementation? Which strategies for dissemination and decision making did they employ?
- The hypotheses we stated in th s regard are:

(a) The community of San Pedro is progressive and open to the modern world and to the outside.

(b) High costs, due to the relative remoteness of the town, necessitate a search for low cost alternatives suitable for the region.

(c) The existence of earlier projects and of a continuing study of of the community for 30 years provides a significant body of accumulated knowledge.

(d) There are already local promoters who can direct the process of making complex decisions and can implement programs.

(e) Divisions among local groups have been a critical obstacle in the implementation of development programs.

(f) In addition to a local leader, it is necessary to achieve deep motivation of a minimum nucleus of local promoters, who can settle the inevitable conflicts.

(g) It is easier to disseminate simple technologies which are learned quickly and produce visible short-term results.

(h) The people are keenly interested in improving their situation.

(i) The dissemination of a technique takes the following course in San Pedro information-knowledge on the part of an innovator -- personal experimentation -- dissemination among a minimum nucleus -- wider dissemination.

For a better idea of the principal development programs that have been undertaken in San Pedro over the last 30 years, we include the following table summarizing these programs, distributed by principal areas.

DEVELOPMENT PROJECTS IN SAN PEDRO LA LAGUNA, SOLOLA, GUATEMALA (1930-1978)

	HEALTH	EDUCATION	AGRICULTURE	HABITAT	WATER AND WASTE TREATMENT
1930 - Protestant leader		Formation of groups	Introduction of coffee and onions		
1947 -50 - Reform government	Health station	Educational reform - more grades and more teachers		Construction of a road	First water source
1954 -62 - SFEI	Health promoter	Training of carpenters and craftsmen	Introduction of fumigation, planting of coffee and chemical fertilizer		Latrine building project
1972 - Community development			Technical services		
1973 - ANACAFE			Technical services		
1972 -73 - Peace Corps			Reforestation and fruit trees		
1972 - CARITAS	Food distribution				
1972 - ACCION CATOLICA		Formation of groups			
1972 - Nuns	Health clinic				
1973 - Canadian group					Second water source
1974 - INDE				Introduction of electricity	
1975 - INCAP (?)	Paper on health and medical service				

1977 -	San Pedro Development Committee	Nutrition and health survey	Training of a team for local decision-making. Training in appropriate technology	Purchase of land as experiment	Stoves to save wood using appropriate technology	Project for expansion of water sources
		One permanent physician and construction of a hospital	Nutrition and health education	Introduction of terraces to prevent erosion		
	CEMAT		Training in appropriate technology		Program of stoves to save firewood	Construction of prototypes of aerobic and anaerobic latrines; survey on contamination

CHAPTER IV

INSTRUMENTS OF ANALYSIS AND RESULTS

General methodology

Basically, three sources of information were used with the following instruments:

1. Survey primarily of mothers, and to a lesser extent fathers

The main topics that the survey attempted to cover may be summarized as the attitudes, opinions and practices of the population with regard to:

- The supply, quantity and quality of the water consumer by the family.
- Elimination of wastes: human excreta, waste water, garbage.
- The new project for the community latrine producing fertilizer and bio-gas which CEMAT is carrying out in the town.
- The concept of health in general.
- Willingness to cooperate or invest in a program of sanitary improvement.

The survey consists of a design prepared by the World Bank which we adapted to local conditions, together with some variables that we added in relation to the project for productive latrines that we are now carrying out in the community.

Sample

The original concept was a sample of 30 for all case studies in the cross-cultural research being done by the World Bank. Accordingly, we selected 30 interview subjects, distributed proportionally among five districts of the town, i.e., six interviews per district. This provided some geographical repreaentativeness of the different parts of the community. The selection of the sample by districts was based on the

establishment of a range proportional to the total number of families in each district, on the basis of a prior population and family census. The distribution by districts was as follows:

District No.	Total families	Range (to obtain 6 surveys in eac
I	243	40
II	194	32
III	156	26
IV	259	43
V	186	31

When necessary the closest number was substituted, preferably even.

We later saw that the sample could be expanded slightly until 40 interviews were completed in order to achieve greater representativeness, for the following reasons:

- The first 30 surveys were completed in less time than expected;
- If the total number of families in the community is 942, a sample of 40 gives a coverage of 4.2%.

The ten additional interviews were selected at random, with two in each district.

Interviewers

Women were selected to compile the data; they had received prior training in interviewing techniques. They had also taken part in the census and have a complete secondary education. The average time of the interview was 45 to 60 minutes.

Interview subjects

In general the people responded to most of the questions readily, although there was some reluctance to answer very intimate questions. This may be due to the nature of some questions, which referred to delicate matters of family life, and/or to the fact that the community has recently been the

subject of studies in this field by several institutions and North Americans who have come to research their dissertations. It may be that the people are saturated with traditional pre-structured surveys.

In this case it was very helpful to us that the interviewers are members of the community and are associated with a comprehensive health program that has begun to do "concrete" good for the people. Thus, those interviewed may see some practical value in their answers as a means of cooperating with a program that can be beneficial to the community.

The main problems were posed by questions which:

- attempted to ascertain attitudes toward future or imaginary situations, and which are characterized by their conditional formulation;
- attempted to identify "processes" of obtaining information about sources that have long existed in the community for example the lake.

The questions with the highest index of no response (30% or more) are shown in the following table, together with possible explanations.

Variable No. (*)	Frequency of non-response	Question	Probably reason for non-response
46	37%	What type of disease may becaused by dirty water?	Lack of knowledge
48	30%	Why is the _____ the insect most injurious to health?	Lack of knowledge
64	40%	Why do you think your ideas about improving water quality have not been put into effect?	To avoid becoming involved
80	77.5%	How much would it cost you to install a latrine?	Lack of knowledge and to avoid becoming involved
82	40%	Would you be prepared to contribute money to build a public latrine	To avoid becoming involved
84	52.5%	What do you think about a latrine that can produce fertilizer?	Lack of knowledge
97	30%	Where do you dispose of your garbage?	Embarassment

96	35%	Quality of house (materials)	Cannot be determined (**)
98	35%	Fuel used in the house	" "
99	35%	Drainage	" "

(*) The numbering of the variables corresponds to that of the questions in the survey and may be seen in Annex 1 -- Table of Results of the Family Survey: Frequency Distribution and Percentages.

(**) Data from a census outside our control.

Questions

The survey included a majority of open questions and a smaller proportion of closed questions. The type of information sought was both qualitative and quantitative.

An attempt was made to prepare a preliminary code for the responses, although the categories actually were formed on the bases of the responses obtained. This was done because otherwise the degree of variability among the responses would not have appeared with sufficient detail.

An attempt was made to retain the entire range of specific responses in order not to lose qualitative information. Categories were added in some cases in order to facilitate conclusions.

2. Open interviews with knowledgeable persons

These interviews were held to obtain information on the following points:

- Descriptions of the process of publicizing previous projects for latrine building and introduction of potable water, with particular emphasis on the method for making them known in the community.
- Perception on the part of some active leaders regarding the attitude of their community toward programs aimed at improving such health aspects as latrines and potable water.
- Information about the agencies, institutions or persons that have undertaken development projects in the community.

With these research objectives in mind, the criterion for selection of "knowledgeable persons" was their participation in the initiation or development of any of the projects mentioned above.

Very specific questions were not formulated for interviews with knowledgeable persons. General guidelines were followed so as to obtain the most extensive information that they could give us.

3. Secondary sources

Secondary sources were used to obtain general data on the population the microregion and the region of the community, and to gain a deeper knowledge of historical or anthropological aspects of importance for the interpretation of data.

These sources were population censuses, agricultural statistics, geographical and environmental data compiled by government ministries, and prior studies of the community made by other institutions or persons.

Results

(1) FAMILY SURVEY

Objective No. 1

To identify water sources and how they are used and to determine what the person interviewed considers to be good or bad in regard to water supply (covers variables 1 to 30). (*)

For 62.5% of the sample the principal source of supply in summer is public taps, followed by water from the lake. For the 35% who have water faucets in their houses, the lake is also an important though secondary

(*) For references to variables, questions, categories and frequency tables, see Annex 1.

source of supply. In conclusion, the majority are supplied from public sources while slightly over one third of the families interviewed have home faucets (see variable 01).

The sources of supply in winter do not vary much for those who lack home faucets since they use primarily the public tap, and secondarily the lake. On the other hand, more than half of those who do have faucets use only the water in their houses, since this is a rainy period when water is not scarce. Fewer than half of those with faucets use water from the lake as their secondary source (see variable 02).

The distance from the house to the public tap is comparatively short; for most of those who carry water it does not exceed one block and the greatest distance is not more than two blocks (see variable 03).

The lake also is not very far from the houses of those interviewed. For most of them the distance does not exceed two blocks, and for one third it is three to four blocks (see variable 04).

The time required to go from house to public tap and return ranges from one to fifteen minutes for most of those who obtain water there (see variable 05).

Obviously, the time spent in going to and coming from the lake carry water is longer than that required for the public tap; more than half of those interviewed said that it takes 16 to 30 minutes. Only one fifth take 31 to 45 minutes to go to the lake and return. It may be seen that in general, the time spent in carrying water from the lake is not excessive (see variable 06).

If we consider the distance and the total time taken in obtaining water from any of the principal sources of water in the town, we find that water is fairly accessible.

20% of those who obtain water from public taps say that they do not know how long they have been doing so; another 20% have been using such taps for 9 to 20 years, while almost one third began to use it more recently: six months to five years (see variable 07). This indicates that the installation of public taps began 20 years ago and has continued gradually up to the present.

A similar conclusion may be drawn regarding the period of use of home faucets, since the range varies from less than one year to 22 years. Some of those who have faucets say that they obtained them from one to ten years ago, while others have had them between 15 and 22 years (see variable 08).

Drinking and cooking are the main uses of water for all those who obtain it from public taps. One third of them combine these uses with others, chiefly to provide drinking water for animals (see variable 09).

Something similar occurs with those who have home faucets; i.e. all of them use water for drinking and cooking, and less than half for additional uses such as watering animals, washing and bathing (see variable 10).

With regard to the lake, we found that 95% of the population draws water from it, chiefly for bathing and washing, although 35% also use it for drinking, cooking and other purposes. This latter percentage may correspond to those who do not have home faucets or easy access to a public tap, especially in winter, and therefore use water from the lake for drinking and cooking as well (see variable 11).

For most of those interviewed the source of information about the existence of the public taps was a neighbor. Only 12.5% became aware of them by direct observation (see variable 12). This may indicate that the news spread before the public taps were installed.

The main channel for knowledge of the availability of private water supply also was information from other persons, primarily neighbors and relatives, and to a lesser extent officials (see variable 13).

The two preceding variables seem to confirm the familiar assumption that interpersonal and informal communication is highly effective in small communities.

Those who use water from public taps said they do so for two main reasons, in the following order of importance: because of need (37.5%), and because it is near (22.5%). Those who decided to obtain private water service said they did so in order not to have to go to the lake (22.5%) and to a lesser extent because of need (12.6%) (see variables 14 and 15).

Most of those interviewed said that they obtain water from the lake because there is a sufficient amount; one-fourth do so when the public tap is dry (see variable 16).

It seems clear that for those who do not have home faucets the public tap is the only alternative besides the lake. For those who do have faucets the lake is only a means of supplementing an insufficient supply of piped water.

The persons interviewed said they prefer water from the public tap for drinking, basically because it is near; some added other reasons. A smaller proportion gave color as the main reason (see variable 17).

In the case of water for cooking, the majority also said they prefer the public tap because of its proximity. Only 10% mentioned cleanness as well (see variable 18).

Almost all of those interviewed said that they do not use water from public taps for bathing or washing (see variables 19 and 20). This may be due in part to that fact that it is prohibited by the local government because of the scarcity of water.

Only a few of those interviewed use public taps to obtain drinking water for animals. Almost one-third of those who do so give proximity as the reason (see variable 21).

Again, proximity is an important reason for preferring the home water supply for drinking by those who have their own faucets. A minority said that they also prefer it because it is cleaner (see variable 22).

For cooking, the owners of faucets prefer their own water, also because of its proximity in an even higher percentage than in the preceding case. Only one person mentioned cleanness as a quality associated with water for cooking (see variable 23).

Virtually no one uses the home faucet to water animals. The few who do so (only three persons) give proximity as the reason (see variable 24).

Water from the lake is preferred for bathing for two reasons of almost equal importance: it is near (42.5%) and sufficient (45%). Once again proximity is an important factor (see variable 25).

The people prefer water from the lake for washing for two main reasons: for 52.5% the main consideration is its proximity; half of this percentage add the factor of cleanness. 42.5% prefer to wash in the lake because there is sufficient water (see variable 26).

It should be noted that the factor of cleanness is much more important in the case of washing clothes or other items than in the case of bathing.

In general, the users of public taps expressed their satisfaction with the water they obtain there. A small percentage (7.5%) said that they have problems with neighbors in getting water first (see variable 28). These responses refer to the water used for drinking and cooking.

All those with home faucets, responding as to what they do not like about the water for drinking and cooking, were in agreement: "We like everything" (see variable 29).

The most unpleasant aspect of water from the lake (for washing and bathing) for almost one-third of those interviewed is the presence of wind, which makes the water dirty. For one-fifth the main problems are the sun and the distance. About 15% gave several reasons such as sun, wind, too many people, and others. Nonetheless, the largest percentage responded that "we like everything" (32.5%).

Taking all these negative responses together we obtain a percentage of 57.5%. In other words, the majority have some objection to water from the lake, a constant being the presence of climatological factors such as wind and/or sun (see variable 30).

Objective No. 2

To determine who carries water, the containers used and the volume of water carried (covers variables 31 to 38).

Mothers and daughters carry water in uniform plastic jugs, most with a capacity of 12 liters (see variable 31).

With regard to the number of trips to carry water* in summer, we found that most make four to seven trips per day, while slightly less than one-third make only one to three trips (see variable 32).

(*) By mothers.

In winter the number of trips per day decreases slightly; 45% make four to seven trips, 35% one to three trips and 7.5% more than seven trips. The interesting feature is that in winter a larger number of persons make one to three trips per day than in summer; nonetheless, there are more people making seven trips per day in winter than in summer (see variable 33).

Among daughters who carry water the majority use large 12-liter jugs and a smaller percentage use medium-size 6-liter jugs (see variable 34).

In summer 42.5% of the families do not have water carried by daughters. One-fourth of them have daughters who make one to three trips per day; a similar proportion make four to six trips, and a minority more than seven (see variable 35).

In winter the percentage of families receiving water carried by daughters increases slightly (47.5%) but the number of daily trips maintains more or less the same proportions as in summer (see variable 36).

The total number of liters per day carried by mothers and daughters in summer is quite variable, with almost equal proportions in the following categories: 1 to 36 liters, 37 to 72 liters and 73 to 144 liters. The second category accounts for the largest percentage of the three, which suggests that it may be taken as the average (see variable 37).

In winter the percentage of families who do not carry water declines slightly in comparison with summer. 40% of the families carry between 37 and 108 liters per day, 20% less than 37 liters, and 20% more than 108 liters (see variable 38).

In general, the volume of water carried per day is slightly greater in summer but the difference is not great.

Objective No. 3

To describe the methods of cleaning the utensils used to carry, store and draw water, to wash clothes and for personal cleanliness. To identify the attitudes and knowledge of the persons interviewed with regard to the most common diseases and insects (covers variables 39 to 52).

The water is carried in jugs, stored in jars and drawn for use with bowls (palanganas). These three utensils are washed in almost all cases, at least with some type of soap and water. More than half of those interviewed also use tusa (a cleanser made from maize leaves) (see variable 39).

The frequency of washing water jugs varies greatly, from daily to every 15 days. Washing of the jars used for storage ranges from daily to weekly. Bowls are usually washed daily (see variable 40).

All the women said that they usually cover the water jar when it is not in use (see variable 41).

It is also a general practice to always use the same utensil to draw water from tne jar (see variable 42).

Most of those interviewed said that they wash clothes two or three times a week. Only one-fifth usually wash once a week (see variable 43).

Almost half wash in the morning and two-thirds do so in the morning and the afternoon on the days when they usually wash (see variable 44).

Most of the women who responded said that they prefer to wash alone. A minority prefer to do so in company with other women (see variable 45).

The reason given most frequently to explain the preference for washing in the lake was the abundance of water. Next was need. Thus, women do not wash in the lake because of any specific quality of the water, but rather because of its availability and because of everyone's need for water (see variable 46).

When we asked about the diseases caused by water we found that one half could not answer. For those who did respond, the disease mentioned most frequently was stomach ache (14), followed by worms (7) and to a lesser extent other diseases or microbes (see variable 46).

We therefore infer a lack of knowledge because of the high number of non-responses and because most of those who did respond referred to a symptom and not to a disease. For the majority, the greatest enemy to health is the fly and/or mosquito. For a smaller proportion of those interviewed it is worms and dirtiness (see variable 47).

The fly was again cited as the most harmful insect when women were asked which they consider to be most injurious to health. To a much lesser extent they mentioned the mosquito, louse and flea (see variable 48).

However, almost one-third could not explain why a certain insect (the one mentioned) was the most harmful. The most frequent response was that they touch the food which causes illness (27.5%) (see variable 48a).

When those interviewed were given a choice among three insects -- ant, fly and mosquito -- to indicate which they thought was the most harmful, the majority mentioned the fly (75%) and one-fourth the mosquito (25%) (see variable 49).

The great majority do not bathe in the house, but in the lake. Almost half do so twice a week (47.5%) one-fifth bathe once a week and one-fourth three times a week. Overall, the majority bathe once to twice a week and the rest three to four times (see variable 51).

There are some exceptions, consisting of families who bathe small children at home. They use from one-half jug (6 liters) to 3 jugs (36 liters) of water (see variable 52).

Objective No. 4

To ascertain whether the person interviewed associates water with health and whether he would be willing to spend more money or make additional efforts to improve the water supply (covers variables 53 to 54).

Most of the women said that they have no problem in obtaining water from the source or sources that they use. Some did mention problems, chiefly of the social type: too many people, crowding, quarrels, and lost time (37.5%) (see variable 53).

When people were asked whether they felt that their house is a healthy place and why, only one-fifth of the sample replied in the negative. One-half of these mentioned social or living problems as preventing them from considering their house to be healthy; one-half referred to sanitary deficiencies. 65% do believe that their house is in a healthy place for social or living reasons; privacy and independence of others is a predominant factor. The most frequent response was "because we live alone" (see variable 54).

It may be inferred from the foregoing that the concept of a healthy place to live is related first of all to family closeness and to living space and social tranquility; next, it is related to health, with the lack of latrines and waste disposal mentioned as the principal deficiencies.

The great majority believe that the water they drink is healthy for that purpose, first of all because they see that it is clean, secondly because some have boiled it previously and thirdly because everyone drinks the same water (this can be interpreted as the validity given to a practice by de facto agreement). Only 15% said that the water is not good for drinking, in particular because it contains microbes, is dirty and causes illness (see variable 55).

The majority said that little time and energy are spent in obtaining water. Only 10% believe they are excessive (see variable 56).

This seems to reflect the times and distances involved in obtaining water, as indicated above, which in general were short. Furthermore the monthly cost of private water is moderate for two-thirds of those who have their own faucets and low for the other third; none said that the price is high (see variable 57).

More than half of those responding stated a willingness to spend some money to obtain better quality water, and the majority of these would pay a small amount. One-fifth said that they would not spend anything, in some cases because of their financial situation and in others because they are satisfied with the present sources (see variable 58).

About one-half of those interviewed indicated their willingness to spend money to have a closer source of water, provided it is a small amount. Some would spend a large amount. Almost one-fourth did not wish to respond and another fourth said they would not spend anything (see variable 59). It is possible that those who say that they are willing to spend money are the ones who now lack private faucets, and that those who are not willing are the ones who already have their own water supply.

Most of the women who carry water have contact with their neighbors; only a third do not. The majority believe that it is good to talk with neighbors, mainly because of the need to discuss problems pass on information, run errands, get along with others, etc. Nonetheless, one-third offerred no reasons why communication is desirable, or do not carry water (see variables 60 and 61).

The monthly cost of a home water supply is the same for all: Q 0.30 (see variable 62).

When the persons interviewed were asked for suggestions about ways of improving water quality over half could not or did not wish to give any. However, among those who did offer suggestions the majority favored seeking new sources of water and a small part proposed requesting help from others (see variable 63).

When those interviewed were asked why they believe that their suggestions have not been carried out, 40% did not respond, possibly because they did not want to get involved with the authorities. Among those who did respond there were two frequent reasons: lack of cooperation among ourselves, and ignorance of the problem (see variable 64).

Almost all of the reasons given for the absence of measures to improve water quality contain an element of self-blame, since they nearly always refer to deficiencies of the community members themselves and not to those of outside agencies or persons.

Objective No. 5

To determine whether methods for the disposal of waste water can affect health (covers variables 65 and 66).

The least common means of disposing of waste water is the drainage ditch, since this virtually does not exist as such in the town. More than half of the women said that they throw their used water on the ground and another large proportion throw it in the street (see variable 65).

Nonetheless, the great majority said that puddles do not form near their houses, and only 12.5% stated the opposite (see variable 66).

Objective No. 7

To find out how excreta are disposed of and whether the person interviewed observes any relationship between this and health (covers variables 67 and 68).

With regard to the use and possession of a latrine for elimination of excreta we found that only 35% of the sample said they have and use one while 65% defecate on the ground (see variable 67).

It is therefore clear that the great majority believe there should be a cleaner way of eliminating excreta, through the use of more individual latrines (40%) or public facilities (32.5%) (see variable 68).

Objective No. 7

To ascertain attitudes, knowledge and willingness to cooperate in all matters pertaining to public latrines. To identify individual possibilities for the installation of latrines as well as the manner in which existing latrines were acquired (covers variables 69 to 86).

A very small proportion have steam baths (made of adobe) which occupy an average of 3 square varas (one vara = 33 inches) (see variable 69).

Exactly one-half of the persons interviewed said that they do not have space in their houses or on their farmland to build a latrine. Only one person said that he could not build one because the ground is very rocky (see variable 70).

The availability of land for building a latrine, among the 12.5% who do have such land, varies from one-half vara to over 12 varas (see variable 71).

When asked their opinion of the public latrines, the majority said it was favorable; the rest were not opposed and possibly did not respond because of a lack of knowledge (see variable 72).

The absence of public latrines is attributed to the following

reasons, in the order most frequently mentioned: lack of skills and/or initiative on the part of the community itself (35%), lack of cooperation among the people of the town (30%) and lack of space (12.5%) (see variable 74).

If we combine the first two reasons we find that the majority attribute the lack of public latrines to deficiencies in the community.

Accordingly, the great majority believe that more public latrines should be built (see variable 75).

The position for using the latrine is seated, according to the responses; this is the appropriate position (see variable 76)*.

About two-thirds of those interviewed said that they prefer wooden seats for latrines, while another third favor cement seats (see variable 77).

We found no one who said that he had received planks or slabs for latrines from any person or institution (among those on which we have information concerning past latrine-building projects) (see variable 78).

Only one-fourth of those interviewed stated that they could not install a latrine alone, and 40% would require the help of a mason and other assistance. Only 12.5% said they could build a latrine without help (see variable 79). It is concluded that the skills required for building latrines are not commonly found in the town.

In connection with the foregoing, we were able to verify that the

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*The reliability of this variable is low, since the question was formulated in a biased manner that would suggest a certain response.

great majority do not know the approximate cost of a latrine (77.5%) while those who do estimate a cost give widely differing figures: some mention Q 15 to Q 25 and others Q 50 to Q 100. These differences may be due to the fact that those giving the lower estimates were referring only to the slab and the outhouse while the others included the cost of excavation (see variable 80).

Willingness to cooperate in building/a public latrine is a general attitude at least among three-fourths of those interviewed. Nonetheless, only one-half specified the number of days of work they could contribute, which varied from one day to one week (see variable 81).

In contrast to the preceding variable, those interviewed are not willing to provide much financial cooperation for the building of a public latrine. 40% did not respond, while a smaller proportion openly said that they would not contribute money. More than half did say that they would be willing to contribute something, but only one-fourth specified the amount. The amounts ranged from Q 0.50 to Q 5 and from Q 10 to Q 50 (see variable 82).

More than half of those interviewed and responding stated that they are willing to work with others to build a public latrine. One-fourth preferred not to respond and only a minority (10%) opposed working together with others (see variable 83).

On the basis of the three preceding variables it can be inferred that the majority have/a favorable attitude toward various types of cooperation in the building of public latrines.

When those interviewed were asked their opinion about fertilizer-producing latrines, we found a high index of no response (52.5%). However,

the rest indicated a favorable opinion (see variable 84).

Those responding do not have much specific information on fertilizer-producing latrines, since only 10% know that they produce both fertilizer and gas (see variable 85).

Consequently, the great majority expressed an interest in obtaining more information on this type of latrine (see variable 86).

Objective No. 8

To ascertain whether those interviewed are accustomed to working with other persons and whether there is any community organization that they could use to improve water supply and waste disposal systems (covers variables 87 and 88).

We found that the great majority (80%) of male family heads have taken part in some type of community activity, primarily road building and to a lesser extent housing construction. Very few have participated in collective agricultural work (see variable 87).

Three-fourths of the men interviewed stated that they would be willing to work with others to improve the supply of water or elimination of wastes. Among these, the majority said that they would do so with everyone (42.5%) while almost one-fifth specified the qualities of those with whom they would work: intelligent and/or experienced, masons, etc. (see variable 88). Of the three-fourths who would cooperate, the majority would work voluntarily, some would do so for money (17.5%) and a minority for something in exchange (5%). It is inferred from the

foregoing that there is a favorable attitude on the part of men to work voluntarily to improve water supply and waste disposal.

Objective No. 9

To utilize information about the person interviewed and the family unit to correlate other responses with social and economic groups (covers variables 89 to 96).

The age groups of the women interviewed are distributed quite homogeneously among the groups of 15 to 24, 25 to 35, 35 to 44 and 45 and over. If the two intermediate groups all combined, we find that two-thirds of those interviewed are between 25 and 44 years of age (see variable 89).

With regard to the occupations of family heads, agriculture on their own land employs more than half. Next are economically nonproductive persons such as housewives and unemployed individuals, followed by craftsmen (of different types), with almost the same frequency as businessmen/contractors; day laborers (persons working on land belonging to others) are near last place. This order gives an idea of the most common occupations in the town, but not the exact individual economic status, since more than one occupation was tabulated per person. In other words, double occupations were found in several cases (see variable 90).

In conclusion, it can be said that employment continues to be predominantly rural, although a substantial proportion is engaged in crafts, trade and contracting.

With regard to family composition by ages, we find that the majority do not have more than three persons over 15 years of age within the common

housing nucleus (see variable 91).

Similarly, with respect to the number of children 15 years or less, we found that three-fourths of the sample said they have one to three, while only 15% have four to six (see variable 93).

The size of the family living in the household is distributed equally among the categories of three to four and five to six members, the proportion being 35% in both cases. One-fifth of the families interviewed have seven to eight members. If we take the average of the two most frequent categories we obtain an average of 4.5 members per family, which is valid only for the sample of this study (see variable 94).

It may also be concluded that there is balance between the percentages over 15 and under 15 years of age.

The dominant religion, according to the responses of those interviewed, is Catholic (70%). Protestant was indicated by only 30% of those responding (see variable 92).

The number of years of schooling of those over 12 years of age ranges from zero to two years for the majority of the families interviewed. The highest frequency is the group with one to two years of schooling (27.5%), followed by that with no schooling (22.5%). Also noteworthy is the 12.5% with an average of 4 to 9 years of family schooling (see variable 95). It is evident from the foregoing that the level of education is quite low.

A composite index was constructed with regard to the physical quality of the house in order to measure socioeconomic status indirectly. On this basis the majority (of those for whom data are available) show a low level,

although 27.5% are at the two higher levels. Since the highest percentages are situated in the two central groups, we can say that the majority of those interviewed fall within an average level with respect to the lowest and the highest levels of the sample itself (see variable 96).

Objective No. 10

To describe the practices of those interviewed with regard to systems for disposal of garbage, fuel employed and drainage (*) (covers variables 97 to 99).

Almost two-thirds of those interviewed usually throw their garbage on the coffee plants. 35% did not respond, which may be interpreted as due to embarassment about a possible lack of hygiene in garbage disposal (see variable 97).

The fuel used by all of those who responded to this question is firewood; in this case also 35% did not respond (see variable 98).

With regard to drainage, virtually all of those who responded usually defecate on the ground; once again 35% did not respond.

Objective No. 11

To determine the general and priority needs that the persons interviewed feel with regard to both the individual and community levels.

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* The variables of this objective and the following one (No. 11) were taken from a census which was not under our control and were calculated individually for the sample of this study.

Four individual needs were mentioned most frequently: latrine (11), money (11), fertilizer (10), and home building materials (20) (see variable 100).

Among the needs shown in the frequency table of the preceding variable, those considered to be most urgent are money (22.5%), latrine (15%) and fertilizer (15%) (see variable 101).

At the community level the needs mentioned by the largest number of persons were financial/commercial (27), community benefit/communications (18) and sanitary (24) (see variable 102).

In the opinion of those interviewed the most urgent needs of the community are infrastructure works (roads, streets, market and water) and health needs (doctor, hospital, latrine) (see variable 103).

One conclusion of importance for the overall research project of which this study is a part is that at both the personal and family levels there is concern for health and hygiene measures among the needs expressed.

2. INTERVIEWS WITH KNOWLEDGEABLE PERSONS

It is not necessary to give a detailed description of the results of these interviews; because of their qualitative nature and their broad coverage, we have preferred to include the results in the chapter on conclusions. Thus, it would have been repetition to summarize the responses of knowledgeable persons here. For further details on the original information as obtained in the field, we include a complete survey sheet for each of the interviews, which may be found in Annex 3.

3. SECONDARY SOURCES

The comment about interviews with knowledgeable persons also applies to these instruments. Because they involve a series of economic, climatic, geographical, and demographic indicators, a summary was not desirable. Furthermore, some of these data have been incorporated in Chapter II (see Annex 2).

CHAPTER V

CONCLUSIONS

1. FAMILY SURVEY

The majority obtain their water from public taps; only one-third have private faucets. In both cases water from the lake is used when piped water is scarce in summer. The lake is farther away and requires more time than going to the public taps, but in neither of the two cases is the time or distance excessive; both sources are quite accessible.

The community began to have piped water service -- public and private -- about 1954 or 1955. Piped water is used basically for drinking and cooking; very few use it for watering animals, plants or washing. Water from the lake is used chiefly to wash and bathe, although some use it for drinking, cooking, and other purposes. This seems to be determined by dry periods when water is in short supply.

The source of information on the availability of sources of piped water in this case has been interpersonal and informal communication. The reasons why women obtain water from the three sources existing in the community may be summarized as proximity and abundance (in the case of the lake). It is clear that they do not notice other qualities, since those interviewed responded that they use X type of water because of need, i.e., because of the lack of alternatives. The quality of cleanness, however is more important in the case of washing clothes or bathing.

The factors that most displease people do not refer to the nature or quality of the water, but rather to the situations that arise in obtaining it. Thus, in obtaining water from the public tap the problem is crowding; in the case of the lake, sun, wind, etc. are most troublesome. Overall, however the people accept the type of water available.

The women of the house (mothers and daughters) carry water in 12-liter plastic jugs in most cases. The average number of trips per day is 5.5 for mothers and 3.5 for daughters. About half of the families interviewed have no daughters who carry water. The approximate average of number of liters carried by the entire family is 50 in summer, while in winter it is slightly less. The water is carried in jugs, stored in jars and drawn for consumption with bowls (palangas). These three utensils are washed in most cases: the bowl is washed once a day; the frequency of washing of the other two containers varies widely. The jar is covered when not in use and the same bowl is always used to draw the water.

Clothing is washed two or three times a week, usually in the morning but sometimes in the afternoon.

One half of those interviewed could not respond as to the diseases transmitted by water and those who did respond mentioned chiefly stomach ache and worms. The fly appears quite frequently both in open and in closed questions about the insect or pest most injurious to health, although the majority cannot explain why.

Most of the people bathe in the lake and almost half do so twice a week.

The majority of the women said that they have no problem in obtaining water from their usual sources.

The people believe that the houses they live in are located in healthy places because they allow relative intimacy, provide enclosed spaces and foster social harmony. This confirms that the basic problem is the crowding of families in the town because of the high population density.

There is a false conviction regarding the potability of the water because of its appearance. On a recent date we verified its high contamination through a laboratory analysis.*

The time and energy spent in obtaining water are small, according to the general opinion. Furthermore, none of those who have private faucets regard the monthly charge of Q 0.30 as high.

There is some willingness to spend money in order to obtain water of better quality and with a closer supply, provided the amount is small.

Among women we note a desire for contact with neighbors when obtaining water. They consider this good for human relationships.

The principal suggestion for improving water quality is a search for new sources. As for the reasons why their suggestions may have not been put into effect, the respondents maintained a significant and/or ambiguous silence.

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* Study of fecal contamination of Lake Atitlán, CEMAT -USAC, 1977.

Although the majority dispose of their waste water on the ground or on the street, they indicate that puddles are not formed; however, direct observation contradicts this. Only one-third of the population use latrines, while the rest deposit excrement on the ground. The majority support the construction of more individual or public latrines, in almost equal proportions.

Very few use the steam bath made of local materials which has been a traditional practice.

The majority lack space in their houses and on their land to build latrines, agreeing that public latrines should be built. They believe that latrines have not been constructed because of the lack of training, initiative and cooperation on the part of the community. The majority would require technical assistance to build their latrines, and stated that they have never received slabs or planks. Wooden seats are preferred, and the cost estimated by those interviewed is less than Q 100. There is a general willingness to cooperate, though without any specific commitment, both in days of work and in contributions of money. Only one-fourth stated a definite amount.

There is not sufficient information among the people regarding fertilizer-producing latrines, and there is great interest in obtaining such information.

Collective work is customary in the community for community and family projects, but not productive ones. Thus, there is a willingness to work together on projects to provide water and waste disposal systems. This work would be voluntary and would involve all.

The ages of the women interviewed are distributed normally. Most are between 25 and 44 years old.

The majority of the family heads are agricultural workers, followed in order by tradesmen, housewives and craftsmen. The approximate average number of family members is 4.5. The majority of the families do not have more than three children under 15 years of age, nor more than three members of over 15 years of age.

The average amount of family schooling of those over 12 years of age in the majority of cases ranges from zero to 2.0. Socioeconomic status, based on quality of the house, indicates that the majority are at an intermediate level.

The majority usually throw their garbage on the coffee plants, use firewood as the principal fuel, and defecate on the ground.

The most urgent individual needs felt, in order of frequency of mention, are money, latrines, and fertilizer. The most urgent community needs expressed are infrastructure works and public health. A concern regarding health and hygiene was expressed for both levels.

2. INTERVIEWS WITH KNOWLEDGEABLE PERSONS

The information obtained from open interviews held with persons involved in development projects in the community was organized selectively according to three main subjects: latrines, water, and strategy of development projects related to those areas.

a. Latrines

The earliest latrine-building project (1930-44), which was undertaken by the Government and was compulsory, did not have the participation of the majority. A second project (about 1958) offered 1 m^2 latrines at a cost of Q 8 or perhaps Q 10 for the slab and outhouse; labor was to be contributed by the applicant.

At present the great majority do not have latrines even though there was an unmet demand in some programs and some people have built adobe latrines at their own initiative. Previously, the people of the town did not feel the need to have latrines as they do now, because they believed that the outlay would not benefit them. Because of the lack of space in houses, they prefer to build more rooms for the children.

The chief financial difficulty in building latrines is the cost of excavation, particularly because the land is very rocky and the people state that the holes fill up quickly. Thus, the latrines built under previous programs were used in most cases, but at present many of them have been filled and covered.

With regard to fertilizer-producing latrines, which are beginning to be tested, it is necessary that the people see them in operation in order to become truly interested.

b. Water

Washing of clothes in houses with private faucets is prohibited in the community because there is neither drainage nor bathrooms. For this reason, the majority bathe and wash in the lake.

The initial installation of piped water (about 1952) was done with materials provided by the National Government and with labor contributed by the community itself.

A second source of water was sought subsequently because of the insufficiency of the first (about 1970), at initiative of the people, who contributed materials and labor for the completion of only 2 km. There was never any refusal by the people to consume potable piped water instead of water from the lake, especially since they considered the lake to be dirty. The two sources that now supply the public and private taps of the town are insufficient, and alternatives are being sought, e.g., new sources and pumping of water from the lake.

At present there is a continuing struggle between the community and neighboring towns for water sources, especially in summer when water is scarcest.

c. Development Projects

To understand anything about development projects in this

community it is necessary to say something about the characteristics of its inhabitants: they are restless, progressive, different from the other people of the lake towns, congenial, complex; in a word, they are distinguished by their openness to what is new and their contact with the outside. This feature may be a positive element or an impediment if they are not properly understood.

At the outset they had serious misgivings about many projects with a significant external component.

- When the National Government introduced a compulsory program of latrines in the 1930s, the legal pressure was strong. It is therefore possible that the people associate latrine-building projects with imposition from outside. The way in which this project was introduced was coercive.
- In the 1950s the resistance to innovations was so great that a project for crop diversification and introduction of free fertilizer promoted by a local resident took more than five years of intense work to involve a substantial number of community members.
- Another latrine-building project (1958) was based on the following steps: support of a group with authority and traditional prestige among the residents (leaders), information and public invitation to the community, demonstration of miniature prototypes and actual models in the houses of the promoters. This project succeeded in building about 50 or 60 latrines and was halted when it was half finished.

- The lack of continuity is explained by several factors:

  (i) institutional conflicts among the officials in charge, red tape, bureaucracy, and few incentives and human and material resources to continue specific programs in the field. This made the agency seem like an even larger government department;

  (ii) extension of the activities of the latrine promoters to literacy programs, shops and crafts cooperatives, with the resulting competition among activities. The literacy and cooperative programs ultimately were given priority, and since material was not provided by the coordinating agency the latrine building program was terminated. At present the crafts cooperative continues, but as a private operation.

It seems that another more recent government initiative (1974) was somewhat inconclusive and achieved very little. This was also a latrine-building program. The planks were received in the municipal office, where they remained and after several months were returned to the Ministry of Health. An important factor in this failure is that the community was told nothing, nor was the convenience and usefulness of latrines explained. Furthermore, no prior study was made.

With regard to the introduction of potable water, we were informed that for the initial installation of the first source a beginning was made thanks to strong financial support from the National Government and a counterpart of labor by the community. With the installation of a second

source the process was similar, the difference being that this time it was an entirely local initiative. This new program and the search for additional sources have sharpened the conflict with neighboring towns in a full-scale struggle for water. At the same time, they have engendered a division between the office of the mayor and the Committee for Potable Water.

In conclusion, it can be said that up to the present all projects of some scale and all those related to the installation of water and latrine-building have been seriously affected by local and national politics.

Furthermore, it should be recalled that the people of this community have been described as experts in internal conflicts and divisions, which has been interpreted by some observers as a factor of progress.

Thus, a major difficulty faces those who believe that it is possible and desirable to unify and join all the people in a comprehensive development project, which is complicated by the need to overcome latent and long-standing differences. Nevertheless, a favorable factor for development programs is that these people are regarded as more qualitative than quantitative, since it is sufficient for some things to operate well and successfully for them to be disseminated among the majority.

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ANNEX 1

CEMAT = Centro Mesoamericano de Estudios sobre Tecnologia Apropiada

PROJECT : Appropriate Technology for water Supply and Waste Disposal

COUNTRY: Guatemala : Case Study: A community from Atlitan Lake

INSTITUTION: World Bank

DATE : January, 1978

SUMMARY TABLE - STANDARD QUESTIONNAIRE : FREQUENCY AND PERCENTAGE DISTRIBUTION

n = 40, 4.2% total families

Variable # 01:

Water Sources during Summer

Clue W.B.: 0.2 # of questions W.N.: 1 # of questions CEMAT: 1

	Abs	%
0) N.A. (no answer/don't know)	-	-
1) N.S.A. (non applicable)	-	-
2) First bucket second lake	25	62.5
3) Only bucket	1	2.5
4) First private faucet, second lake	13	32.5
5) Only private faucet	1	2.5
	40	100.0%

AGGREGATE CATEGORIES

	Abs	%
0) No Answer	-	-
1) No faucet	26	65
2) Yes, with faucet	14	35
	40	100%

Variable # 2

Water sources during Winter

Clue W.B.: 0.2 # of question W.B.: 1b # of question CEMAT: 1b

Variable # 02:

Fuentes de abastecimiento de agua en Invierno

Clave W.B.: 0-2 # de preg. W.B.: 1b # de preg. CEMAT: 1b

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Primero llenacántaro, luego lago	24	60
3) Unicamente llenacántaro	3	7.5
4) Primero llave privada, luego lago	5	12.5
5) Unicamente llave privada	8	20
	40	100.0 %

Variable # 03:

Distancia de la casa al Llenacántaros

Clave W.B.: 0-2 # de preg. W.B.: 1d # de preg. CEMAT: 1d

	Abs.	%
0) NR	-	-
1) NSA	11	27.5
2) Menos de media cuadra	9	22.5
3) Media cuadra	12	30
4) Una cuadra	7	17.5
5) Dos cuadras	1	2.5
	40	100.0 %

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) No usa llenacántaro	11	27.5
2) Menos de 1 cuadra	21	52.5
3) 1 cuadra o más	8	20
	40	100.0 %

Variable # 04:

Distancia de la casa al lago

Clave W.B.: 0-2 # de preg. W.B.: 1d # de preg. CEMAT: 1d

	Abs.	%
0) NR	1	2.5
1) NSA	2	5
2) Media cuadra	8	20
3) Una cuadra	9	22.5
4) 1 1/2 - 2 cuadras	8	20
5) 3 cuadras	8	20
6) 4 cuadras	4	10
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	1	2.5
1) No va al lago	2	5
2) Hasta 2 cuadras	25	62.5
3) Más de 2 cuadras	12	30
	40	100.0

Variable # 05:

Tiempo de ida y vuelta al Llenacántaros

Clave W.B.: 0-2 # de preg. W.B.: 1e

	Abs.	%
0) NR	1	2.5
1) NSA	14	35
2) Hasta 5 minutos	14	35
3) De 5 a 15 minutos	9	22.5
4) De 16 a 30 minutos	2	5
	40	100.0%

de preg. CEMAT: 1e

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	1	2.5
1) No usa el llenacántaro	14	35
2) De 1 a 15 minutos	23	57.5
3) Más de 15 minutos	2	5
	40	100.0%

Variable # 06:

Tiempo de ida y vuelta al lago

Clave W.B.: 0-2 # de preg. W.B.: 1e

	Abs.	%
0) NR	1	2.5
1) NSA	2	5
2) De 5 a 15	5	12.5
3) De 16 a 30	23	57.5
4) De 31 a 45	9	22.5
	40	100.0%

de preg. CEMAT: 1e

Variable # 07

Tiempo de utilizar Llenacántaro

Clave W.B.: 0-2 # de preg. W.B.: 1f

	Abs.	%
0) NR/no sabe	8	20
1) NSA	13	32.5
2) De 1/2 a 2 años	6	15
3) De 3 a 5 años	5	12.5
4) De 9 años	1	2.5
5) De 16 a 20 años	7	17.5
	40	100.0%

de preg. CEMAT: 1f

CATEGORIAS AGREGADAS

	Abs.	%
0) NR/no sabe	8	20
1) No usa el Llenacántaro	13	32.5
2) De 1/2 a 5 años	11	27.5
3) Hace 9 a 20 años	8	20
	40	100.0

Variable # 08:

Tiempo de utilizar llave privada

Clave W.B.: 0-2 # de preg. W.B.: 1f # de preg. CEMAT: 1f

	Abs.	%
0) NR/no sabe	1	2.5
1) NSA	26	65
2) Menos de 1 año	1	2.5
3) De 1 a 4 años	2	5
4) De 5 a 10 años	2	5
5) De 15 a 19 años	1	2.5
6) De 20 a 22 años	7	17.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR/no sabe	1	2.5
1) No tiene llave privada	26	65
2) Hace de 1 a 10 años	5	12.5
3) Hace de 15 a 22 años	8	20
	40	100.0%

Variable # 09:

Usos del agua del llenacántaros

Clave W.B.: 0-2 # de preg. W.B.: 1g # de preg. CEMAT: 1g

	Abs.	%
0) NR	-	-
1) NSA	14	35
2) Beber, cocinar	15	37.5
3) Beber, cocinar, plantas	1	2.5
4) Beber, cocinar, animales	1	2.5
5) Beber, cocinar, animales	7	17.5
6) Para todo	1	2.5
7) Beber, cocinar, lavar, animales	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) No usan llenacántaros	14	35
2) Beber y cocinar	16	40
3) Beber, cocinar y animales	10	25
	40	100.0%

Variable # 10:

Usos del agua privada

Clave W.B.: 0-2 # de preg. W.B.: 1g # de preg. CEMAT: 1g

	Abs.	%
0) NR	-	-
1) NSA	26	65
2) Beber, cocinar	9	22.5
3) Beber, cocinar, lavar	2	5
4) Beber, cocinar, bañarse animales	2	5
5) Para todo	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) No tiene agua privada	26	65
2) Beber y cocinar	9	22.5
3) Beber, cocinar y otros	5	12.5
	40	100.0

Variable # 11:

Usos del agua del lago

Clave W.B.: 0-2	# de preg. W.B.: 1g		# de preg. CEMAT: 1g		
	Abs.	%	CATEGORIAS AGREGADAS	Abs.	%
0) NR	-	-			
1) NSA	2	5	0) NR	-	-
2) Lavar	1	2.5	1) No usa el lago	2	5
3) Bañarse, lavar	20	50	2) Bañarse y lavar	21	52.5
4) Bañarse, lavar, animales	3	7.5	3) Bañarse, lavar y animales	3	7.5
5) Beber, cocinar, bañarse, lavar	9	22.5	4) Beber, cocinar, bañarse, lavar y otros	14	35
6) Para todo	5	12.5		40	100.0%
	40	100.0%			

Variable # 12

Forma en que supo que existía el llenacántaro

Clave W.B.: 0-2	# de preg. W.B.: 1h		# de preg. CEMAT: 1h		
	Abs.	%	CATEGORIAS AGREGADAS	Abs.	%
0) NR	1	2.5			
1) NSA	14	35	0) NR	1	2.5
2) Menciona vecinos en general	19	47.5	1) No usa el llenacántaro	14	35
3) Menciona familiares	1	2.5	2) Por información de vecinos	20	50
4) Observación de otros	5	12.5	3) Por observación	5	12.5
	40	100.0%		40	100.0

Variable # 13

Forma en que supo que existía el servicio privado de agua

Clave W.B.: 0-2	# de preg. W.B.: 1h		# de preg. CEMAT: 1h		
	Abs.	%	CATEGORIAS AGREGADAS	Abs.	%
0) NR	-	-			
1) NSA	25	62.5	0) NR	-	-
2) Por vecinos	7	17.5	1) No tiene agua privada	25	62
3) Por familiares	3	7.5	2) Por información de vecinos y familiares	10	25
4) Por autoridades	3	7.5	3) Por información de autoridades	3	7
5) Observación	2	5	4) Por observación	2	5
	40	100.0%		40	100

Variable # 14:

Razones por las que buscó el agua del llenacántaro

Clave W.B.: 0-2 # de preg. W.B.: 1i # de preg. CEMAT: 1i

	Abs.	%
0) NR	-	-
1) NSA	15	37.5
2) Por necesidad	15	37.5
3) Es cerca	9	22.5
4) No tenemos llave privada	1	2.5
	40	100.0%

Variable # 15:

Razones por las que buscó el agua privada

Clave W.B.: 0-2 # de preg. W.B.: 1i # de preg. CEMAT: 1i

	Abs.	%
0) NR	-	-
1) NSA	25	62.5
2) Para no ir al lago/ cerca	9	22.5
3) Llenacántaros nos queda lejos	1	2.5
4) Por necesidad	5	12.5
	40	100.0%

Variable # 16:

Razones por las que buscó el agua del lago

Clave W.B.: 0-2 # de preg. W.B.: 1i # de preg. CEMAT: 1i

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) Hay suficiente	26	65
3) Porque se acaba la del chorro	10	25
4) Por necesidad	2	5
	40	100.0%

Variable # 20:

Razones por qué prefiere el agua del llenacántaro para lavar

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	37	92.5	
2) Cerca	3	7.5	
	40	100.0%	

Variable # 21:

Razones por las que prefiere el agua del llenacántaro para dar de beber a los animales

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	28	70	
2) Cerca	10	25	
3) Limpia	1	2.5	
4) Cerca y suficiente	1	2.5	
	40	100.0%	

Variable # 22:

Razones por las que prefiere el agua privada para beber

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	27	67.5	
2) Cerca	9	22.5	
3) Limpia y cerca	4	10	
	40	100.0%	

Variable # 23:

Razones por las que prefiere el agua privada para cocinar

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	27	67.5	
2) Cerca	12	30	
3) Cerca y limpia	1	2.5	
	40	100.0%	

Variable # 24:

Razones por las que prefiere el agua privada para los animales

Clave W.B.: 0-3 # de preg. W.B.: 2a # de preg. CEMAT: 2a

	Abs.	%
0) NR	-	-
1) NSA	37	92.5
2) Cerca	3	7.5
	40	100.0%

Variable # 25

Razones por las que prefiere el agua del lago para bañarse

Clave W.B.: 0-3 # de preg. W.B.:2a # de preg. CEMAT: 2a

	Abs.	%
0) NR	-	-
1) NSA	3	7.5
2) Cerca	17	42.5
3) Suficiente	18	45
4) Se siente libre	1	2.5
5) Cerca y limpia	1	2.5
	40	100.0%

Variable # 26

Razones por las que prefiere el agua del lago para lavar

Clave W.B.: 0-3 # de preg. W.B.: 2a # de preg. CEMAT: 2a

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) Se limpia mejor la ropa	2	5
3) Cerca y limpia	10	25
4) Cerca	9	22.5
5) Hay suficiente	16	40
6) Cerca y suficiente	1	2.5
	40	100.0%

CATEGORIA AGREGADA

	Abs.	%
0) NR	-	-
1) No lava en el lago	2	5
2) Cerca y limpia	21	52.5
3) Suficiente	17	42.5
	40	100.0

Variable # 27:

Razones por las que prefiere el agua del lago para los animales

Clave W.B.: 0-3 # de preg. W.B.: 2a # de preg. CEMAT: 2a

	Abs.	%
0) NR	-	-
1) NSA	39	97.5
2) Cerca	1	2.5
	40	100.0%

Variable # 28:

Aspectos que no le gustan del agua del llenacántar para beber y cocinar

Clave W.B.: 0-3 # de preg. W.B.: 2b # de preg. CEMAT: 2b

	Abs.	%
0) NR	-	-
1) NSA	11	27.5
2) Hay problemas con otros	3	7.5
3) El color	1	2.5
4) Todo les gusta	25	62.5
	40	100.0%

Variable # 29:

Aspectos que no le gustan del agua privada para beber y cocinar

Clave W.B.: 0-3 # de preg. W.B.: 2b # de preg. CEMAT: 2b

	Abs.	%
0) NR	-	-
1) NSA	29	72.5
2) Todo les gusta	11	27.5
	40	100.0%

Variable # 30:

Aspectos que no le gustan del agua del lago para bañarse y lavar

Clave W.B.: 0-3 # de preg. W.B.: 2b # de preg. CEMAT: 2b

	Abs.	%
0) NR	2	5
1) NSA	-	-
2) Mucho sol	4	10
3) Está lejos	4	10
4) Cuando hay viento	8	20
5) Cuando el viento ensucia el agua	1	2.5
6) Cuando está sucia el agua	2	5
7) Hay paxtle y sol	1	2.5
8) Cuando hay viento, sol y mucha gente	5	12.5
9) Todo les gusta	13	32.5
	40	100.0%

CATEGORIA AGREGADA

	Abs.	%
0) NR	2	5
1) No usa el lago	-	-
2) Cuando hay viento y se ensucia el agua	11	27.5
3) Cuando hay sol ó por la lejanía	8	20
4) Cuando hay viento, sol, mucha gente, otros	6	15
5) Todo les gusta	13	32.5
	40	100.0%

Variable # 31:

Capacidad de las tinajas de plástico en que acarrean agua las mujeres de casa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3a

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) 12 litros (grande)	38	95
	40	100.0%

Variable # 32:

Número de viajes al día en verano para acarrear agua, de las mujeres de la casa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3b

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) 1 a 3	11	27.5
3) 4 a 7	26	65
4) 8 a 11	1	2.5
	40	100.0%

Variable # 33:

Número de viajes al día en invierno para acarrear agua, de las mujeres

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3 b

	Abs.	%
0) NR	-	-
1) NSA	5	12.5
2) 1 a 3	14	35
3) 4 a 7	18	45
4) 8 a 11	2	5
5) Más de 20	1	2.5
	40	100.0%

Variable # 34:

Capacidad de las tinajas de plástico en que acarrean agua las hijas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 4b

	Abs.	%
0) NR	-	-
1) NSA	17	42.5
2) 6 litros (mediana)	5	12.5
3) 12 litros (grande)	18	45
	40	100.0%

Variable # 35:

Número de viajes al día en verano para acarrear agua de las hijas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 4b

	Abs.	%
0) NR	-	-
1) NSA	17	42.5
2) 1 a 3	10	25
3) 4 a 6	9	22.5
4) 7 a 9	2	5
5) 10 a 12	2	5
	40	100.0%

Variable # 36:

Número de viajes al día en invierno para acarrear agua por hija

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 4b

	Abs.	%
0) NR	-	-
1) NSA	19	47.5
2) 1 a 3	10	25
3) 4 a 6	8	20
4) 7 a 9	2	5
5) 10 a 12	1	2.5
	40	100.0%

Variable # 37:

Total de litros por día acarreados por la familia en verano

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3 y 4

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) 1 a 36 litros	8	20
3) 37 a 72 litros	13	32.5
4) 73 a 108 litros	6	15
5) 109 a 144 litros	5	12.5
6) 156 a 216 litros	3	7.5
7) 217 a 277 litros	1	2.5
8) 300 a 360 litros	2	5
	40	100.0%

CATEGORIA AGREGADA

	Abs.	%
0) NR	-	-
1) No acarrean agua	2	5
2) 1 a 36 litros	8	20
3) 37 a 72 litros	13	32.5
4) 73 a 144 litros	11	27.5
5) 156 a 360 litros	6	15
	40	100.0

Variable # 38:

Total de litros por día acarreados por la familia en invierno

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3 y 4

	Abs.	%
0) NR	-	-
1) NSA	6	15
2) 1 a 36 litros	8	20
3) 37 a 108 litros	16	40
4) 109 a 181 litros	7	17.5
5) 182 a 258 litros	2	5
6) 360 litros	1	2.5
	40	100.0%

CATEGORIA AGREGADA

	Abs.	%
0) NR	-	-
1) No acarrean agua	6	15
2) 1 a 36 litros	8	20
3) 37 a 108 litros	16	40
4) 109 a 181 litros	7	17.
5) 182 a 360 litros	3	7.
	40	100..

Variable # 39:

Forma de limpiar los 3 utensilios por los que pasa el agua: tinaja, olla, palangana

Clave W.B.: - # de preg. W.B.:- # de preg.CEMAT: 6a, 7c y 8c.

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Tusa y agua	2	5
3) Con jabón y agua	12	30
4) Tusa, jabón y agua	19	47.5
5) Arena y agua, jabón, tusa	6	15
6) Detergente, jabón, tusa, agua	1	2.5
	40	100.0%

Variable # 40:

Frecuencia con que limpia los utensilios con los que maneja el agua

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 6b, 7d y 8d

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Diario/semanal/diario	1	2.5
3) Diario	5	12.5
4) Cada 3-4 días	6	15
5) Semanal/cada 3/diario	3	7.5
6) Diario/cada 2/diario	7	17.5
7) Cada 3/diario/diario	4	10
8) Cada 3/cada 3/diario	4	10
9) Semanal-3/días/semanal	1	2.5
10) Semanal-semanal-diaria	1	2.5
11) Cada 3-semanal-semanal	1	2.5
12) Cada 15-cada 2-diario	1	2.5
13) Cada 15-diario-diario	2	5
14) Cada 15-cada 3-cada 3	1	2.5
15) Cada 3-diario-semanal	1	2.5
16) Cada 3-semanal-cada 2	1	2.5
17) Semanal-semanal-cada 3	1	2.5
	40	100.0%

Variable # 41

Tapa la olla donde almacena el agua

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 7b

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) No	-	-
3) Si	40	100.0
	40	100.0%

Variable # 42

Siempre usa el mismo utensilio para sacar agua de la olla

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT:

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) No	-	-
3) Si	40	100.0
	40	100.0%

Variable # 43

Frecuencia con que lava ropa

Clave W.B.: - # de preg. W.B.: - # de preg.CEMAT: 9b

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 1 vez por semana	8	20
3) 2 veces por semana	21	52.5
4) 3 veces por semana	9	22.5
5) Diario	2	5
	40	100.0%

Variable # 44

Períodos en que lava ropa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 9d

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Mañana	14	35
3) Tarde	1	2.5
4) Ambas	25	62.5
	40	100.0%

Variable # 45

Preferencias por lavar en compañía

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 10

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) Prefiere sola	29	72.5
3) Da lo mismo	6	15
4) Prefiere compañeras	4	10
	40	100.0%

Variable # 46

Razones por las que prefiere lavar en el lago

Clave W.B.: - # de preg. W.B.: - 3 de preg. CEMAT:

	Abs.	%
0) NR	-	-
1) NSA (no lava en lago)	1	2.5
2) Agua abundante	19	47.5
3) Elementos naturales: aire sol, fresco	2	5
4) Se limpia bien	3	7.5
5) Por necesidad	15	37.5
	40	100.0%

Variable # 46:

Frecuencia de enfermedades causadas por el agua mencionada por entrevistadas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 12

	Abs.	%
0) NR	20	
1) NSA	-	
2) Dolor de estómago	14	
3) Lombrices	7	
4) Tos	4	
5) Calenturas	3	
6) Diarrea	2	
7) Toda clase de enfermedades	2	
8) Dolor de cabeza	2	
9) Microbios	1	
10) Enfermedades de la piel	1	
	N=54	

Variable # 47:

Opinión sobre lo que consideran el peor enemigo de la salud

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 14

	Abs.	%
0) NR	7	17.5
1) NSA	-	-
2) Moscas y mosquitos	16	40
3) Lombriz	6	15
4) Suciedad	6	15
5) Microbios	2	5
6) Enfermedades	1	2.5
7) Nada	1	2.5
8) Todo animal/suciedad/ enfermedad	1	2.5
	40	100.0%

Variable # 48

Opinión sobre el animal más ofensivo a la salud

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 15

	Abs.	%
0) NR	1	2.5
1) NSA	1	2.5
2) La mosca	32	80
3) Sancudo	1	2.5
4) Piojo, mosca	3	7.5
5) Piojos y pulgas	1	2.5
6) Piojo, sancudo, mosca	1	2.5
	40	100.0%

Razones:	Abs.	%
0) NR	12	30
1) Contacto con alimentos, enferman	11	27.5
2) Son sucias	6	15
3) Tienen contacto con excretas	1	2.5
4) Producen enfermedad	4	10
5) Producen microbios	3	7.5
6) Pican mucho	2	5
7) Agua sucia que bebemos	1	2.5
	40	100.0%

Variable # 49

Opinión sobre el insecto más insalubre de los siguientes:

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 16

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Hormiga	-	-
3) Mosca	30	75
4) Sancudo	10	25
	40	100.0%

Variable # 50

Frecuencia con que se bañan en casa, a la semana

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 13a

	Abs.	%
0) NR	-	-
1) NSA	36	90
2) 2 veces por semana	3	7.5
3) 4 veces por semana	1	2.5
	40	100.0%

Variable # 51

Frecuencia con que se bañan en el lago a la semana

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 13a

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) 1 vez por semana	8	20
3) 2 veces por semana	19	47.5
4) 3 veces por semana	10	25
5) 4 veces por semana	1	2.5
	40	100.0%

Variable # 52

Cantidad de agua utilizada para bañar a los niños

Clave W.B.: - # de preg. W.B.: # de preg. CEMAT:13c

	Abs.	%
0) NR	-	-
1) NSA	36	90
2) De 1/2 a 1 tinaja (6 a 12 litros)	2	5
3) 2 a 3 tinajas (24 a 36 litros)	2	5
	40	100.0%

Variable # 53

Problemas para conseguir agua en alguna de las fuentes que usa

Clave W.B.: 0-5 # de preg. W.B.: 3 # de preg. CEMAT: 17

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) Mucha gente, aglomeración pleitos, pierden tiempo	15	37.5
3) Se mojan los otros	1	2.5
4) Escasea el agua	1	2.5
5) Ninguno	22	55
	40	100.0%

Variable # 54

Opinión y concepto sobre si la ubicación de su casa es saludable

Clave W.B.: 0-1 # de preg. W.B.: 4 # de preg. CEMAT: 18

	Abs.	%
0) NR	6	15
1) NSA	-	-
Si, porque:		
El sol alumbra aquí	1	2.5
Los vecinos son buenos, hacen sus necesidades en sus propias casas	3	7.5
Buenas relaciones con vecinos	1	2.5
Viven solos	10	25
No hay suciedad aquí	1	2.5
Tenemos letrina y agua privada	1	2.5
Nadie nos molesta	5	12.5
Todo está cerrado, sólo vive la familia	2	5
Viven en campo, hay aire libre	1	2.5
Viven solos en sitio grande	1	2.5
No, porque:		
Tiran agua sucia y vienen moscas	1	2.5
Problemas de tipo familiar	2	5
La gente viene a ensuciarse	1	2.5
Nos falta letrinas, no tenemos sitio	1	2.5

Cont. del variable # 54:	Abs.	%
Cocinan y duermen en el mismo cuarto	1	2.5
No explica	1	2.5
Estamos apretados, nos molestan los vecinos	1	2.5
	40	100.0%

Variable # 55:

Opinión sobre si el agua que beben es saludable

Clave W.B.: O-4 # de preg. W.B.: 5 # de preg. CEMAT: 19

	Abs.	%
0) NR	3	7.5
1) NSA	-	-
Si, porque:		
Agua se ve ó es limpia	17	42.5
Hervimos agua para beber	7	17.5
Hemos bebido eso y no pasa nada	1	2.5
Todos tomamos la misma agua	6	15
No, porque:		
El agua es sucio	1	2.5
No hervimos agua y enfermamos	1	2.5
Tiene microbios	4	10
	40	100.0%

Variable # 56:

Opinión sobre si la energía y el tiempo empleado para conseguir agua es:

Clave W.B.: O-6 # de preg. W.B.: 6 # de preg. CEMAT: 20

	Abs.	%
0) NR	1	2.5
1) NSA	1	2.5
2) Demasiado	4	10
3) Normal	2	5
4) Poco	32	80
	40	100.0%
En que usaría tiempo liberarlo:		
Quehacer doméstico	1	2.5
Otros trabajos	2	5

Variable # 57:

Opinión sobre el costo del agua.

Clave W.B.: 0-6 # de preg. W.B.: 6a # de preg. CEMAT: 20a

	Abs.	%
0) NR	-	-
1) NSA	25	62.5
2) Bajo	5	12.5
3) Normal	10	25
4) Alto	-	-
	40	100.0%

Variable # 58:

Disposición a gastar $ para obtener agua de más calidad.

Clave W.B.: 0-8 # de preg. W.B.: 7a # de preg. CEMAT: 21a

	Abs.	%
0) NR	6	15
1) NSA	-	-
Si:		
Sin dato	3	7.5
Poco	18	45
Mucho	5	12.5
No:		
Sin dato	2	5
El chorro da agua suficiente	1	2.5
El llenacántaro lo tiene cerca	1	2.5
Soy pobre y soy mujer y no puedo ayudar	1	2.5
No tengo sitio	1	2.5
No tengo, solo vivo	1	2.5
No tenemos $	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	6	15
1) NSA	-	-
2) Si	26	65
3) No	8	20
	40	100.0

Variable # 59:

Disposición a gastar $ para tener agua más cercana

Clave W.B.: 0-8 # de preg. W.B.: 7b # de preg. CEMAT: 21b

	Abs.	%
0) NR	9	22.5
1) NSA	1	2.5
Si:		
Sin dato	-	-
Poco	15	37.5
Mucho	6	15
No:		
El llenacántaros es suficiente	1	2.5
Tengo agua cerca	4	10
No tengo dinero	1	2.5
No podemos	1	2.5

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	9	22.5
1) NSA	1	2.5
2) Si	21	52.5
3) No	9	22.5
	40	100.0%

Variable # 60:

Comunicación con vecinos en el trayecto para el acarreo de agua.

Clave W.B.: 0-7 # de preg. W.B.: 8a # de preg. CEMAT: 22a

	Abs.	%
0) NR	2	5
1) NSA	2	5
2) No	11	27.5
3) Algunas veces	12	30
4) Si	13	32.5
	40	100.0%

Variable # 61

Opinión sobre la comunicación o no-comunicación con personas al ir por agua

Clave W.B.: 0-7 # de preg. W.B.: 8b # de preg. CEMAT: 22b

	Abs.	%
0) NR	7	17.5
1) NSA	7	17.5
Es bueno, porque:		
En los problemas me consultan	1	2.5
Pueden saberse más cosas	2	2.5
Se conoce más; se dan mandados	3	7.5
Me hablan de sus necesidades	4	10

Cont. del variable # 61:

	Abs.	%
Nos saludamos	5	12.5
Algunos aconsejan	1	2.5
Nos contentamos para no tener enemigos	1	2.5
Enviar cosas con otra	1	2.5
Tenemos costumbre	1	2.5
Para sentirnos bien	2	5
A veces necesito hablar con otros	1	2.5
No es bueno, porque:		
Pienso en mi trabajo	1	2.5
Sólo es costumbre	1	2.5
No perder el tiempo	2	5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	7	17.5
1) NSA (No acarreo agua)	7	17.5
2) Es bueno	22	55
3) No es bueno	4	10
	40	100.0%

Variable # 62:

Cantidad de $ que paga por el agua al mes

Clave W.B.: 0-7 # de preg. W.B.: 9 # de preg. CEMAT: 23

	Abs.	%
0) NR	-	-
1) NSA	23	57.5
2) 0.30	17	42.5
	40	100.0%

Variable # 63:

Sugerencias para mejorar la calidad del agua:

Clave W.B.: 0-9 # de preg. W.B.: 10 # de preg. CEMAT: 24

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) No da sugerencias	22	55
3) Buscar otra fuente	13	32.5
4) Matar los microbios	1	2.5
5) Pedir ayuda para conseguir más agua	2	5
6) Buscar ayuda de otras personas	1	2.5
7) Un poco de dinero	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) No da sugerencias	22	55
3) Buscar otra fuente	13	32.5
4) Pedir ayuda y otros	5	12.5
	40	100.0%

Variable # 64:

¿Por qué supone que estas ideas no se han realizado?

Clave W.B.: 0-9 # de preg. W.B.: 11 # de preg. CEMAT: 25

	Abs.	%
0) NR	16	40
1) NSA	-	-
2) El alcalde anterior no pudo colaborar	1	2.5
3) No había $ en la Municipalidad	1	2.5
4) Falta de conocimientos	4	10
5) No se ha advertido contaminación del agua	1	2.5
6) Poco inteligencia	1	2.5
7) Por nosotros mismos falta cooperación	7	17.5
8) La gente no sabía la necesidad de un pueblo	1	2.5
9) No todos comprendemos	1	2.5
10)La gente no se preocupa	3	7.5
11)Poco experiencia	1	2.5
12)No sabíamos del problema	3	7.5
	40	100.0%

Variable # 65:

Forma de deshechar aguas utilizadas

Clave W.B.: 0-10 # de preg. W.B.: 12 # de preg. CEMAT: 26

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Las tira en el terreno	22	55
3) Las tira en la calle	17	42.5
4) Canal de desague	1	2.5
	40	100.0%

Variable # 66:

Existencia de charcos de aguas utilizadas cerca de su casa

Clave W.B.: 0-11 # de preg. W.B.: 13 # de preg. CEMAT: 27

	Abs.	%
0) NR	-	-

Cont. del variable # 66:

	Abs.	%
1) NSA	-	-
2) Si	5	12.5
3) No	35	87.5
	40	100.0%

Variable # 67:

Forma en que la familia elimina los excrementos

Clave W.B.: 0-12 # de preg. W.B.: 14 # de preg. CEMAT: 28

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) En el campo	26	65
3) Letrina de pozo	14	35
	40	100.0%

Variable : 68:

Opinión: Debería haber un modo más limpio para eliminar la excreta y como.

Clave W.B.: 0-13 # de preg. W.B.: 15 # de preg. CEMAT: 29

	Abs.	%
0) NR	5	12.5
1) NSA	-	-
No	2	5
Si: Hacer más inodoros	1	2.5
Abrir desague bajo tierra	1	2.5
Hacer más letrinas	16	40
Tener un sitio especial	1	2.5
Hacer letrinas públicas	13	32.5
Limpiar nuestros terrenos	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	5	12.5
1) NSA	-	-
2) No	2	5
3) Si	33	82.5
	40	100.0%

Variable # 69:

Posesión de temascal*en la casa y área que ocupa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 32

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) No	36	90
3) Si: 2 varas	1	2.5
4) 4 varas^2	1	2.5
5) 3 varas	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) No	36	90
3) Si	3	7.5
	40	100.0%

* Baño de vapor, hecho de adobe.

Variable : 70:

Posesión de espacio para construir letrina

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 33

	Abs.	%
NR	-	-
NSA	14	35
Si: Sin datos	1	2.5
En la casa	2	5
En terreno de cultivo	1	2.5
Cerca de la casa	1	2.5
No: Sin datos	-	-
Porque no tiene sitio	20	50
Porque el sitio está lleno de piedras	1	2.5
	40	100.0%

Variable : 71:

Espacio disponible para construir letrinas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 34

	Abs.	%
0) NR	-	-
1) NSA (tiene letrina)	32	80
2) 1 vara x 4	1	2.5
3) 2 varas	3	7.5
4) 10 metros	1	2.5

Cont. del Variable # 71:

	Abs.	%
5) 1/2 vara	1	2.5
6) 4 varas	1	2.5
7) 3 varas	1	2.5
	40	100.0%

Variable # 72:

Opinión sobre letrinas públicas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 34

	Abs.	%
0) NR	8	20
1) NSA	-	-
2) Serían limpias y saludables	4	10
3) Bien, así no irían a los cafetales	8	20
4) Sería bueno	5	12.5
5) Bueno para los que no tienen	7	17.5
6) Bueno, así no iríamos lejos	3	7.5
7) Bueno, porque es muy útil	1	2.5
8) Bueno, todos necesitan	3	7.5
9) Bueno, para bienestar del pueblo	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	8	20
1) NSA	-	-
2) Favorable	32	80
	40	100.0%

Variable # 74:

Razones por las que no hay letrinas públicas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 35

	Abs.	%
0) NR	9	22.5
1) NSA	-	-
2) Falta de espacio	5	12.5
3) Desinterés de Municipalidad	2	5
4) Falta de colaboración de la gente	12	30
5) Falta iniciativa para limpieza	1	2.5

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	9	22.5
1) NSA	-	-
2) Falta de espacio	5	12.5
3) Falta de colaboración de la gente	12	30
4) Otros	14	35
	40	100.0%

Cont. del Variable # 74:

	Abs.	%
6) Por ignorancia	3	7.5
7) Porque no somos iguales	1	2.5
8) La gente no ha pensado	2	5
9) Falta de experiencia	2	5
10)Falta de costumbre	1	2.5
11)No hay ayuda	1	2.5
12)No hay quien lo haga	1	2.5
	40	100.0%

Variable # 75:

Opinión sobre si se deberían construir letrinas públicas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 36

	Abs.	%
0) NR	2	5
1) NSA	-	-
2) No	-	-
3) Si	38	95
	40	100.0%

Variable # 76:

Posición adecuada para sentarse en una letrina

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 37

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) Parado de cuclillas	-	-
3) Sentado	39	97.5
	40	100.0%

Variable # 77:

Tipo de material que prefiere para el asiento de letrinas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 38

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) Cemento	13	32
3) Madera	26	65
	40	100.0%

Variable # 78:

Recibió brocales para letrinas y cuándo

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 39

	Abs.	%
0) NR	4	10
1) NSA	-	-
2) No recibió	36	90
	40	100.0%

Variable # 79:

Capacidad para instalar sólo una letrina, tipo de ayuda técnica

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 40

	Abs.	%
0) NR	10	25
1) NSA	-	-
2) No podría sólo	9	22.5
3) Si podría sólo, sin ayuda	5	12.5
4) Necesitaría: albañil y dinero	1	2.5
5) Necesitaría: albañil	8	20
6) Necesitaría albañil y pocero	7	17.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	10	25
1) NSA	-	-
2) No podría sólo	9	22.5
3) Si podría, sin ayuda	5	12.5
4) Necesitaría ayuda de albañil y otros	16	40
	40	100.0%

Variable # 80:

Costo estimado de una letrina

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 40

	Abs.	%
0) NR	31	77.5
1) NSA	1	2.5
2) 15 Q.	1	2.5
3) 20 Q.	2	5
4) 25 Q.	1	2.5
5) 50 Q.	3	7.5
6) 100 Q.	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR/no sabe	31	77.5
1) NSA	1	2.5
2) 15 a 25 Q.	4	10
3) 50 a 100 Q.	4	10
	40	100.0%

Variable # 81:

Disposición a colaborar con trabajo para construir letrina pública

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 41

	Abs.	%
0) NR	7	17.5
1) NSA	-	-
2) No	3	7.5
3) Si: sin datos	8	20
4) Un día	2	5
5) Dos días	6	15
6) Tres días	6	15
7) Un día por semana	1	2.5
8) Una semana	6	15
9) Cinco días	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	7	17.5
1) NSA	-	-
2) No	3	7.5
3) Si, sin especificar en cuánto	8	20
4) Si, desde 1 día hasta 1 semana	22	55
	40	100.0%

Variable # 82:

Disposición a colaborar con $ para construir letrina pública

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 41

	Abs.	%
0) NR	16	40
1) NSA	-	-
2) No	3	7.5
3) Si: sin datos	10	25
4) Si: 0.50 Q.	1	2.5

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	16	40
1) NSA	-	-
2) No	3	7.5
3) Si, sin especificar	10	25

Cont. del Variable # 82:

	Abs.	%
5) Si: 2.00 Q.	1	2.5
6) Si: 5.00 Q.	5	12.5
7) Si: 10.00 Q.	1	2.5
8) Si: 15.00 Q.	1	2.5
9) Si: 25.00 Q.	1	2.5
10)Si: 50.00 Q.	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
4) Si, de 0.50 a 5 Q.	7	17.5
5) Si, de 10 a 50 Q.	4	10
	40	100.0%

Variable # 83:

Disposición a trabajar colectivamente para construir letrina pública

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 41

	Abs.	%
0) NR	10	25
1) NSA	-	-
2) No	4	10
3) Si	26	65
	40	100.0%

Variable # 84:

Opinión sobre letrina productora de abono

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 42a

	Abs.	%
0) NR	21	52.5
1) NSA	-	-
2) Buena para bien del pueblo	2	5
3) Buena, así no compraríamos abonos	5	12.5
4) Sería bueno hacerlas	2	5
5) Sería bueno, traen beneficios	3	7.5
6) Sería bueno, para mejorar siembras	1	2.5
7) Me gusta	5	12.5
8) Que si somos capaces	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	21	52.5
1) NSA	-	-
2) Opinión favorable	19	47.5
	40	100.0%

Variable # 85:

Información que ha escuchado sobre letrinas aboneras

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 42b

	Abs.	%
0) NR	5	12.5
1) NSA	-	-
2) No ha oído nada	28	70
3) Que produce abono y gas	4	10
4) Un poco	3	7.5
	40	100.0%

Variable # 86:

Interés por conocer más sobre letrinas aboneras

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 42c

	Abs.	%
0) NR	5	12.5
1) NSA	-	-
2) No tiene interés	-	-
3) Si le interesa	35	87.5
	40	100.0%

Variable # 87:

Práctica de trabajo colectivo en algunas tareas

Clave W.B.: 0-14 # de preg. W.B.: 16 # de preg. CEMAT: 43

	Abs.	%
0) NR	6	15
1) NSA	2	5
2) (Viejos) en ninguna	2	5
3) Construcción de viviendas	14	35
4) Construcción de caminos	22	55
5) Trabajos agrícolas	3	7.5
6) Venta de cultivos	-	-
	N=49	

Variable # 88:

Actitud para trabajar en conjunto para mejorar suministro de agua o eliminación de excrementos

Clave W.B.: O-15 # de preg. W.B.: 17 # de preg. CEMAT: 44

	Abs.	%
0) NR	3	7.5
1) NSA	2	5
2) (viejos) No	5	12.5
3) Si ó tal vez, sin especificar	1	2.5
4) Si con todos	17	42.5
5) Si con personas de experiencia ó inteligencia	6	15
6) Si con los que quieran	5	12.5
7) Si con albañiles	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	3	7.5
1) NSA	2	5
2) No	5	12.5
3) Si	30	75
	40	100.0%

Condiciones en que trabajaría:

	Abs.	%
0) NR	1	2.5
1) NSA	9	22.5
2) Por dinero	7	17.5
3) Por intercambio	2	5
4) Voluntario	21	52.5
	40	100.0%

Variable # 89:

Edad de la entrevistada

Clave W.B.: O-16 # de preg. W.B.: 18 # de preg. CEMAT:

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 15 a 24	5	12.5
3) 25 a 34	13	32.5
4) 35 a 44	13	32.5
5) 45 o más	9	22.5
	40	100.0%

Variable # 89:

Escolaridad de la entrevistada

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 05, 06

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Analfabeta = 0	27	67.5
3) Alfabeta autodidacta = 1	3	7.5
4) 1 a 3 grados	4	10
5) 4 a 6 grados	6	15
	40	100.0%

Variable # 90:

Ocupación jefe de familia (más de una respuesta por entrevistado)

Clave W.B.: 0-17 # de preg. W.B.: 19 # de preg. CEMAT:

	Abs.	%
0) NR	2	5
1) NSA	-	-
2) Desempleado	1	2.5
3) Ama de casa	9	22.5
4) Jornalero	6	15
5) Costurera	2	5
6) Tejedora	4	10
7) Sastre	1	2.5
8) Carpintería	1	2.5
9) Panadería	1	2.5
10) Agricultor	21	52.5
11) Catedrático	1	2.5
12) Funcionario	1	2.5
13) Negociante/Contratista/Comerciante	10	25
	N=60	

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	2	5
1) NSA	-	-
2) Desempleado/ama de casa	10	25
3) Jornalero	6	15
4) Artesano	9	22.5
5) Agricultor	21	52.5
6) Empleado	2	5
7) Negociante/contratista	10	25
	60	

Variable # 91:

Número de personas mayores de 15 años que viven en casa, incluyendo a la encuestada

Clave W.B.: 0-18 # de preg. W.B.: 20 # de preg. CEMAT: 01

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 1 a 3	29	72.5
3) 4 a 6	11	27.5
	40	100.0%

Variable # 92:

Religión

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: -

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Evangélica	12	30
3) Católica	28	70
	40	100.0%

Variable # 93:

Número de hijos-as de 15 años o menos en la familia

Clave W.B.: 0-19 # de preg. W.B.: 21 # de preg. CEMAT: 01

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Ninguno	4	10
3) 1 a 3	30	75
4) 4 a 6	6	15
	40	100.0%

Variable # 94:

Tamaño de la familia que vive en casa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 01

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 1	1	2.5

Cont. del Variable # 94:

	Abs.	%
3) 2	2	5
4) 3	5	12.5
5) 4	9	22.5
6) 5	4	10
7) 6	10	25
8) 7	6	15
9) 8	3	7.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 1 - 2	3	7.5
3) 3 - 4	14	35
4) 5 - 6	14	35
5) 7 - 8	9	22.5
	40	100.0%

Variable # 95:

Promedio de escolaridad de los mayores de 12 años

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 05 y 06

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Cero	9	22.5
3) 0.1 - 0.5	6	15
4) 0.6 - 0.9	1	2.5
5) 1.0 - 1.5	8	20
6) 1.6 - 2.0	3	7.5
7) 2.1 - 2.4	1	2.5
8) 2.5 - 3.0	7	17.5
9) 4.00 - 5.00	2	5
10)5.00 - 7.00	2	5
11)8.00 - 9.00	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Cero	9	22.5
3) 0.1 a 0.9	7	17.5
4) 1.0 a 2.0	11	27.5
5) 2.1 a 3.0	8	20
6) 4.0 a 9.0	5	12.5
	40	100.0%

Variable # 96:

Status Socioeconómico (Indice compuesto en base a la vivienda: # de habitaciones no productivas + material de paredes + material del piso. Cfr. Código de Respuestas.

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: -

	Abs.	%
0) NR	14	35.0
1) NSA	-	-
2) 3 - 5	2	5
3) 6 - 8	13	32.5

Cont. del Variable # 96:

	Abs.	%
4) 9 - 11	9	22.5
5) 12 - 14	2	5
	40	100.0%

Variable # 97:

Disposición de Basura (más de una respuesta por entrevistado)

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: -

	Abs.	%
0) NR	14	35
1) NSA	-	-
2) Se quema papeles	3	7.5
3) Tiran en los cafetales	25	62.5
4) Un montón en el lote	2	5
	N=44	110.0%

Variable # 98:

Tipo de combustible

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT:

	Abs.	%
0) NR	14	35
1) NSA	-	-
2) 1 leña	26	65
3) 2 gas	-	-
4) 3 kerosene	-	-
5) 4 carbón	-	-
	40	100.0%

Variable # 99:

Drenaje

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT:

	Abs.	%
0) NR	14	35
1) NSA	-	-
2) Flor de tierra	25	62.5
3) Pozo ciego	1	2.5
4) Alcantamiento	-	-
	40	100.0%

Variable # 100:

Necesidades sentidas (más de 1 respuesta por entrevistado)

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT:

	Abs.	%
NR	10	25
Material de construcción/casa	8	20
Abono	10	25
Pajalote	4	10
Letrina	11	27.5
Azúcar/chile/sal/café	3	7.5
Azadon, hacha	3	7.5
Luz Eléctrica	2	5
Dinero	11	27.5
Agrónomo	1	2.5
Pila	1	2.5
Hilo para tejer	1	2.5
Tierra	1	2.5
Llenacántaro	1	2.5
Poyo	1	2.5
Maiz	1	2.5
	N=69	

Variable # 101:

Necesidad más urgente

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: -

	Abs.	%
Materiales de construcción	3	7.5
Letrina	6	15
Abono	6	15
Dinero	9	22.5
Tierra	1	2.5
Luz	1	2.5
Una paja de agua	2	5
Maiz	1	2.5
NR	11	25
	40	100.0%

Variable # 102

Necesidades del pueblo (más de 1 respuesta por entrevistado)

Clave W.B.: -

	# de preg. W.B.: - Abs.	%
NR	9	22.5
Doctor permanente	2	5
Edificio escolar	5	12.5
Carretera	11	27.5
Industria	2	5
Mercado	22	55
Hospital	16	40
Letrina	3	7.5
Ferretería	1	2.5
Drenaje	2	5
Arreglo calles	4	10
Abono	1	2.5
Material labranza	1	2.5
Cancha	2	5
Rep. Iglesia	1	2.5
Agua pública	1	2.5
	N=83	

de preg. CEMAT: -

CATEGORIAS AGREGADAS	Abs.	%
0) NR	9	22.5
1) Beneficio comunal/ comunicaciones (carretera, calles, canchas, reparar iglesias)	18	45
2) Económicas/comerciales (industria, mercado, abono, instrumentos agrícolas)	27	67.5
3) Educativas (edificio escolar)	5	12.5
4) Sanitarios (doctor, hospital, letrina, drenaje, agua)	24	60
	83	

Variable # 103:

Necesidad más urgente

Clave W.B.: -

	# de preg. W.B.: - Abs.	%
NR	10	25
Doctor permanente	1	2.5
Hospital	9	22.5
Carretera	4	10
Mercado	11	27.5
Reparación de calle	3	7.5
Agua pública	1	2.5
Letrina	1	2.5
	40	100.0%

de preg. CEMAT: -

CATEGORIAS AGREGADAS	Abs.	%
0) NR	10	25
1) Obras infraestructura (carretera, calles, mercado, agua)	19	47.5
2) Necesidades de salud (doctor, hospital, letrina)	11	27.5
	40	100.0

CEMAT
Centro Mesoamericano de Estudios sobre Tecnología Apropiada
Institución: WORLD BANK

ANEXO # 2

APPROPRIATE TECHNOLOGY FOR WATER SUPPLY AND WASTE DISPOSAL

Background Information

Name of Community: San Pedro La Laguna, Sololá, Guatemala
Name of Researcher: Cáceres and Salinas (CEMAT)
Date: 1978

Please complete this background questionnaire for each community studied. If information requested is not available, answer N.A. If the question is not applicable, answer N.P. If it is estimated by CEMAT answer E.

I. Reasons for selecting this rural or urban community:

A. Special problems

1) Health Situation: Good · Average · Bad

2) Pollution: Low level · Medium level · High level

3) Density of population: Low · High

4) Others: A dynamic town in process of modernization in comparison with the other towns of Lake Atitlán.

B. Special or Varied Techniques

1) Waste Disposal Procedures: Aerobic and anaerobic bio-gas latrines.

2) Re-use Techniques:

a) Fertilizer: Yes · No

b) Biogas Production: Yes · No

c) Aquaculture: Yes · No

d) Others: Evacuation of excreta on coffee farms.

C. Others (community involvement, existence of laboratory, good health data, etc.)

1. The existence of an Integral Development Committee, a local team of indian promotors in charge of development, with one permanent doctor, five employees, initial system of health data, a rural hospital in construction, in the near future the possibility of constructing a laboratory.
2. The existence of a peasant radio with educational programs for all towns around the Lake and made up of a team of local indian promotors, situated in a town near San Pedro which uses the local language, Zutuhil.
3. The good cooperation relationship between CEMAT and the Integral Development Committee of San Pedro and with the educational radio of Santiago.

II. Physical Characteristics

A. Location (relation to capital city; situated on coast; high altitude area, etc).

It is situated in the highlands of Guatemala, around Lake Atitlán, with an altitude of 1,564 m. and it is 160 km. away from the capital city by road, of which 40 km. is of earth and practically untransitable during the rainy season

Climate Both of these sets of data were taken at the town of Santiago Atitlán, on the lake shore, 3 miles by water from San Pedro.

1) Rainfall - average per month if available (mm) or describe seasonal variation and approximate level

Average for 1974-1975

	J	F	M	A	M	J	J	A	S	O	N	D
Rainfall	3.1	6.5	1.5	5.1	155.8	320.8	42.7	33.2	300.0	12.5	19.6	2.0
Days	1	1	2	4	21	24	11	10	19	1	5	1

2) Temperature per month if available (otherwise summer and winter)

Average for 1974-75

	J	F	M	A	M	J	J	A	S	O	N	D
- Mean	N.A.											
- Mean max.	77.9	74.6	75.9	76.5	79.7	78.8	80.6	83.3	80.6	80.6	80.6	79.4
- Mean min.	48.3	47.1	49.3	52.7	51.8	47.3	47.3	46.4	42.8	42.8	41.0	44.0

3) Humidity, wind velocity or any other important climatic features:
Semi-tropical and monzonic climate

IV. Population

A. Number (year) 3,661 (1964), 4,462 (1972), 4,872 (1976)

B. Growth rate (%) (years) 2.4%,

C. Density (persons/km^2) 603.6 persons per km^2 (1973)
474.2 persons per km^2 (1964)
728.2 persons per km^2 of cultivated land (1973)
572.1 persons per km^2 of cultivated land (1964)

D. Average family size 5.2 (1976)

E. Distribution by ages (if available) (1976)

0-11 months-- 3.4%
1- 4 years --12.1%
5- 9 years --15.0%
10-14 years --12.7%
15-44 years --42.2%
44 years --14.7%

V. Economic Data

A. Main Activities

1) For Rural Communities

a) Main crop (subsistence and/or trade; hectares planted in each, annual production; use of natural and chemical fertilizers)

There are 24 km^2 of land area, 40% of the head of the family are farmers and 25.7% are "jornaleros" (non-skilled agricultural labor). There is no dependable data about hectares planted in each annual production nor subsistence and/or trade; but it can be said that San Pedro has quickly passed from a merely subsistence economy to a trade economy, it is now known that maize is bought outside. The commercial harvests in order of their importance are: coffee (in 1962 between 2000 and 3000 qq), onions, and avocados. There are other harvests of less importance such as chickpeas, tomatoes and "jocotes" In 1969-74 half of the farmers used fertilizers. 10% of the farmers used chemical fertilizers and 40% used natural fertilizers.

b) Other activities (aquaculture, livestock, etc.) There is little fishing in the region and there is no aquaculture, except in San Lucas, one of the towns of the Lake. The farmers from San Pedro give their livestock to poorer peasants around the Lake, to fatten them, there is no information of the quantity of the existent livestock.

2. For Urban Community (main sectors including any relevant for reuse)

In 1972 there were 122 businesses which represented 39 full-time occupations and 44 part-time occupations; of the total, 23 of these businesses were different In 1978 the number of urban occupations in order of ranking were: Merchants, housewives and artesans.

III. Hydrology - Water Resources What about Lake Atitlan?

A. Rivers (complete only if used as source for water supply or discharge basin for sewage)

1) General Description (including source, length, average width, depth, seasonal variation)

N.P.

2) Discharge measures (m^3/s)

N.P

3) Floods (if any)

N.P

4) Is the river used by other communities as well? For what purposes? Where are they located with respect to this community?

N.P

B. Ground waters (complete only if used as source for water supply)

1) Volume and location of aquifer(s)
1. Chiquiacay: 33,000 lt/day, N.P. location
2. Deposit of an aquifer in San Juan, a neighbor town, 2 km. from San Pedro N.P. volume

2) Depth of water table 60 m.

C. Pollution

1) If sampling stations exist, average measures of BOD, DO, E.Coli,etc.

N.A., no sampling stations exist.

2) Or describe general pollution level
90.5 of water is not potable (10 MPN of coliforms/ml)
93.3 of water is not potable in"Tinajas" (water basin)
90.0 of water is not potable in public outlets
92.3 contamination by (coli)

B. Employment - Wages - Income levels

1) Rate of employment (seasonal pattern if significant)
No there is no data concerning employment, but a calculation can be made that 50% of the active masculine population (1,400, E.) are seasonal workers. The seasonal work is done from february to june on the cotton farms near the Pacific and from november to january on the coffee farms.

2) Minimum wage rate (or average daily wage of unskilled worker)
The minimum wages according to the law is Q. 1.90 a day, but the reality is that the average daily wage of unskilled workers is Q.0.90-1.10 (E.)

3) Income levels per household (average, lowest 20% of population)
There is no official information with respect to income levels per household. According to estimations of ours, the average is 654.26 Q. per household a year and the lowest population has an annual income between Q. 250 and Q. 350.

4) Availability of skilled labor

	Available	Scarce	Daily Wage
a) Carpenters		x	3.50
b) Plumbers		x	4.00
c) Masons or bricklayers	x		3.00
d) Mechanics or electricians		x	6.00

C. Market Situation

	Official Rate	Shadow Factor
1) Minimum wage legislation	Q. 1.90	
2) Foreign exchange	$ 1.00 = Q. 1.00	
3) Interest rate (cost of capital)	8-10% a month	
4) Taxes and subsidies	11.5% for the enterprises of more than 3 workers.	
5) Water ($ / m^3)	Q. 0.30 a month	
6) Re-use products (specify)	75 lbs. per Q. 1.00	

VI. Socio-cultural Data

A. Literacy rate The official data is N.A.

1) Adults (%) (E.) which have a 50% ability to read (words read/words written)

a) men 27%

b) women 19%

2) Children (percentage of children in school) 48.8% (1973, E.)

B. Community work (types and importance of community organizations)
6 years of primary and 3 years of secondary.
Movies per week
Program of maternal and nutritional health education
Program of radio schools

VII. Technical Data and Cost Estimates

A. Housing

1) Materials (list principal materials, their unit and total costs, and indicate which of these are not available on local markets)

Materials	Units	Total costs	Available on local markets
stone (E)	100	Q. 20.00	available
sand (E)	$5m^3$	Q. 10.00	scarce
lime (E)	1 qq	Q. 2.00	scarce
blocks (E)	100	Q. 25.00	scarce
cement (E)	1 qq	Q. 3.50	scarce
"adobe" (E)	100	Q. 17.00	available
wood (E)	1'x1'x1"	Q. 0.22	scarce

2) Description of construction requirements (labor, time, wages)

	Good house	Poor house
Time of construction (E)	3 months	2 months
Cost of materials (E)	700 Q.	200 Q.
Labor costs (E)	270 Q. (mason)	180 Q. (mason)
	30 Q. (assistant)	-
	1000 Q.	380 Q.

In 1971-72, 22 new houses were built

3) Typical problems, if any aglomeration, 4-5 persons per room

B. Employment - Wages - Income levels

1) Rate of employment (seasonal pattern if significant)
No there is no data concerning employment, but a calculation can be made that 50% of the active masculine population (1,400, E.) are seasonal workers. The seasonal work is done from february to june on the cotton farms near the Pacific and from november to january on the coffee farms.

2) Minimum wage rate (or average daily wage of unskilled worker)
The minimum wages according to the law is Q. 1.90 a day, but the reality is that the average daily wage of unskilled workers is Q.0.90-1.10 (E.)

3) Income levels per household (average, lowest 20% of population)
There is no official information with respect to income levels per household. According to estimations of ours, the average is 654.26 Q. per household a year and the lowest population has an annual income between Q. 250 and Q. 350.

4) Availability of skilled labor

	Available	Scarce	Daily Wage
a) Carpenters		x	3.50
b) Plumbers		x	4.00
c) Masons or bricklayers	x		3.00
d) Mechanics or electricians		x	6.00

C. Market Situation

	Official Rate	Shadow Factor
1) Minimum wage legislation	Q. 1.90	
2) Foreign exchange	$ 1.00 = Q. 1.00	
3) Interest rate (cost of capital)	8-10% a month	
4) Taxes and subsidies	11.5% for the enterprises of more than 3 workers.	
5) Water ($ / m^3)	Q. 0.30 a month	
6) Re-use products (specify)	75 lbs. per Q. 1.00	

ANEXO # 1

C E M A T

Centro Mesoamericano de Estudios sobre Tecnología Apropiada (Guatemala)

PROYECTO: Tecnología Apropiada para sistemas de abastecimiento de aguas y eliminación de deshechos

PAIS: Guatemala: Estudio de Caso: una comunidad del Lago de Atitlán

INSTITUCION: World Bank

FECHA: Enero de 1978

TABLA DE RESULTADOS DE LA ENCUESTA STANDARIZADA APLICADA A FAMILIAS: DISTRIBUCION DE FRECUENCIAS Y PORCENTAJES

n= 40, 4.2 % del total de familias

Variable # 01:

Fuentes de abastecimiento de agua en Verano

Clave W.B.: 0-2 # de pregunta W.B.: 1a # de pregunta CEMAT: 1a

	Abs.	%
0) N.R. (no responde y/o no sabe)	-	-
1) N.S.A. (no se aplica)	-	-
2) Primero el llenacántaro, luego el lago	25	62.5
3) Unicamente el llenacántaro	1	2.5
4) Primero llave privada, luego lago	13	32.5
5) Unicamente llave privada	1	2.5
	40	100.0 %

CATEGORIAS AGREGADAS	Abs.	%
0) N.R.	-	-
1) No tiene llave	26	65
2) Si tiene llave	14	35
	40	100 %

Variable # 02:

Fuentes de abastecimiento de agua en Invierno

Clave W.B.: 0-2 # de preg. W.B.: 1b # de pregunta CEMAT: 1b

Variable # 02:

Fuentes de abastecimiento de agua en Invierno

Clave W.B.: 0-2 # de preg. W.B.: 1b # de preg. CEMAT: 1b

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Primero llenacántaro, luego lago	24	60
3) Unicamente llenacántaro	3	7.5
4) Primero llave privada, luego lago	5	12.5
5) Unicamente llave privada	8	20
	40	100.0 %

Variable # 03:

Distancia de la casa al Llenacántaros

Clave W.B.: 0-2 # de preg. W.B.: 1d # de preg. CEMAT: 1d

	Abs.	%
0) NR	-	-
1) NSA	11	27.5
2) Menos de media cuadra	9	22.5
3) Media cuadra	12	30
4) Una cuadra	7	17.5
5) Dos cuadras	1	2.5
	40	100.0 %

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) No usa llenacántaro	11	27.5
2) Menos de 1 cuadra	21	52.5
3) 1 cuadra o más	8	20
	40	100.0 %

Variable # 04:

Distancia de la casa al lago

Clave W.B.: 0-2 # de preg. W.B.: 1d # de preg. CEMAT: 1d

	Abs.	%
0) NR	1	2.5
1) NSA	2	5
2) Media cuadra	8	20
3) Una cuadra	9	22.5
4) 1 1/2 - 2 cuadras	8	20
5) 3 cuadras	8	20
6) 4 cuadras	4	10
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	1	2.5
1) No va al lago	2	5
2) Hasta 2 cuadras	25	62.5
3) Más de 2 cuadras	12	30
	40	100.0

Variable # 05:

Tiempo de ida y vuelta al Llenacántaros

Clave W.B.: 0-2 # de preg. W.B.: 1e

	Abs.	%
0) NR	1	2.5
1) NSA	14	35
2) Hasta 5 minutos	14	35
3) De 5 a 15 minutos	9	22.5
4) De 16 a 30 minutos	2	5
	40	100.0%

de preg. CEMAT: 1e

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	1	2.5
1) No usa el llenacántaro	14	35
2) De 1 a 15 minutos	23	57.5
3) Más de 15 minutos	2	5
	40	100.0%

Variable # 06:

Tiempo de ida y vuelta al lago

Clave W.B.: 0-2 # de preg. W.B.: 1e

	Abs.	%
0) NR	1	2.5
1) NSA	2	5
2) De 5 a 15	5	12.5
3) De 16 a 30	23	57.5
4) De 31 a 45	9	22.5
	40	100.0%

de preg. CEMAT: 1e

Variable # 07

Tiempo de utilizar Llenacántaro

Clave W.B.: 0-2 # de preg. W.B.: 1f

	Abs.	%
0) NR/no sabe	8	20
1) NSA	13	32.5
2) De 1/2 a 2 años	6	15
3) De 3 a 5 años	5	12.5
4) De 9 años	1	2.5
5) De 16 a 20 años	7	17.5
	40	100.0%

de preg. CEMAT: 1f

CATEGORIAS AGREGADAS

	Abs.	%
0) NR/no sabe	8	20
1) No usa el Llenacántaro	13	32.5
2) De 1/2 a 5 años	11	27.5
3) Hace 9 a 20 años	8	20
	40	100.0

Variable # 08:

Tiempo de utilizar llave privada

Clave W.B.: 0-2 # de preg. W.B.: 1f

	Abs.	%
0) NR/no sabe	1	2.5
1) NSA	26	65
2) Menos de 1 año	1	2.5
3) De 1 a 4 años	2	5
4) De 5 a 10 años	2	5
5) De 15 a 19 años	1	2.5
6) De 20 a 22 años	7	17.5
	40	100.0%

de preg. CEMAT: 1f

CATEGORIAS AGREGADAS

	Abs.	%
0) NR/no sabe	1	2.5
1) No tiene llave privada	26	65
2) Hace de 1 a 10 años	5	12.5
3) Hace de 15 a 22 años	8	20
	40	100.0%

Variable # 09:

Usos del agua del llenacántaros

Clave W.B.: 0-2 # de preg. W.B.: 1g

	Abs.	%
0) NR	-	-
1) NSA	14	35
2) Beber, cocinar	15	37.5
3) Beber, cocinar, plantas	1	2.5
4) Beber, cocinar, animales	1	2.5
5) Beber, cocinar, animales	7	17.5
6) Para todo	1	2.5
7) Beber, cocinar, lavar, animales	1	2.5
	40	100.0%

de preg. CEMAT: 1g

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) No usan llenacántaros	14	35
2) Beber y cocinar	16	40
3) Beber, cocinar y animales	10	25
	40	100.0%

Variable # 10:

Usos del agua privada

Clave W.B.: 0-2 # de preg. W.B.: 1g

	Abs.	%
0) NR	-	-
1) NSA	26	65
2) Beber, cocinar	9	22.5
3) Beber, cocinar, lavar	2	5
4) Beber, cocinar, bañarse animales	2	5
5) Para todo	1	2.5
	40	100.0%

de preg. CEMAT: 1g

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) No tiene agua privada	26	65
2) Beber y cocinar	9	22.5
3) Beber, cocinar y otros	5	12.5
	40	100.0

Variable # 11:

Usos del agua del lago

Clave W.B.: 0-2 # de preg. W.B.: 1g # de preg. CEMAT: 1g

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) Lavar	1	2.5
3) Bañarse, lavar	20	50
4) Bañarse, lavar, animales	3	7.5
5) Beber, cocinar, bañarse, lavar	9	22.5
6) Para todo	5	12.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) No usa el lago	2	5
2) Bañarse y lavar	21	52.5
3) Bañarse, lavar y animales	3	7.5
4) Beber, cocinar, bañarse, lavar y otros	14	35
	40	100.0

Variable # 12

Forma en que supo que existía el llenacántaro

Clave W.B.: 0-2 # de preg. W.B.: 1h # de preg. CEMAT: 1h

	Abs.	%
0) NR	1	2.5
1) NSA	14	35
2) Menciona vecinos en general	19	47.5
3) Menciona familiares	1	2.5
4) Observación de otros	5	12.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	1	2.5
1) No usa el llenacántaro	14	35
2) Por información de vecinos	20	50
3) Por observación	5	12.5
	40	100.0

Variable # 13

Forma en que supo que existía el servicio privado de agua

Clave W.B.: 0-2 # de preg. W.B.: 1h # de preg. CEMAT: 1h

	Abs.	%
0) NR	-	-
1) NSA	25	62.5
2) Por vecinos	7	17.5
3) Por familiares	3	7.5
4) Por autoridades	3	7.5
5) Observación	2	5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) No tiene agua privada	25	62
2) Por información de vecinos y familiares	10	25
3) Por información de autoridades	3	7
4) Por observación	2	5
	40	100

Variable # 14:

Razones por las que buscó el agua del llenacántaro

Clave W.B.: 0-2 # de preg. W.B.: 11 # de preg. CEMAT: 11

	Abs.	%
0) NR	-	-
1) NSA	15	37.5
2) Por necesidad	15	37.5
3) Es cerca	9	22.5
4) No tenemos llave privada	1	2.5
	40	100.0%

Variable # 15:

Razones por las que buscó el agua privada

Clave W.B.: 0-2 # de preg. W.B.: 11 # de preg. CEMAT: 11

	Abs.	%
0) NR	-	-
1) NSA	25	62.5
2) Para no ir al lago/ cerca	9	22.5
3) Llenacántaros nos queda lejos	1	2.5
4) Por necesidad	5	12.5
	40	100.0%

Variable # 16:

Razones por las que buscó el agua del lago

Clave W.B.: 0-2 # de preg. W.B.: 11 # de preg. CEMAT: 11

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) Hay suficiente	26	65
3) Porque se acaba la del chorro	10	25
4) Por necesidad	2	5
	40	100.0%

Variable # 17:

Razones por las que prefiere el agua del llenacántaro para beber

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a		
	Abs.	%	CATEGORIA AGREGADA	Abs.	%
0) NR	-	-			
1) NSA	13	32.5	0) NR	-	-
2) Color	5	12.5	1) No usa llenacántaros	13	32.5
3) Cerca	10	25	2) Cerca y otros	21	52.5
4) Limpia y cerca	11	27.5	3) Color	6	15
5) Color y limpia	1	2.5		40	100.0
	40	100.0%			

Variable # 18:

Razones por las que prefiere agua de llenacántaros para cocinar

Clave W.B.: 0-3	# de preg. W.B.: 2a.		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	13	32.5	
2) Cerca	23	57.5	
3) Cerca y limpia	4	10	
	40	100.0%	

Variable # 19:

Razones por las que prefiere el agua del llenacántaro para bañarse

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	37	92.5	
2) Cerca	2	5	
3) Sólo para niños que son pequeños	1	2.5	
	40	100.0%	

Variable # 20:

Razones por qué prefiere el agua del llenacántaro para lavar

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	37	92.5	
2) Cerca	3	7.5	
	40	100.0%	

Variable # 21:

Razones por las que prefiere el agua del llenacántaro para dar de beber a los animales

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	28	70	
2) Cerca	10	25	
3) Limpia	1	2.5	
4) Cerca y suficiente	1	2.5	
	40	100.0%	

Variable # 22:

Razones por las que prefiere el agua privada para beber

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	27	67.5	
2) Cerca	9	22.5	
3) Limpia y cerca	4	10	
	40	100.0%	

Variable # 23:

Razones por las que prefiere el agua privada para cocinar

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	27	67.5	
2) Cerca	12	30	
3) Cerca y limpia	1	2.5	
	40	100.0%	

Variable # 24:

Razones por las que prefiere el agua privada para los animales

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	37	92.5	
2) Cerca	3	7.5	
	40	100.0%	

Variable # 25

Razones por las que prefiere el agua del lago para bañarse

Clave W.B.: 0-3	# de preg. W.B.:2a		# de preg. CEMAT: 2a
	Abs.	%	
0) NR	-	-	
1) NSA	3	7.5	
2) Cerca	17	42.5	
3) Suficiente	18	45	
4) Se siente libre	1	2.5	
5) Cerca y limpia	1	2.5	
	40	100.0%	

Variable # 26

Razones por las que prefiere el agua del lago para lavar

Clave W.B.: 0-3	# de preg. W.B.: 2a		# de preg. CEMAT: 2a	
	Abs.	%	CATEGORIA AGREGADA	
				Abs. %
0) NR	-	-	0) NR	- -
1) NSA	2	5	1) No lava en el lago	2 5
2) Se limpia mejor la ropa	2	5	2) Cerca y limpia	21 52.5
3) Cerca y limpia	10	25	3) Suficiente	17 42.5
4) Cerca	9	22.5		40 100.0
5) Hay suficiente	16	40		
6) Cerca y suficiente	1	2.5		
	40	100.0%		

Variable # 27:

Razones por las que prefiere el agua del lago para los animales

Clave W.B.: 0-3 # de preg. W.B.: 2a # de preg. CEMAT: 2a

	Abs.	%
0) NR	-	-
1) NSA	39	97.5
2) Cerca	1	2.5
	40	100.0%

Variable # 28:

Aspectos que no le gustan del agua del llenacántar para beber y cocinar

Clave W.B.: 0-3 # de preg. W.B.: 2b # de preg. CEMAT: 2b

	Abs.	%
0) NR	-	-
1) NSA	11	27.5
2) Hay problemas con otros	3	7.5
3) El color	1	2.5
4) Todo les gusta	25	62.5
	40	100.0%

Variable # 29:

Aspectos que no le gustan del agua privada para beber y cocinar

Clave W.B.: 0-3 # de preg. W.B.: 2b # de preg. CEMAT: 2b

	Abs.	%
0) NR	-	-
1) NSA	29	72.5
2) Todo les gusta	11	27.5
	40	100.0%

Variable # 30:

Aspectos que no le gustan del agua del lago para bañarse y lavar

Clave W.B.: 0-3 # de preg. W.B.: 2b # de preg. CEMAT: 2b

	Abs.	%
0) NR	2	5
1) NSA	-	-
2) Mucho sol	4	10
3) Está lejos	4	10
4) Cuando hay viento	8	20
5) Cuando el viento ensucia el agua	1	2.5
6) Cuando está sucia el agua	2	5
7) Hay paxtle y sol	1	2.5
8) Cuando hay viento, sol y mucha gente	5	12.5
9) Todo les gusta	13	32.5
	40	100.0%

CATEGORIA AGREGADA

	Abs.	%
0) NR	2	5
1) No usa el lago	-	-
2) Cuando hay viento y se ensucia el agua	11	27.5
3) Cuando hay sol ó por la lejanía	8	20
4) Cuando hay viento, sol, mucha gente, otros	6	15
5) Todo les gusta	13	32.5
	40	100.0%

Variable # 31:

Capacidad de las tinajas de plástico en que acarrean agua las mujeres de casa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3a

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) 12 litros (grande)	38	95
	40	100.0%

Variable # 32:

Número de viajes al día en verano para acarrear agua, de las mujeres de la casa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3b

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) 1 a 3	11	27.5
3) 4 a 7	26	65
4) 8 a 11	1	2.5
	40	100.0%

Variable # 33:

Número de viajes al día en invierno para acarrear agua, de las mujeres

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3 b

	Abs.	%
0) NR	-	-
1) NSA	5	12.5
2) 1 a 3	14	35
3) 4 a 7	18	45
4) 8 a 11	2	5
5) Más de 20	1	2.5
	40	100.0%

Variable # 34:

Capacidad de las tinajas de plástico en que acarrean agua las hijas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 4b

	Abs.	%
0) NR	-	-
1) NSA	17	42.5
2) 6 litros (mediana)	5	12.5
3) 12 litros (grande)	18	45
	40	100.0%

Variable # 35:

Número de viajes al día en verano para acarrear agua de las hijas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 4b

	Abs.	%
0) NR	-	-
1) NSA	17	42.5
2) 1 a 3	10	25
3) 4 a 6	9	22.5
4) 7 a 9	2	5
5) 10 a 12	2	5
	40	100.0%

Variable # 36:

Número de viajes al día en invierno para acarrear agua por hija

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 4b

	Abs.	%
0) NR	-	-
1) NSA	19	47.5
2) 1 a 3	10	25
3) 4 a 6	8	20
4) 7 a 9	2	5
5) 10 a 12	1	2.5
	40	100.0%

Variable # 37:

Total de litros por día acarreados por la familia en verano

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3 y 4

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) 1 a 36 litros	8	20
3) 37 a 72 litros	13	32.5
4) 73 a 108 litros	6	15
5) 109 a 144 litros	5	12.5
6) 156 a 216 litros	3	7.5
7) 217 a 277 litros	1	2.5
8) 300 a 360 litros	2	5
	40	100.0%

CATEGORIA AGREGADA

	Abs.	%
0) NR	-	-
1) No acarrean agua	2	5
2) 1 a 36 litros	8	20
3) 37 a 72 litros	13	32.5
4) 73 a 144 litros	11	27.5
5) 156 a 360 litros	6	15
	40	100.0

Variable # 38:

Total de litros por día acarreados por la familia en invierno

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 3 y 4

	Abs.	%
0) NR	-	-
1) NSA	6	15
2) 1 a 36 litros	8	20
3) 37 a 108 litros	16	40
4) 109 a 181 litros	7	17.5
5) 182 a 258 litros	2	5
6) 360 litros	1	2.5
	40	100.0%

CATEGORIA AGREGADA

	Abs.	%
0) NR	-	-
1) No acarrean agua	6	15
2) 1 a 36 litros	8	20
3) 37 a 108 litros	16	40
4) 109 a 181 litros	7	17.
5) 182 a 360 litros	3	7.
	40	100.

Variable # 39:

Forma de limpiar los 3 utensilios por los que pasa el agua: tinaja, olla, palangana

Clave W.B.: - # de preg. W.B.:- # de preg.CEMAT: 6a, 7c y 8c.

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Tusa y agua	2	5
3) Con jabón y agua	12	30
4) Tusa, jabón y agua	19	47.5
5) Arena y agua, jabón, tusa	6	15
6) Detergente, jabón, tusa, agua	1	2.5
	40	100.0%

Variable # 40:

Frecuencia con que limpia los utensilios con los que maneja el agua

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 6b, 7d y 8d

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Diario/semanal/diario	1	2.5
3) Diario	5	12.5
4) Cada 3-4 días	6	15
5) Semanal/cada 3/diario	3	7.5
6) Diario/cada 2/diario	7	17.5
7) Cada 3/diario/diario	4	10
8) Cada 3/cada 3/diario	4	10
9) Semanal-3/días/semanal	1	2.5
10) Semanal-semanal-diaria	1	2.5
11) Cada 3-semanal-semanal	1	2.5
12) Cada 15-cada 2-diario	1	2.5
13) Cada 15-diario-diario	2	5
14) Cada 15-cada 3-cada 3	1	2.5
15) Cada 3-diario-semanal	1	2.5
16) Cada 3-semanal-cada 2	1	2.5
17) Semanal-semanal-cada 3	1	2.5
	40	100.0%

Variable # 41

Tapa la olla donde almacena el agua

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 7b

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) No	-	-
3) Si	40	100.0
	40	100.0%

Variable # 42

Siempre usa el mismo utensilio para sacar agua de la olla

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT:

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) No	-	-
3) Si	40	100.0
	40	100.0%

Variable # 43

Frecuencia con que lava ropa

Clave W.B.: - # de preg. W.B.: - # de preg.CEMAT: 9b

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 1 vez por semana	8	20
3) 2 veces por semana	21	52.5
4) 3 veces por semana	9	22.5
5) Diario	2	5
	40	100.0%

Variable # 44

Períodos en que lava ropa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 9d

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Mañana	14	35
3) Tarde	1	2.5
4) Ambas	25	62.5
	40	100.0%

Variable # 45

Preferencias por lavar en compañía

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 10

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) Prefiere sola	29	72.5
3) Da lo mismo	6	15
4) Prefiere compañeras	4	10
	40	100.0%

Variable # 46

Razones por las que prefiere lavar en el lago

Clave W.B.: - # de preg. W.B.: - 3 de preg. CEMAT:

	Abs.	%
0) NR	-	-
1) NSA (no lava en lago)	1	2.5
2) Agua abundante	19	47.5
3) Elementos naturales: aire sol, fresco	2	5
4) Se limpia bien	3	7.5
5) Por necesidad	15	37.5
	40	100.0%

Variable # 46:

Frecuencia de enfermedades causadas por el agua mencionada por entrevistadas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 12

	Abs.	%
0) NR	20	
1) NSA	-	
2) Dolor de estómago	14	
3) Lombrices	7	
4) Tos	4	
5) Calenturas	3	
6) Diarrea	2	
7) Toda clase de enfermedades	2	
8) Dolor de cabeza	2	
9) Microbios	1	
10) Enfermedades de la piel	1	
	N=54	

Variable # 47:

Opinión sobre lo que consideran el peor enemigo de la salud

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 14

	Abs.	%
0) NR	7	17.5
1) NSA	-	-
2) Moscas y mosquitos	16	40
3) Lombriz	6	15
4) Suciedad	6	15
5) Microbios	2	5
6) Enfermedades	1	2.5
7) Nada	1	2.5
8) Todo animal/suciedad/ enfermedad	1	2.5
	40	100.0%

Variable # 48

Opinión sobre el animal más ofensivo a la salud

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 15

	Abs.	%
0) NR	1	2.5
1) NSA	1	2.5
2) La mosca	32	80
3) Sancudo	1	2.5
4) Piojo, mosca	3	7.5
5) Piojos y pulgas	1	2.5
6) Piojo, sancudo, mosca	1	2.5
	40	100.0%

Razones:	Abs.	%
0) NR	12	30
1) Contacto con alimentos, enferman	11	27.5
2) Son sucias	6	15
3) Tienen contacto con excretas	1	2.5
4) Producen enfermedad	4	10
5) Producen microbios	3	7.5
6) Pican mucho	2	5
7) Agua sucia que bebemos	1	2.5
	40	100.0%

Variable # 49

Opinión sobre el insecto más insalubre de los siguientes:

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 16

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Hormiga	-	-
3) Mosca	30	75
4) Sancudo	10	25
	40	100.0%

Variable # 50

Frecuencia con que se bañan en casa, a la semana

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 13a

	Abs.	%
0) NR	-	-
1) NSA	36	90
2) 2 veces por semana	3	7.5
3) 4 veces por semana	1	2.5
	40	100.0%

Variable # 51

Frecuencia con que se bañan en el lago a la semana

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 13a

	Abs.	%
0) NR	-	-
1) NSA	2	5
2) 1 vez por semana	8	20
3) 2 veces por semana	19	47.5
4) 3 veces por semana	10	25
5) 4 veces por semana	1	2.5
	40	100.0%

Variable # 52

Cantidad de agua utilizada para bañar a los niños

Clave W.B.: - # de preg. W.B.: # de preg. CEMAT:13c

	Abs.	%
0) NR	-	-
1) NSA	36	90
2) De 1/2 a 1 tinaja (6 a 12 litros)	2	5
3) 2 a 3 tinajas (24 a 36 litros)	2	5
	40	100.0%

Variable # 53

Problemas para conseguir agua en alguna de las fuentes que usa

Clave W.B.: 0-5 # de preg. W.B.: 3 # de preg. CEMAT: 17

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) Mucha gente, aglomeración pleitos, pierden tiempo	15	37.5
3) Se mojan los otros	1	2.5
4) Escasea el agua	1	2.5
5) Ninguno	22	55
	40	100.0%

Variable # 54

Opinión y concepto sobre si la ubicación de su casa es saludable

Clave W.B.: 0-1 # de preg. W.B.: 4 # de preg. CEMAT: 18

	Abs.	%
0) NR	6	15
1) NSA	-	-
Si, porque:		
El sol alumbra aquí	1	2.5
Los vecinos son buenos, hacen sus necesidades en sus propias casas	3	7.5
Buenas relaciones con vecinos	1	2.5
Viven solos	10	25
No hay suciedad aquí	1	2.5
Tenemos letrina y agua privada	1	2.5
Nadie nos molesta	5	12.5
Todo está cerrado, sólo vive la familia	2	5
Viven en campo, hay aire libre	1	2.5
Viven solos en sitio grande	1	2.5
No, porque:		
Tiran agua sucia y vienen moscas	1	2.5
Problemas de tipo familiar	2	5
La gente viene a ensuciarse	1	2.5
Nos falta letrinas, no tenemos sitio	1	2.5

Cont. del variable # 54:	Abs.	%
Cocinan y duermen en el mismo cuarto	1	2.5
No explica	1	2.5
Estamos apretados, nos molestan los vecinos	1	2.5
	40	100.0%

Variable # 55:

Opinión sobre si el agua que beben es saludable

Clave W.B.: 0-4 # de preg. W.B.: 5 # de preg. CEMAT: 19

	Abs.	%
0) NR	3	7.5
1) NSA	-	-
Si, porque:		
Agua se ve ó es limpia	17	42.5
Hervimos agua para beber	7	17.5
Hemos bebido eso y no pasa nada	1	2.5
Todos tomamos la misma agua	6	15
No, porque:		
El agua es sucio	1	2.5
No hervimos agua y enfermamos	1	2.5
Tiene microbios	4	10
	40	100.0%

Variable # 56:

Opinión sobre si la energía y el tiempo empleado para conseguir agua es:

Clave W.B.: 0-6 # de preg. W.B.: 6 # de preg. CEMAT: 20

	Abs.	%
0) NR	1	2.5
1) NSA	1	2.5
2) Demasiado	4	10
3) Normal	2	5
4) Poco	32	80
	40	100.0%
En que usaría tiempo liberarlo:		
Quèhacer doméstico	1	2.5
Otros trabajos	2	5

Variable # 57:

Opinión sobre el costo del agua.

Clave W.B.: 0-6 # de preg. W.B.: 6a # de preg. CEMAT: 20a

	Abs.	%
0) NR	-	-
1) NSA	25	62.5
2) Bajo	5	12.5
3) Normal	10	25
4) Alto	-	-
	40	100.0%

Variable # 58:

Disposición a gastar $ para obtener agua de más calidad.

Clave W.B.: 0-8 # de preg. W.B.: 7a # de preg. CEMAT: 21a

	Abs.	%
0) NR	6	15
1) NSA	-	-
Si:		
Sin dato	3	7.5
Poco	18	45
Mucho	5	12.5
No:		
Sin dato	2	5
El chorro da agua suficiente	1	2.5
El llenacántaro lo tiene cerca	1	2.5
Soy pobre y soy mujer y no puedo ayudar	1	2.5
No tengo sitio	1	2.5
No tengo, solo vivo	1	2.5
No tenemos $	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	6	15
1) NSA	-	-
2) Si	26	65
3) No	8	20
	40	100.0

Variable # 59:

Disposición a gastar $ para tener agua más cercana

Clave W.B.: 0-8 # de preg. W.B.: 7b # de preg. CEMAT: 21b

	Abs.	%
0) NR	9	22.5
1) NSA	1	2.5
Si:		
Sin dato	-	-
Poco	15	37.5
Mucho	6	15
No:		
El llenacántaros es suficiente	1	2.5
Tengo agua cerca	4	10
No tengo dinero	1	2.5
No podemos	1	2.5

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	9	22.5
1) NSA	1	2.5
2) Si	21	52.5
3) No	9	22.5
	40	100.0%

Variable # 60:

Comunicación con vecinos en el trayecto para el acarreo de agua.

Clave W.B.: 0-7 # de preg. W.B.: 8a # de preg. CEMAT: 22a

	Abs.	%
0) NR	2	5
1) NSA	2	5
2) No	11	27.5
3) Algunas veces	12	30
4) Si	13	32.5
	40	100.0%

Variable # 61

Opinión sobre la comunicación o no-comunicación con personas al ir por agua

Clave W.B.: 0-7 # de preg. W.B.: 8b # de preg. CEMAT: 22b

	Abs.	%
0) NR	7	17.5
1) NSA	7	17.5
Es bueno, porque:		
En los problemas me consultan	1	2.5
Pueden saberse más cosas	2	2.5
Se conoce más; se dan mandados	3	7.5
Me hablan de sus necesidades	4	10

Cont. del variable # 61:

	Abs.	%
Nos saludamos	5	12.5
Algunos aconsejan	1	2.5
Nos contentamos para no tener enemigos	1	2.5
Enviar cosas con otra	1	2.5
Tenemos costumbre	1	2.5
Para sentirnos bien	2	5
A veces necesito hablar con otros	1	2.5
No es bueno, porque:		
Pienso en mi trabajo	1	2.5
Sólo es costumbre	1	2.5
No perder el tiempo	2	5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	7	17.5
1) NSA (No acarreo agua)	7	17.5
2) Es bueno	22	55
3) No es bueno	4	10
	40	100.0%

Variable # 62:

Cantidad de $ que paga por el agua al mes

Clave W.B.: 0-7 # de preg. W.B.: 9 # de preg. CEMAT: 23

	Abs.	%
0) NR	-	-
1) NSA	23	57.5
2) 0.30	17	42.5
	40	100.0%

Variable # 63:

Sugerencias para mejorar la calidad del agua:

Clave W.B.: 0-9 # de preg. W.B.: 10 # de preg. CEMAT: 24

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) No da sugerencias	22	55
3) Buscar otra fuente	13	32.5
4) Matar los microbios	1	2.5
5) Pedir ayuda para conseguir más agua	2	5
6) Buscar ayuda de otras personas	1	2.5
7) Un p de dinero	1	2.5

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) No da sugerencias	22	55
3) Buscar otra fuente	13	32.5
4) Pedir ayuda y otros	5	12.5
	40	100.0%

Variable # 64:

¿Por qué supone que estas ideas no se han realizado?

Clave W.B.: 0-9 # de preg. W.B.: 11 # de preg. CEMAT: 25

	Abs.	%
0) NR	16	40
1) NSA	-	-
2) El alcalde anterior no pudo colaborar	1	2.5
3) No había $ en la Municipalidad	1	2.5
4) Falta de conocimientos	4	10
5) No se ha advertido contaminación del agua	1	2.5
6) Poco inteligencia	1	2.5
7) Por nosotros mismos falta cooperación	7	17.5
8) La gente no sabía la necesidad de un pueblo	1	2.5
9) No todos comprendemos	1	2.5
10)La gente no se preocupa	3	7.5
11)Poco experiencia	1	2.5
12)No sabíamos del problema	3	7.5
	40	100.0%

Variable # 65:

Forma de deshechar aguas utilizadas

Clave W.B.: 0-10 # de preg. W.B.: 12 # de preg. CEMAT: 26

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Las tira en el terreno	22	55
3) Las tira en la calle	17	42.5
4) Canal de desague	1	2.5
	40	100.0%

Variable # 66:

Existencia de charcos de aguas utilizadas cerca de su casa

Clave W.B.: 0-11 # de preg. W.B.: 13 # de preg. CEMAT: 27

	Abs.	%
0) NR	-	-

Cont. del variable # 66:

	Abs.	%
1) NSA	-	-
2) Si	5	12.5
3) No	35	87.5
	40	100.0%

Variable # 67:

Forma en que la familia elimina los excrementos

Clave W.B.: 0-12 # de preg. W.B.: 14 # de preg. CEMAT: 28

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) En el campo	26	65
3) Letrina de pozo	14	35
	40	100.0%

Variable : 68:

Opinión: Debería haber un modo más limpio para eliminar la excreta y como.

Clave W.B.: 0-13 # de preg. W.B.: 15 # de preg. CEMAT: 29

	Abs.	%
0) NR	5	12.5
1) NSA	-	-
No	2	5
Si: Hacer más inodoros	1	2.5
Abrir desague bajo tierra	1	2.5
Hacer más letrinas	16	40
Tener un sitio especial	1	2.5
Hacer letrinas públicas	13	32.5
Limpiar nuestros terrenos	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	5	12.5
1) NSA	-	-
2) No	2	5
3) Si	33	82.5
	40	100.0%

Variable # 69:

Posesión de temascal*en la casa y área que ocupa

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 32

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) No	36	90
3) Si: 2 varas	1	2.5
4) 4 varas^2	1	2.5
5) 3 varas	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) No	36	90
3) Si	3	7.5
	40	100.0%

* Baño de vapor, hecho de adobe.

Variable : 70:

Posesión de espacio para construir letrina

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 33

	Abs.	%
NR	-	-
NSA	14	35
Si: Sin datos	1	2.5
En la casa	2	5
En terreno de cultivo	1	2.5
Cerca de la casa	1	2.5
No: Sin datos	-	-
Porque no tiene sitio	20	50
Porque el sitio está lleno de piedras	1	2.5
	40	100.0%

Variable : 71:

Espacio disponible para construir letrinas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 34

	Abs.	%
0) NR	-	-
1) NSA (tiene letrina)	32	80
2) 1 vara x 4	1	2.5
3) 2 varas	3	7.5
4) 10 metros	1	2.5

Cont. del Variable # 71:

	Abs.	%
5) 1/2 vara	1	2.5
6) 4 varas	1	2.5
7) 3 varas	1	2.5
	40	100.0%

Variable # 72:

Opinión sobre letrinas públicas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 34

	Abs.	%
0) NR	8	20
1) NSA	-	-
2) Serían limpias y saludables	4	10
3) Bien, así no irían a los cafetales	8	20
4) Sería bueno	5	12.5
5) Bueno para los que no tienen	7	17.5
6) Bueno, así no iríamos lejos	3	7.5
7) Bueno, porque es muy útil	1	2.5
8) Bueno, todos necesitan	3	7.5
9) Bueno, para bienestar del pueblo	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	8	20
1) NSA	-	-
2) Favorable	32	80
	40	100.0%

Variable # 74:

Razones por las que no hay letrinas públicas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 35

	Abs.	%
0) NR	9	22.5
1) NSA	-	-
2) Falta de espacio	5	12.5
3) Desinterés de Municipalidad	2	5
4) Falta de colaboración de la gente	12	30
5) Falta iniciativa para limpieza	1	2.5

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	9	22.5
1) NSA	-	-
2) Falta de espacio	5	12.5
3) Falta de colaboración de la gente	12	30
4) Otros	14	35
	40	100.0%

Cont. del Variable # 74:

	Abs.	%
6) Por ignorancia	3	7.5
7) Porque no somos iguales	1	2.5
8) La gente no ha pensado	2	5
9) Falta de experiencia	2	5
10)Falta de costumbre	1	2.5
11)No hay ayuda	1	2.5
12)No hay quien lo haga	1	2.5
	40	100.0%

Variable # 75:

Opinión sobre si se deberían construir letrinas públicas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 36

	Abs.	%
0) NR	2	5
1) NSA	-	-
2) No	-	-
3) Si	38	95
	40	100.0%

Variable # 76:

Posición adecuada para sentarse en una letrina

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 37

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) Parado de cuclillas	-	-
3) Sentado	39	97.5
	40	100.0%

Variable # 77:

Tipo de material que prefiere para el asiento de letrinas

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 38

	Abs.	%
0) NR	1	2.5
1) NSA	-	-
2) Cemento	13	32
3) Madera	26	65
	40	100.0%

Variable # 78:

Recibió brocales para letrinas y cuándo

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 39

	Abs.	%
0) NR	4	10
1) NSA	-	-
2) No recibió	36	90
	40	100.0%

Variable # 79:

Capacidad para instalar sólo una letrina, tipo de ayuda técnica

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 40

	Abs.	%
0) NR	10	25
1) NSA	-	-
2) No podría sólo	9	22.5
3) Si podría sólo, sin ayuda	5	12.5
4) Necesitaría: albañil y dinero	1	2.5
5) Necesitaría: albañil	8	20
6) Necesitaría albañil y pocero	7	17.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	10	25
1) NSA	-	-
2) No podría sólo	9	22.5
3) Si podría, sin ayuda	5	12.5
4) Necesitaría ayuda de albañil y otros	16	40
	40	100.0%

Variable # 80:

Costo estimado de una letrina

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 40

	Abs.	%
0) NR	31	77.5
1) NSA	1	2.5
2) 15 Q.	1	2.5
3) 20 Q.	2	5
4) 25 Q.	1	2.5
5) 50 Q.	3	7.5
6) 100 Q.	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR/no sabe	31	77.5
1) NSA	1	2.5
2) 15 a 25 Q.	4	10
3) 50 a 100 Q.	4	10
	40	100.0%

Variable # 81:

Disposición a colaborar con trabajo para construir letrina pública

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 41

	Abs.	%
0) NR	7	17.5
1) NSA	-	-
2) No	3	7.5
3) Si: sin datos	8	20
4) Un día	2	5
5) Dos días	6	15
6) Tres días	6	15
7) Un día por semana	1	2.5
8) Una semana	6	15
9) Cinco días	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	7	17.5
1) NSA	-	-
2) No	3	7.5
3) Si, sin especificar en cuánto	8	20
4) Si, desde 1 día hasta 1 semana	22	55
	40	100.0%

Variable # 82:

Disposición a colaborar con $ para construir letrina pública

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 41

	Abs.	%
0) NR	16	40
1) NSA	-	-
2) No	3	7.5
3) Si: sin datos	10	25
4) Si: 0.50 Q.	1	2.5

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	16	40
1) NSA	-	-
2) No	3	7.5
3) Si, sin e	10	25

Cont. del Variable # 82:

	Abs.	%
5) Si: 2.00 Q.	1	2.5
6) Si: 5.00 Q.	5	12.5
7) Si: 10.00 Q.	1	2.5
8) Si: 15.00 Q.	1	2.5
9) Si: 25.00 Q.	1	2.5
10)Si: 50.00 Q.	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
4) Si, de 0.50 a 5 Q.	7	17.5
5) Si, de 10 a 50 Q.	4	10
	40	100.0%

Variable # 83:

Disposición a trabajar colectivamente para construir letrina pública

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 41

	Abs.	%
0) NR	10	25
1) NSA	-	-
2) No	4	10
3) Si	26	65
	40	100.0%

Variable # 84:

Opinión sobre letrina productora de abono

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 42a

	Abs.	%
0) NR	21	52.5
1) NSA	-	-
2) Buena para bien del pueblo	2	5
3) Buena, así no compraríamos abonos	5	12.5
4) Sería bueno hacerlas	2	5
5) Sería bueno, traen beneficios	3	7.5
6) Sería bueno, para mejorar siembras	1	2.5
7) Me gusta	5	12.5
8) Que si somos capaces	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	21	52.5
1) NSA	-	-
2) Opinión favorable	19	47.5
	40	100.0%

Variable # 85:

Información que ha escuchado sobre letrinas aboneras

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 42b

	Abs.	%
0) NR	5	12.5
1) NSA	-	-
2) No ha oído nada	28	70
3) Que produce abono y gas	4	10
4) Un poco	3	7.5
	40	100.0%

Variable # 86:

Interés por conocer más sobre letrinas aboneras

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 42c

	Abs.	%
0) NR	5	12.5
1) NSA	-	-
2) No tiene interés	-	-
3) Si le interesa	35	87.5
	40	100.0%

Variable # 87:

Práctica de trabajo colectivo en algunas tareas

Clave W.B.: 0-14 # de preg. W.B.: 16 # de preg. CEMAT: 43

	Abs.	%
0) NR	6	15
1) NSA	2	5
2) (Viejos) en ninguna	2	5
3) Construcción de viviendas	14	35
4) Construcción de caminos	22	55
5) Trabajos agrícolas	3	7.5
6) Venta de cultivos	-	-
	N=49	

Variable # 88:

Actitud para trabajar en conjunto para mejorar suministro de agua o eliminación de excrementos

Clave W.B.: O-15 # de preg. W.B.: 17 # de preg. CEMAT: 44

	Abs.	%
0) NR	3	7.5
1) NSA	2	5
2) (viejos) No	5	12.5
3) Si ó tal vez, sin especificar	1	2.5
4) Si con todos	17	42.5
5) Si con personas de experiencia ó inteligencia	6	15
6) Si con los que quieran	5	12.5
7) Si con albañiles	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	3	7.5
1) NSA	2	5
2) No	5	12.5
3) Si	30	75
	40	100.0%

Condiciones en que trabajaría:

	Abs.	%
0) NR	1	2.5
1) NSA	9	22.5
2) Por dinero	7	17.5
3) Por intercambio	2	5
4) Voluntario	21	52.5
	40	100.0%

Variable # 89:

Edad de la entrevistada

Clave W.B.: O-16 # de preg. W.B.: 18 # de preg. CEMAT:

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 15 a 24	5	12.5
3) 25 a 34	13	32.5
4) 35 a 44	13	32.5
5) 45 o más	9	22.5
	40	100.0%

Variable # 89:

Escolaridad de la entrevistada

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 05, 06

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Analfabeta = 0	27	67.5
3) Alfabeta autodidacta = 1	3	7.5
4) 1 a 3 grados	4	10
5) 4 a 6 grados	6	15
	40	100.0%

Variable # 90:

Ocupación jefe de familia (más de una respuesta por entrevistado)

Clave W.B.: 0-17 # de preg. W.B.: 19 # de preg. CEMAT:

	Abs.	%
0) NR	2	5
1) NSA	-	-
2) Desempleado	1	2.5
3) Ama de casa	9	22.5
4) Jornalero	6	15
5) Costurera	2	5
6) Tejedora	4	10
7) Sastre	1	2.5
8) Carpintería	1	2.5
9) Panadería	1	2.5
10) Agricultor	21	52.5
11) Catedrático	1	2.5
12) Funcionario	1	2.5
13) Negociante/Contratista/Comerciante	10	25
	N=60	

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	2	5
1) NSA	-	-
2) Desempleado/ama de casa	10	25
3) Jornalero	6	15
4) Artesano	9	22.5
5) Agricultor	21	52.5
6) Empleado	2	5
7) Negociante/contratista	10	25
	60	

Variable # 91:
Número de personas mayores de 15 años que viven en casa, incluyendo a la encuestada
Clave W.B.: 0-18 # de preg. W.B.: 20 # de preg. CEMAT: 01

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 1 a 3	29	72.5
3) 4 a 6	11	27.5
	40	100.0%

Variable # 92:
Religión
Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: -

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Evangélica	12	30
3) Católica	28	70
	40	100.0%

Variable # 93:
Número de hijos-as de 15 años o menos en la familia
Clave W.B.: 0-19 # de preg. W.B.: 21 # de preg. CEMAT: 01

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Ninguno	4	10
3) 1 a 3	30	75
4) 4 a 6	6	15
	40	100.0%

Variable # 94:
Tamaño de la familia que vive en casa
Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 01

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 1	1	2.5

Cont. del Variable # 94:

	Abs.	%
3) 2	2	5
4) 3	5	12.5
5) 4	9	22.5
6) 5	4	10
7) 6	10	25
8) 7	6	15
9) 8	3	7.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) 1 - 2	3	7.5
3) 3 - 4	14	35
4) 5 - 6	14	35
5) 7 - 8	9	22.5
	40	100.0

Variable # 95:

Promedio de escolaridad de los mayores de 12 años

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: 05 y 06

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Cero	9	22.5
3) 0.1 - 0.5	6	15
4) 0.6 - 0.9	1	2.5
5) 1.0 - 1.5	8	20
6) 1.6 - 2.0	3	7.5
7) 2.1 - 2.4	1	2.5
8) 2.5 - 3.0	7	17.5
9) 4.00 - 5.00	2	5
10)5.00 - 7.00	2	5
11)8.00 - 9.00	1	2.5
	40	100.0%

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	-	-
1) NSA	-	-
2) Cero	9	22.5
3) 0.1 a 0.9	7	17.5
4) 1.0 a 2.0	11	27.5
5) 2.1 a 3.0	8	20
6) 4.0 a 9.0	5	12.5
	40	100.0

Variable # 96:

Status Socioeconómico (Indice compuesto en base a la vivienda: # de habitaciones no productivas + material de paredes + material del piso. Cfr. Código de Respuestas.

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: -

	Abs.	%
0) NR	14	35
1) NSA	-	-
2) 3 - 5	2	5
3) 6 - 8	13	32.5

Cont. del Variable # 96:

	Abs.	%
4) 9 - 11	9	22.5
5) 12 - 14	2	5
	40	100.0%

Variable # 97:

Disposición de Basura (más de una respuesta por entrevistado)

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: -

	Abs.	%
0) NR	14	35
1) NSA	-	-
2) Se quema papeles	3	7.5
3) Tiran en los cafetales	25	62.5
4) Un montón en el lote	2	5
	N=44	110.0%

Variable # 98:

Tipo de combustible

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT:

	Abs.	%
0) NR	14	35
1) NSA	-	-
2) 1 leña	26	65
3) 2 gas	-	-
4) 3 kerosene	-	-
5) 4 carbón	-	-
	40	100.0%

Variable # 99:

Drenaje

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT:

	Abs.	%
0) NR	14	35
1) NSA	-	-
2) Flor de tierra	25	62.5
3) Pozo ciego	1	2.5
4) Alcantamiento	-	-
	40	100.0%

Variable # 100:

Necesidades sentidas (más de 1 respuesta por entrevistado)

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT:

	Abs.	%
NR	10	25
Material de construcción/casa	8	20
Abono	10	25
Pajalote	4	10
Letrina	11	27.5
Azúcar/chile/sal/café	3	7.5
Azadon, hacha	3	7.5
Luz Eléctrica	2	5
Dinero	11	27.5
Agrónomo	1	2.5
Pila	1	2.5
Hilo para tejer	1	2.5
Tierra	1	2.5
Llenacántaro	1	2.5
Poyo	1	2.5
Maiz	1	2.5

N=69

Variable # 101:

Necesidad más urgente

Clave W.B.: - # de preg. W.B.: - # de preg. CEMAT: -

	Abs.	%
Materiales de construcción	3	7.5
Letrina	6	15
Abono	6	15
Dinero	9	22.5
Tierra	1	2.5
Luz	1	2.5
Una paja de agua	2	5
Maiz	1	2.5
NR	11	25
	40	100.0%

Variable # 102

Necesidades del pueblo (más de 1 respuesta por entrevistado)

Clave W.B.: -

	# de preg. W.B.: - Abs.	%
NR	9	22.5
Doctor permanente	2	5
Edificio escolar	5	12.5
Carretera	11	27.5
Industria	2	5
Mercado	22	55
Hospital	16	40
Letrina	3	7.5
Ferretería	1	2.5
Drenaje	2	5
Arreglo calles	4	10
Abono	1	2.5
Material labranza	1	2.5
Cancha	2	5
Rep. Iglesia	1	2.5
Agua pública	1	2.5
	N=83	

de preg. CEMAT: -

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	9	22.5
1) Beneficio comunal/ comunicaciones (carretera, calles, canchas, reparar iglesias)	18	45
2) Económicas/comerciales (industria, mercado, abono, instrumentos agrícolas)	27	67.5
3) Educativas (edificio escolar)	5	12.5
4) Sanitarios (doctor, hospital, letrina, drenaje, agua)	24	60
	83	

Variable # 103:

Necesidad más urgente

Clave W.B.: -

	# de preg. W.B.: - Abs.	%
NR	10	25
Doctor permanente	1	2.5
Hospital	9	22.5
Carretera	4	10
Mercado	11	27.5
Reparación de calle	3	7.5
Agua pública	1	2.5
Letrina	1	2.5
	40	100.0%

de preg. CEMAT: -

CATEGORIAS AGREGADAS

	Abs.	%
0) NR	10	25
1) Obras infraestructura (carretera, calles, mercado, agua)	19	47.5
2) Necesidades de salud (doctor, hospital, letrina)	11	27.5
	40	100.0

CEMAT/World Bank: Appropriate Technology for Water Supply and Waste Disposal Systems, Guatemala, 1978.

Annex

Interviews with knowledgeable persons

Interview No. 1

Interview with a health professional participating in a development project:

- Characteristics of San Pedro residents: "They are clever, they are not deceived by others, they give less than they ask, they are congenial, ingenious, and different from all the other people in the lake area."

- Latrines: "The survey is good because it promises nothing to the people." "Population density is very high, 2 km^2 for almost 6,000 inhabitants. Since there is no space in the house for the latrine, the people prefer to build bedrooms for their children; those who have latrines built them some time ago when they had land."

'The new community latrine will not gain acceptance among individuals because there is no space, because they must see it first, and furthermore because it would be expensive."

"Perhaps the rich people can build their own fertilizer-producing latrines."

Interview No. 2

With a midwife:

Latrines

In 1935-44 the Ubico government required everyone to build latrines, but only to comply with the law. However, the majority did not use either pits (mudholes) or latrines, which were compulsory.

A Peace Corps group came later offering cement slabs for latrines; they collected Q 0.50 from me and never gave me anything.

Those who were given slabs did use their latrines. (*)

Water

It is forbidden to wash clothing with the home faucet because there is no drainage, and there is no space to build bathrooms. Almost everyone in the town bathes in the lake.

(*) This program for the sale of cement slabs was carried out by PUMAC -- Alliance for Progressive/Peace Corps.

Interview No. 3

A promoter, former member of SFEI (Local Community Development Services) responsible for the introduction of several programs including one for latrine building. Now self-employed.

Latrines: At the initiative of SFEI, a revolving fund was established in the town to build a carpentry shop to teach young people. For the latrine-building program, the material from the carpentry shop was used and fertilizer sacks discarded by SFEI were used to build the outhouses. I was the initiator and was responsible. My chief only approved. I was never given credit or recognition in the office of SFEI.

At the beginning the people distrusted the UN sponsors. The people of San Pedro trusted me and accepted the latrines (the informant is an Indian from another town of the highlands and is married to a San Pedro woman). The people are afraid of the "gringos" because they enrich themselves from them and send the money abroad. (*)

The steps that were taken to introduce the latrines were:

1. The informant put a latrine into service.
2. Another SFEI coordinator did the same.
3. At the SFEI office there were miniature samples for the people to see.

(*) cf. Mito de la Antropofagia in Benjamin PAUL (1950).

4. Twenty or thirty latrines were built. (*)

The cost for the people was Q 7 which got them a wooden latrine and outhouse; some had to dig their own pits.

Previously the people did not feel the need for latrines or hygiene. They felt that the expenditure would not benefit them. Now, however, since I came to San Pedro over a year ago, their houses and hygiene have improved greatly.

In addition to the above-mentioned steps to introduce latrines, the following was done:

1. It was decided to begin with the leaders (**), holding a meeting with ten of them to give practical demonstration of how the latrine functions, using leaflets. One of the leaders helped introduce the latrine, building one in his house for demonstration purposes.

2. A public meeting was held to explain the latrine program and to invite the community. The mayor cooperated, inviting the people and providing a band; the clergy also attended.

3. The people asked the assistant directly for their latrines, and they were going to be installed. We could not take further action with the latrine program because I had moved to another project and spent a lot of time in a literacy program for children and adults, as well as other crafts programs. I lacked resources and personnel.

(*) He had records of the latrines built but these were destroyed in the earthquake.

(**) At that time the leaders were the unquestioned local authority, and comprised the elders.

Explanation for the failure of the latrine building program:

Institutional factors and problems within SFEI. The informant explained that the agency began its operations about 1954, and until 1958 was under the direction of UN experts, who were replaced by local personnel. Since 1962 SFEI has virtually been part of the government. When the original chairman died everything began to go downhill.

There was a sharp change in policy, and in objectives as well. The new directors were not interested in the real progress of the Indian, but rather in giving him crumbs to keep him quiet. The employees who remained from the original SFEI, as it began to decline, were absorbed by a new government agency, Community Development. There was a great deal of bureaucracy -- only paperwork, job changes, and directives and no real work. I resigned twice in 1968 until they finally accepted my resignation, since I did not wish to be absorbed by the government. At present I have a small crafts shop with a few of the people that I trained under the SFEI program, but now as a private operation.

Interview No. 4

Another SFEI promoter, son of the first representative of that agency in the region (now deceased):

My father began with only a pump to fumigate a pest (ants) and nearby towns. He did this without charge, going from house to house offering service to those who wanted it. He also fumigated the coffee with good results.

The problem was that people accused my father of being a communist because he introduced chemical fertilizer and because he provided his services free. They said all of this out of ignorance. SFEI asked my father to bring together a group of youths to set up the carpentry shop, and a teacher came from one of the centers to train ten boys. Later they asked him to bring together ten, or at least four girls to set up a rug-making shop. It was difficult because the women did not want this; they were brought together one by one until there were ten;

I believe that all of this was in 1958, but I am not certain.

For the rugs they use wool from Uruguay and from the Andes, but we did not want this; we preferred wool from our own country.

My father fought hard; before, the people knew nothing, they were ignorant and he did good for them. He also introduced coffee planting and trained people with good results. By that time my father had the confidence of the people but only after five years of work. He also went to Atitlán but the people there did not use coffee.

Latrines: The chief of SFEI later said that the important thing now was latrines. First we built a demonstration model with a small latrine.

The latrine measured approximatley 1 m^2. The molds were for cement slags, the outhouse was of pine wood and the pit was about 5 m deep.

Dissemination of latrines: Since the people already know that SFEI provided everything free, they came with us to request their latrines. They saw the model and it was requested that 15 latrines be built for testing. If they caught on they would be placed on sale. Finally, about Q 8 or Q 9 was charged for the material and the person dug his pit with advisory services from SFEI.

Failure: About 50 or 60 latrines were built. The UNESCO officials who worked with this SFEI program departed, leaving us alone. But when they went SFEI slipped badly.

We left the latrines; the boys in the workshop became bored, and the responsible official returned to his town (referring to the informant of interview No. 3). When SFEI lost its authority it was merged with the Community Development.

The people of the town did use their latrines. They asked us for more but we no longer had the materials. They are willing to use latrines once they are in their homes. Some have built adobe latrines at their own expense.

If prices are favorable the people buy them, but today everything is very expensive, especially wood. Today a latrine would cost about Q 200 -- Q 150 for wood plus labor. The majority of the people of the town do not have latrines at present.

When the rug-making shop was started the latrine-building program was neglected, since there were up to 30 girls making rugs.

My father supervised the work and prepared the reports.

When SFEI disappeared another person from the town made an effort to buy his own building and help the people continue to progress by continuing the rug-making shop on a private basis. At present enough is produced for the domestic and international market, and 60 workers are employed.

Interview No. 5:

A former mayor of the town, during whose term a water supply program was begun with a new source (approximately 1968-70).

Latrines: During the time of President Ubico (1930-44) a law was enacted obliging everyone to build latrines. Wooden planks were distributed. There were inspectors who observed whether the people used them -- they measured with a stick to see if it came out dirty -- and if not they were fined.

Later (I am not certain but it might have been in 1974) the Ministry of Health brought slabs for latrines from Panajachel, of cement and cast iron. The courthouse square was full of slabs. They were sold to the people for about Q 2.50 (?), but not all were sold because it cost about Q 1,500 to dig the pit; furthermore, there is no space in the houses.

Water: A group from the town (at its own initiative) sought a new facility, and to do so they began to seek sources of water in different places, until they found one in a rocky area. They began to cooperate voluntarily, each laying some pipe, until 2 km of pipe were completed.

The informant went to see the President to ask for help and for the government to pay for the pipe. This was refused because they were not with him. When the presidential election came, during the electoral campaign, it was suggested that they vote with him so that the official candidate would win. The mayor (interviewed) and the municipal government proposed a deal: the people would vote for the official candidate and the Government of the Republic would install the pipe that they lacked to bring the water to the town. This was done and the pipe

and cement soon arrived. A foreign institution provided a fund which was under the control of the next mayor. The people who wanted private faucets in their houses had to buy all the material (pipe, taps, etc.) and do the work, besides paying Q 0.30 per month. There was no refusal by the people to use potable water instead of the lake, especially because they regard the lake as dirty, since people wash their clothes there and also because the "gringos" have dirtied it by swimming nude.

But now the two sources of water for the town are insufficient and other possibilities are being sought (e.g., pumping of water from the lake), since another nearby town refused permission for the people of San Pedro to use the source of water they should have.

The informant proposed that pumps be installed to draw water from the lake, but not directly. Rather, it should be inside the town so that the water will be well filtered and clean.

Interview No. 6

An active promoter of the local committee and instructor of the Catholic Action program.

Latrines: The Ministry of Public Health offered a latrine-building program headed by a woman (around 1960 ?). They brought cement, lime and iron. The town had to supply crushed stone.

By government order an attempt was made to publicize the latrine program as follows: town criers went through the streets inviting those who wanted slabs. The slabs were given to them and each one contributed his labor to build the latrine. But there was not prior study nor was information given to the people on the reason for the latrines or their use. Most people kept the slabs in their houses and did not use the latrines. Also, the program did not benefit everyone, since there were not sufficient slabs.

In another program that provided latrines, the SFEI program, there was also no instruction to the people. This cost each one Q 5. The majority of the planks were kept and rotted.

Other SFEI programs (to kill ants which attack plants) provided implements for fumigation, but the people were not trained nor was there much participation. They also established a carpentry shop to train young people, and a rug-making shop. The use of chemical fertilizer was introduced, but there was no agronomist; they brought only the fertilizer.

The failure by SFEI was due in part to the change of name; there were many personnel changes and the program was suspended.

Interview No. 7

An American studying the local Indian dialect and resident in the community for over ten years.

Potable water

About 1952 the mayor learned that the President of the Republic was to visit a nearby town (Santiago), and went there to see the President and mention to him that there was a source of water in another nearby town (San Juan). Apparently, after this incident an agreement was reached with the people of San Juan; the President provided materials and the people contributed their labor. At present there is a sharp struggle between the two towns concerning the distribution of the water and other matters that are perhaps less immediate. The reason is that water is scarce in winter.

Second source of potable water

A Committee for Potable Water was formed in the town about 1970. I decided to request funds from a foreign agency. Meanwhile, a conflict arose between the committee and the mayor because of disagreements on the manner of proceeding, especially on technical matters, to the point where there was one engineer for the committee and another for the office of the mayor. With all this disagreement and confrontation I became discouraged and nearly cancelled the request for financing, since the money did not arrive and I did not wish to involve the agency in political affiars. The mayor proposed completion of the work on the new source before the national elections and did so.

It seems that much was done through the cooperation that the people provided for construction of the pipeline. At that time I returned from the capital with the money which had just arrived from abroad. I did not wish to turn over the money to the Chairman of the Committee for Potable Water, since he was a candidate for the office of the mayor; the incumbent mayor also had his own candidate. The Chairman of the Committee won the elections and appointed a new chairman to replace him when he became mayor, so that there was no longer conflict between the two officers.

I then turned over the money but kept a close watch so that it would be used for work such as the reserve tank, a platform or retaining wall so that the water would not be lost, and enlargement of the pipe since it was very small. We required receipts and invoices for each portion of the money that we paid out. It was an unpleasant experience to want to help with money and not be able to do so. It is necessary to turn over money without having control over its management; I was distrustful from the beginning and this bothered them. This is based on specific experiences which have taught us that money given or lent with only a verbal agreement is not repaid by the people and damages personnel relationships.

Interview No. 8

A former mayor, former chairman of the Committee for Potable Water, promoter of rural health and grandson of one of the most respected folk healers in the community.

Steam bath:

The people have lost confidence in the steam bath because they do not use it very much and not because of a lack of space to build one. In the past it was used mainly by women -- about 70%. The people are afraid to use the steam bath because they do not know how; when they make it too hot they scald themselves. But they are aware of the medical benefits.

Latrines:

Today there are fewer latrines because we have listened to the promises of the government and we have been kept waiting. At present there is no place to build latrines, but some people have built blind shafts at their own expense. Previously they did not build latrines because the ground was very rocky, it is very costly to dig and the pit fills very rapidly. The cost of a blind shaft is over Q 60.

Drainage:

The Ministry of Public Works has promised drainage and has not provided it. The people do not know that a lake can be contaminated by blind shafts in contact with underground water. The problem of building a drainage system is that land is needed for the oxidization ponds. When I was mayor I had the plans prepared for a pond, but the

people would have to give up a little of their land. Since the town is on two slopes, two ponds are needed. The people want drainage but they do not want to give up their land.

The project we planned consisted of an electric pump to draw waste water and carry it to the oxidization pond. The approximate cost of this project was Q 80,000. (It is known that the project was not carried out).

Present latrines:

We have been kept back because we have listened to the promises of agencies, who apparently come ready for action but do nothing. For example, one agency promised a latrine program with a budget of Q 10,000; however, it seems that everything has now been spent and only one latrine costing Q 1,000 was built. The committee that promoted these latrines became politicized and the excellent program of the agency came to nothing. The people are very angry with the mayor's office and the government since they took Q 1,500 that Public Works provided for the health center. (*)

(*) The informant belongs to a political party opposing the one which now holds the mayor's office, and has opposed the present latrine-building program because he regards it as an instrument of his opponents.

Interview No. 9

An American anthropologist who has been studying various aspects of the community since 1941.

Conflicts:

The people of San Pedro are experts in conflicts and divisions of the religious and political type, among clans, etc. The present Development Committee wishes to unite the people in a single committee but there are a thousand underlying divisions even though nothing seems to happen.

Dissemination of innovations

A former "leader" who was a true innovator introduced the first Protestant church and the first coffee plant at the same time. At the beginning the people were distrustful because coffee is a crop that takes a long time to yield anything; however, when they began to see the first bags of coffee the people became interested, until everyone was involved. The same thing happened with the introduction of native onions. Anything that provides money is introduced more easily.

C E M A T/ WORLD BANK: T.A. PARA SISTEMAS DE ABASTECIMIENTO DE AGUAS Y ELIMINACION DE DESECHOS, GUATEMALA, 1978

ANEXO # 3

FICHAS DE ENTREVISTAS A CONOCEDORES

Entrevista #1

Entrevista a un profesional de la salud que participa en un proyecto de desarrollo:

-Caracteristicas de los Pedranos:"Son listos,no se dejan de otros ,dan menos de lo que piden,geniales,mañosos y diferentes a todo el resto del Lago"

-Letrinas:"La encuesta es buena porque no promete nada a la gente".

"La densidad de poblacion es altísima, para casi 6 mil habitantes.Por tanto no cabe en la casa la letrina ,la gente prefiere construir cuartos para sus hijos ,los que tiene letrinas la cosntruyeron hace tiempo cuando habian terrenos ".

"La nueva letrina comunal no se difundirá individualmente,porque no hay espacio, porque primero tienen que verla y ademas le saldría cara ".

"Tal vez los mas ricos puedan hacer su letrina abonera ".

Entrevista # 2

A una comadrona:

Letrinas

En 1935-44, el gobierno de Ubico obligó a qué todos hicieran sus letrinas pero sólo para cumplir con la ley. Pero la mayoría no usó ni poyos (estufas de barro) ni letrinas, que eran obligatorios.

Más adelante vino un cuerpo de Paz ofreciendo planchas de cemento para letrinas, a mi me cobraron 0.50 Q y nunca me dieron.

A los que se les entregó su plancha sí usaron su letrina.(*)

Agua

Es prohibido lavar ropa en el chorro particular de la casa porque no hay desague y además no hay espacio para hacer cuartitos de baño. Casi todo el pueblo se baña en el lago.

(*) Este programa de venta de planchas de cemento era de PUMAC - Alianza para el Progreso/ Cuerpo de Paz.

Entrevista # 3

A un promotor, ex-miembro del SFEI (Servicios de Fomento de la economía indígena) que tuvo a su cargo la introducción de varios programas, entre ellos uno de letrinización. Actualmente trabaja por cuenta propia.

Letrinas

Por iniciativa del SFEI se creó en el pueblo un fondo rotativo para hacer un taller de carpinteria que enseñara a los jovenes.Para el programa de letrinas se usaba el material de la carpinteria y los costales que el SFEI desechaba del

(Cont. entrevista # 3)

fertilizante se usaron para hacer las casetas .

Yo fuí el iniciador ,bajo mi responsabilidad,mi jefe solamente aprobó .

Nunca me dieron crédito ni merito en la oficina del SFEI.

Al principio la gente desconfiaba de los patrocinadores de la ONU .Los Pedranos me tenian confianza y aceptaron las letrinas(El informante es indigena originario de otro pueblo del altiplano y casado con una pedrana) porque la gente tiene miedo a los"gringos" porque engordan a la gente y la envian al extranjero(*)

Los pasos que se dieron para introducir las letrinas fueron los siguientes:

1.-El informante puso una letrina a su servicio

2.-Otro coordinador del SFEI hizo lo mismo

3.-En el local del SFEI se tenian muestras en miniatura para que la gente los viera .

4.-Se hicieron como 20 o 30 letrinas (**).

El costo para la gente era de 7 Q.con lo que se le daba la letrina de madera y la caseta ,ellos debian cavar su hoyo.

Antes la gente no sentia necesidad de letrinas ni de higiene,creian que el gasto no les beneficiaría.En cambio ahora que diferencia ,desde que llegué a San Pedro,hace mas de un año,han mejorado mucho sus casas y la higiene .

(*) cfr . mito de la antropofagia en Benjamin PAUL(1950)

(**)El tenia records de las letrinas construidas pero estos se destruyeron con el terremoto.

Ademas de los anteriores pasos para introducir las letrinas se hizo lo siguiente:

1.- Se decidió empezar por los principales(***)del pueblo,haciendo una reunion con 10 de ellos para mostrarles practicamente el funcionamiento de la letrina y usando folletos .Uno de los lideres ayudo a introducir la letrina,construyendo una en su casa ,para demostracion.

2.-Se hizo una reunion publica en el convento para explicar el programa de letrinas e invitar a la comunidad.El alcalde colaboró invitando al pueblo con la banda de musica,para que asistieran incluso los evangelicos .

3.-La gente solicitaba directamente su letrina al auxiliar y se le iba a instalar.

No pudimos impulsar mas la letrinizacion porque yo cambié de proyecto y empleaba mucho tiempo en alfabetizacion de niños y adultos ,ademas de otros programas artesanales.Me faltaban recursos y equipo humano.

(***)En aquella época los principales constituian la autoridad indigena indiscutida y se componía de los ancianos.

(cont. entrevista # 3)

Explicación del fracaso del programa de letrinización:
Factores institucionales y problemática dentro del SFEI.- El informante explicó que la institución empezó a funcionar alrededor de 1954 y hasta 1958 se mantuvo bajo la dirección de los expertos de la ONU, quienes fueron sustuidos por personal nacional. A partir de 1962 el SFEI queda prácticamente integrado al gobierno. Cuando murió el presidente Ejecutivo original todo empezó a venirse abajo.
Hubo un cambio de política fuerte y también en los objetivos. A los nuevos directores no les convenía que el índigena despertara, sino darle migajas para contentarlo.
Los empleados que restaban del SFEI original, según empezó a decaer, fueron absorbidos por una nueva institución del gobierno: Desarrollo de la comunidad.
Se veía mucha burocracia, sólo papeles, cambios de puestos y directivos y nada de trabajo real.
Yo renuncié en dos ocasiones en 1968 hasta que me aceptaron la renuncia pues no quise ser absorbido por el gobierno. Actualmente tengo un pequeño taller artesanal con algunas de las personas que capacitamos dentro del programa del SFEI, pero ahora en plan particular.

Entrevista # 4

A otro promotor del SFEI, hijo del primer representante de dicha institución en toda la zona (ya fallecido):
Mi padre empezó sólo con una bomba para fumigar una plaga (zompopos) en los pueblos vecinos y lo hacía gratis yendo de casa en casa ofreciendo el servicio a los que quisieran. También fumigaban el café con buenos resultados.
El problema fue que la gente tachaba a mi padre de comunista porque introdujo el abono químico y porque daba gratis los servicios, todo esto lo decían por ignorancia.
Del SFEI pidieron a mi papá que reuniera un grupo de patojos para hacer un taller de carpintería y vino un maestro de uno de los centros a entrenar a 10 muchachos. Luego le pidieron que reuniera a 10 o al menos 4 muchachas para hacer un taller de alfombras (artesanía). Fue difícil con la gente pues las mujeres no querían, de una en una fueron aprendiendo hasta formar como 10.
Todo esto creo que fue por 1958, pero no estoy preciso.
Para las alfombras se usaban lanas de Uruguay, de los Andes pero eso no queremos nosotros, sino usar lana de nuestro país.
Mi papá luchó mucho, antes la gente no sabía nada, era ignorante y él hizo bien al pueblo. También introdujo el almácigo para café, entrenó a la gente y resultó bien.
Ya para entonces, mi papá tenía la confianza de la gente pero hasta después de 5 años de trabajo, También fueron a Atitlán pero la gente ahí no usó el café.

Letrinas

Después el jefe del SFEI dijo que a lo importante eran las letrinas.

(cont. entrevista # 4)

Primero hicimos un muestrario con una pequeña letrina.
La letrina medía aproximadamente 1 m^2, los moldes eran para planchas de cemento, el cuartito era de madera de pino y el pozo se hacía de 5 m de profundidad aproximadamente.
Difusión de letrinas:
Como la gente ya sabía que el SFEI daba todo gratis venía con nosotros para pedir su letrina. Ellos veían el muestrario y se les pedía que hicieran 15 letrinas para experimentar y si pegaba se sacaban a la venta. Finalmente se sacó como a $ 8 o $ 9 Q por el material y el interesado trabajaba en su excavación con asesoría del SFEI.
Fracaso:
Se construyeron hasta 50 o 60 letrinas.
Los dirigentes de la UNESCO que trabjaron en este programa del SFEI, se fueron para que nosotros siguiéramos solos. Pero al irse ellos bajó mucho el SFEI.
Nosotros dejamos las letrinas,los muchachos del taller se aburrieron, el encargado se fue a su pueblo (se refiere al informante de la entrevista # 3) y el SFEI al perder fuerza se unió con Desarrollo de la Comunidad.
La gente del pueblo si usó sus letrinas, nos pedían más pero ya no teníamos para los materiales. Están dispuestos a usar las letrinas una vez que ya están en su casa, algunos hicieron por su cuenta letrinas de adobe.
Sí hay precios favorables la gente compra, pero hoy todo está carísimo especialmente la madera. Hoy saldría como en $20Q una letrina, 15Q de madera más mano de obra.
La mayoría de la gente del pueblo no tiene letrina actualmente.
Cuando se paso al taller de artesanía del alfombras se descuidó el programa de letrinas, pues se tenían hasta 30 muchachas haciando alfombras, mi padre supervisaba el trabajo y elaboraba sus informes..
Al morir el SFEI, otra persona del pueblo hizo un esfuerzo para comprar un local propio y hacer que el pueblo progresara continuando con el taller de alfombras de manera particular. Actualmente se produce bastante para el mercado nacional e internacional y se cuenta 60 trabajadoras.

Entrevista # 5

A un ex-alcalde del pueblo, en cuyo período se inició un programa de re-abastecimiento de agua con un nuevo nacimiento (1968-1970 aproximadamente)

Letrinas

En tiempo del presidente Ubico (1930-1944) se hizo una ley que obligaba a todos a construir letrinas y se repartieron planchas de madera. Había inspectores que vigilaban si la gente las usaba -medían con una vara para ver sí salía sucia- y si no multaban.

Después, no recuerdo cuando tal vez por 1974, el Ministerio de Salud trajo planchas

(cont. entrevista # 6)

Pero no se hizo ningún estudio antes, ni se dabá información a la gente sobre la razón de las letrinas ni de su uso.
La mayoría guardó las planchas en su casa y no usaron las letrinas.
Tampoco alcanzaron para todos pues no trajeron planchas suficientes.
Sobre otro programa que trajo letrinas, el del SFEI tampoco hubo instrucción a la gente, éste le costaba a cada uno $5 Q. La mayoría de las planchas se quedaron y se pudrían.
Tuvieron además otros programas del SFEI: mataban sompopos (plagas de plantas), trajeron herramientas para fumigar. Pero no capacitaron a la gente ni hubo mucha participación. Hicieron también un taller de carpintería para entrenar jóvenes, un taller de alfombras y el uso del abono químico fue introducido por ellos pero sin traer agrónomo, únicamente trajeron el abono.
El fracaso del SFEI, se debió en parte a que cambiaron de nombre, hubo muchos cambios de puestos y suspendieron el programa.

Entrevista # 7

A un norteamericano especialista en el dialecto indígena local y residente en la comunidad desde hace más de 10 años.

Agua Potable

Alrededor de 1952 el alcalde municipal se entera que el Presidente de la República, visitará un pueblo vecino (Santiago) y viaja para llamar la atención de éste y mencionarle que había una fuente de agua en otro pueblo vecino (Sar Juan).
Parece ser que después de este incidente se logra un acuerdo con los de San Juan, el Presidente apoya con material y seguramente el pueblo aportó su mano de obra.
Actualmente hay una fuerte lucha entre ambos pueblos por el reparto del agua y por otras cuestiones tal vez más remotas. La razón es que en invierno falta agua.

2a. fuente de agua potable:
Se formó dentro del pueblo un Comité Pro-agua potable, alrededor de 1970.
Yo decidí pedir un fondo de una agencia extranjera.
Mientras se dio un conflicto entre el Comité y el alcalde municipal, por desacuerdos en la forma de proceder sobre todo por cuestiones técnicas, al punto de que existía un Ingeniero por parte del Comité y otro de la alcaldía.
Por tanto desacuerdo y enfrentamiento yo me desanimé y casi cancelo la solicitud de financiamiento, pues además el dinero no llegaba y no quería involucrar a la agencia en cuestiones políticas.
El alcalde se propuso terminar la obra de la nueva fuente antes de las elecciones nacional y lo logró, parece que gran parte se hizo con la colaboración que el pueblo

(cont. entrevista # 5)

para letrinas de Panajachel, que eran de cemento y hierro fundido. El patio del Juzgado estaba lleno de planchas. Se le vendían a la gente como en $2.50 (?), pero no se acabaron todas porque costaba como $1,500 cavar el pozo y además no hay espacio en las casas.

Agua

Un grupo del pueblo (por su iniciativa) fué el promotor de una nueva instalación, y para hacerla se pusieron a buscar nacimientos de agua por diferentes lugares hasta encontrarlo en una peña. Voluntariamente empezaron a colaborar cada uno poniendo algunos caños, hasta completar como 2 kilómetros de tubería.

El informante fue a ver al Presidente en turno para pedirle ayuda y que el gobierno pagara la tubería y se las negó porque ellos NO estaban con él. Al llegar las elecciones presidenciales y durante la campaña electoral se les propone que votaran con él para que ganara el candidato oficial. El alcalde(entrevistado) y el gobierno municipal propuso un intercambio: el pueblo vota por el candidato oficial y el gobierno de la república les instala la tubería que faltaba para traer el agua hasta el pueblo. Así se hizo y pronto llegó la tubería y el cemento.

Una institución extranjera dió un fondo que quedó en manos del siguiente Alcalde. La gente que quería tener chorro privado en su casa, debía pagar todo el material (tubos, llaves, etc.) y hacer su trabajo, además de pagar Q.0.30 mensuales.

Nunca hubo rechazo del pueblo para emplear el agua potable en lugar del Lago, sobre todo porque lo miran sucio, porque la gente lava ahí su ropa y también porque los "gringos" han llegado a ensuciar pues se bañan desnudos en el lago.

Pero ahora tampoco son suficientes los dos nacimientos que dan agua al pueblo, se siguen buscando otras posibilidades (por ej. bombeo de agua del lago) pues otro pueblo vecino negó permiso para que los pedranos utilicen el nacimiento de agua que les corresponde.

El informante propone que se pongan bombas que saquen agua del lago pero no directamente sino adentro del pueblo para que el agua salga bien filtrada y limpia.

Entrevista # 6

A un promotor activo del Comité local e instructor de la acción católica:

Letrinas

El Ministerio de Salud Pública ofreció un programa de letrinización encabezado por una mujer (aproximadamente en 1960 ¿?). Trajeron cemento, cal, hierro, el pueblo debía traer piedrín.

Por orden gubernamental se trató de hacer difusión de la siguiente manera:

Pusieron pregoneros en las calles, llamando a los que querían las planchas. Las plantas se les regalaba y cada uno aportaba su trabajo para construir la letrina.

(Cont. entrevista # 7)

aportó para la construcción de la cañería. Por esos días yo llegué de la capital con el dinero que acababa de llegar del extranjero. No quise entregar el dinero al presidente del Comité Pro-agua potable pues a su vez era candidato a la Municipalidad, mientras que el alcalde en funciones tenía también su propio candidato. El primero ganó las elecciones y nombró un nuevo presidente del comité que lo sustituyera al tomar posesión de la alcaldía, y ya no hubo conflicto entre ellos.
Entregué entonces el dinero pero vigilé muy de cerca que se usara en obras como:
- tanque de reserva
- plataforma o muro de contención para no perder el agua
- ampliación de la cañería pues era muy delgada

Exigimos recibos y facturas de cada parte del dinero que íbamos entregando.
Fue una experiencia desagradable querer ayudar con dinero y no poder hacerlo. Es una necesdad entregar dinero sin tener una vigilancia sobre su manejo, yo tuve desconfianza desde el principio y eso les molestó. Lo anterior tiene su base en experiencias concretas que nos han enseñado que el dinero regalado o como préstamos bajo palabra, no son reintegrados por la gente y perjudica las relaciones personales.

Entrevista # 8:
A un ex-alcalde, ex-presidente del Comité Pro-agua potable, promotor de salud rural y nieto de unos de los curanderos más prestigiados en la comunidad.

Tuj o Temascal

La gente ha perdido confianza en el temascal por ello no lo usan mucho y no tanto por la falta de espacio para construirlo. Anteriormente era utilizado principalmente por las mujeres como en un 70%.
La gente tiene miedo de usar el temascal porque no saben utilizarlo, al ponerlo demasiado caliente se queman mucho. Pero si se conocen los beneficios médicos.

Letrinas

Hoy hay menos letrinas porque nos hemos atenido a las promesas del gobierno y nos quedamos esperando.
Ahora falta sitio para que se hagan letrinas pero por su cuenta algunos hacen su pozo ciego. Antes no hacían letrinas porque el terreno era muy pedregoso y cuesta mucho cavar y se llena el pozo muy rápido. Cuesta más de $60 Q cavar un pozo ciego.

Drenajes

Obtas Públicas ha prometido drenaje y no lo ha hecho.
La gente no sabe que puede contaminarse el lago por los pozos ciegos con las aguas subterráneas.
El problema de la con cción de un sistema de drenaje es que se necesita terreno

(Cont. entrevista # 8)

para las lagunas de oxidación. Cuando fuí alcalde se hicieron los trazos para hacer una laguna, pero la gente debería ceder un poco de su tierra. Como el pueblo está sobre dos vertientes necesita dos lagunas. La gente quiere drenaje pero no quieren ceder su tierra.

El proyecto que trazamos consistía en una bomba eléctrica para succionar aguas negras hasta llevarlas a la laguna de oxidación. El costo aproximado de este proyecto era de $80,000 Q. (se sabe que este proyecto no fue realizado).

Letrinas actuales

El atraso es nuestro por estar atenidos a las promesas de las instituciones y aparentemente llegan con manos llenas para hacer cosas y no hacen nada.

Por ejemplo una institución prometió un programa de letrinas con una partida de $10,000 Q pero parece que ya se gastaron todo, sólo hicieron una letrina que ocupó $1,000 Q.

El Comité que promovía estas letrinas se politizó y el buen programa de esa institución se hechó a perder. Ellos están muy metidos con la alcaldía y con el gobierno pues tomaron $1,500 Q que dio Obras Públicas para el Centro de Salud. (*)

(*) El informante pertenece a un partido político opositor al que actualmente ocupa la alcaldía y se ha opuesto al programa de letrinización actual por considerar lo un instrumento de sus opositores

Entrevista # 9

A un antropólogo norteamericano que desde 1941 estudia diferentes aspectos de la comunidad.

Conflictos

Los pedranos son muy peritos en luchas y divisiones de tipo religioso, político, de clanes, etc.

El acutual Comité de Desarrollo quiere unir al pueblo en un sólo Comité, pero hay mil divisiones por debajo aunque aparentemente no pase nada.

Difusión de Innovaciones

Un antiguo "principal", que era un verdadero innovador introdujo al mismo tiempo la primera Iglesia Protestante y la primera mata de café. Al principio la gente desconfianba pues el café es un cultivo que tarda mucho en dar frutos, pero cuando se empezaron a ver los primeros quintales la gente se empezó a interesar hasta que se extendíó a toda la población. Igual pasó con la introducción de la cebolla criolla.

Lo que deja dinero se introduce más fácilmente.

ANNEX IV
16 pages

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C E M A T

Centro Mesoamericano de Estudios
sobre Tecnologia Apropiada

Guatemala

Excerpts from

ACTIVITIES REPORT

1976-1977

Guatemala, January 1978

1. WHAT IS CEMAT?

1.1 CEMAT, Centro Mesoamericano de Estudios sobre Tecnología Apropiada, is a nonprofit private association with permanent headquarters in Guatemala City.

1.2 CEMAT was created at the initiative of a number of persons, groups and institutions who considered it important to set up instruments specifically designed to promote the appropriate technologies necessary to the socioeconomic development of the rural and suburban sectors of Guatemala and the other countries of the region.

1.3 Objectives

(a) To promote and organize the transfer of appropriate technical know-how from the more technologically advanced countries to Guatemala and the rest of the region.

(b) To promote and organize appropriate scientific and technical research at a local level, with the possibility of national or regional application.

(c) To develop and implement projects involving appropriate technology and systems for training and upgrading personnel in this field.

(d) To promote communications and the exchange of experiences in the field of appropriate technology, at the national, regional and international levels.

1.4 Relationship with international agencies

Three important conferences have pledged their definitive support for CEMAT:

I The conference of experts in appropriate technology held in Mexico in June 1976 at the invitation of CEESTM (Centro de Estudios Económicos y Sociales del Tercer Mundo), and the creation of a Technological Information Network for Latin America (RITLA).

II The UN International Conference on Human Settlements in Vancouver, and the creation of the Network for the Alternative Development of Human Settlements (REDA).

III The conference on exchange of documentation and project coordination organized by GRET in Paris in October 1976, and the creation of the Appropriate Technology Information Network (RITA).

Thus, with respect to technological information and logistics at the international level, CEMAT has the support of these three active networks, which were set up following the earthquake in Guatemala to assist with reconstruction and to support actively involved groups. CEMAT and its supporter aim to make the maximum use of such new concepts as:

- Intermediate technology
- Appropriate technology
- Ecodevelopment
- Appropriat technology

We list below some of the international institutions or groups that have been working in this field for some time are willing to lend their support to CEMAT:

The Intermediate Technology Group (ITDG) - England. This institution has many years of experience in the fields of appropriate and intermediate technology. There are two particular aspects of its work that we intend to work on: farm implement manufacture and construction alternatives.

Brace Research Institute - Canada (McGill University). We are mainly taking advantage of its experience with solar instruments.

The Volunteer International Technical Association (VITA) - USA. What interests us most is the experience it has gained in Central America with the establishment of a network of VITA groups for appropriate technology development. VITA also has a number of experienced technical consultants.

Groupe de Recherche sur les Techniques Rurales (GRET). This group is currently working on a card system reflecting world-wide experience in two fields of appropriate technology, with a view to creating a Dynamic Enciclopedia of Rural Techniques. This Group is currently providing CEMAT with very active support.

Centro de Estudios Economicos y Sociales del Tercer Mundo (CEESTM). This Institute was recently set up in Mexico. It regards CEMAT as a respected counterpart in the field of appropriate technology in the Central American region, and the two organizations are trying to develop joint projects, involving either specific action in the appropriate technology field or publications to promote RITA.

ENERGY, HEALTH, AND AGRICULTURE ACTIVITIES REPORT, 1966 - 1977

EXPERIMENTAL DEVELOPMENT OF COMPOSTING
AND BIO-GAS PRODUCING LATRINES

As mentioned earlier in the chapter on appropriate technology and reconstruction and the development of alternative construction materials, the initial survey of groups of rural promoters and masons was the starting point for detecting the basic needs of the rural and suburban population of the area affected by the February 1976 earthquake.

The first basic need was that of minimum shelter, to enable the people to get past the start of the rainy season. Later, a more formal type of minimum housing would gradually be built. Many of the post-earthquake reconstruction programs planned this type of minimum housing along the most simple lines: a roof and wall for sleeping. But as the programs were developed it became evident that there were also pressing needs in other very important areas, such as kitchen facilities and privies or toilets. In many of the programs the inclusion of a sanitary infrastructure as part of the minimum module began to represent a real problem in terms of financing, since it pushed up reconstruction costs by 40%.

Thus it became necessary to make experimental studies on alternative sanitary and kitchen infrastrutures for low-cost housing. CEMAT's initial line of research was the experimental development of alternative materials for the rural area (cf. Construction, production, and development of "Cematita (sic) technology) with a view to bringing down the costs of

small-scale rural infrastructures.

The second line of research was designed to determine which appropriate technologies could offer some alternative for cooking and sanitary infrastructures. Besides providing direct help to the rural families, how could these techniques generate income, jobs and/or social economies?

Thus the survey-action strategy was based fundamentally on combining the need for domestic improvement with the creation of instruments of production. Accordingly, the cornerstone of study was defined as the saving of energy and the production of agricultural inputs.

For purposes, the poyo de lorena was selected, a stove made of a mud and sand (cf. Energy- Poyos de Lorena), and for the composting and bio-gas latrines, three different prototypes at family and communal level.

Selection of technology

In the first stage it was necessary to make a rapid field survey to find out the most frequent reasons why use of traditional privies has not been more widespread, despite the existence of different times. The preliminary survey yielded a number of findings that may be subject to revision as more extensive data are obtained.

1. The privy occupies an unproductive space and requires outlay in terms of work-days and money that do not have visibility or directly result in higher incomes, the number one priority of most households.

2. Although privy represents a middle solution between the toilet and defecation on the ground, and as such is most suited to the rural way of life, it conflicts with a cultivation practice that has received little study: defecation on the small cultivated plots around the house (maize fields, coffee plantations, etc.) This tradition goes far back into the history of rural Guatemala. We regard this as the traditional method of reusing excreta, as paracticed in a more advanced and systematic manner in densely popualted regions of Asia (Japan, China, Korea, Viet Nam, India.)

3. The non-continuous nature of scattered privies causes them to overflow quite rapidly, which makes the life of the investment very short and raises medium-term costs.

4. There are no ongoing educational programs designed to motivate or encourage the communities to make the necessary decisions and organizational arrangements for implementation of these programs.

On the basis of these data, collected from indirect surveys, detailed questionnaires, working groups, and interviews with knowledgeable persons, it was possible to determine which privy type would be the most suitable.

The second stage consisted of obtaining information on the existing experiments with privies producing agricultural inputs. It was discovered that the following major experiments were already being conducted in Guatemala:

1. Mr. Penagos, who may be regarded as a pioneer in this field, has set up a number of experiments in situ with digesters, using agricultural refuse. He built over 12 plants on the coast, where the high tropical temperatures allow for efficient digestion.

2. A number of groups working in the rural area use compost as a major input. This is the case on the San Lucas farm, the Vecinos Mundiales[1/] groups in San Martín Jilotepeque, and many other groups that have participated in various agricultural programs stressing the importance of organic fertilizer.

3. A number of Guatemalan technicians have been working with academic institutions, such as the Engineering School of Guatemala and Quezaltenango, on experimental research into aerobic and anaerobic processes.

Once we had obtained a general idea of the experiments carried out in Guatemala, we approached the Appropriate Technology Network (RITA) with a view to investigating the most interesting experiments carried out in this field in other parts of the world.

It is interesting that the conventional-technology data banks have given us practically nothing of interest. We checked with CESTEEM of Mexico, which has a PEMEX computer terminal and is linked to several data banks such as NTIS, but only about 1% of the mini-abstracts we obtained contained any relevant data. This is why we feel that the information on

1/-- World Neighbors

appropriate technology should also have appropriate forms of diffusion.

In March 1977, the San Pedro Development Committee (Comité Pedrano de Desarrollo), composed of representatives of the San Pedro de Laguna Community,Sololá, asked CEMAT for help with its "latrinization" program. The Committee is working on various aspects of an integrated health program: pre-natal, post-natal and nutritional education, preparation of health data for a continuing study, construction of a people's clinic, purchase of land for agricultural experiments, and attendance by a full-time doctor.

Work then started immediately on the construction of two demonstration privies.

The anaerobic privy for composting and bio-gas production

In contacts and discussions with the CETA group, whose members are with the Engineering School of USAC, we studied the different models of continuous privies that could be proposed to the San Pedro Committee. In addition, CEMAT contacted the Low Cost Housing group of McGill University to determine the most interesting prototype.

The basic data provided by the San Pedro Committee are as follows:

1. In San Pedro La Laguna there is practically no room in the houses for the installation of individual privies.
2. The Committee's budget for latrine construction was small, and it would therefore be best to install latrines with a

daily capacity of 30 persons.

After consideration it was decided to build a (latrine based on a) design by Mr. Lou, CEMAT adviser and member of the CETA group (see photos 4.0, 4.1 and 4.2), composed of a digester with an inlet and outlet cast in the same structure. This is a parallelpipe measuring 2.6 x 1.1. It was built of local materials: hewn volcanic rock, which is used for the houses in San Pedro, a weak cement mixture (cement, limestone, and puzzolan volcanic sand), and rounded rocks from river-beds. In addition, a slab was cast in weak concrete, using iron. The gas containers were built of barrels and the outhouses of wood. The cost of this prototype was quite high owing to a variety of factors, such as:

1. Shortage of local masons both because of the demand generated by reconstruction, and because work was available in the chalets on the edge of the Lake.

2. The high cost of construction materials. SanPPedro La Laguna is 180 km from the capital, and since 60 km of this is dirt road it takes 5 hours to get there by car. And haulage costs were pushed up by the fact that the truck that was rented had to carry only the one privy prototype instead of a large consignment.

3. The masons were not sufficiently skilled, with the result that some work items had to be redone while others were left in unsatisfactory condition.

4. Since this was the first experiment of its kind, the persons in charge of the project could not follow a strict schedule

either for the purchase of materials or for supervision.

Despite the high cost of the prototype, it was much lower than it would have been if used in conventional experimental conditions.

A number of major obstacles arose at the technical level:

- The amount of bio-gas produced is small. So far, two hypothesis have been put forward: either the gas is leaking through a crack in the structure or the temperature of the high plateau is not conducive to massive bio-gas production. Yet another possibility relates to the quality of the bio-mass. At the start, cow dung and coffee waste were used, and only later were human excreta added. This delay in producing bio-gas on a massive scale has had some effects on the population and on the Committee, which did not believe it possible that bio-gas could be produced from agricultural waste and human and animal excreta.

For instructive and experimental purposes a small digester was also built of barrels (see photo No. 4.4) and filled with animal dung and agricultural waste. After a month it started producing bio-gas normally. This has played a useful part in convincing the inhabitants of San Pedro.

The latrine that feeds this small composting and bio-gas plant is currently being used by the public. Having been built, at the recommendation of the San Pedro Committee and the municipality, close to the central park where the market is,

it is constantly being used by a large number of people (an average of 20 persons a day). There is a charge of 3 centavos. The plant has generated two jobs for two young San Pedrans who take turns with maintenance and supervision.

The second stage will comprise:

1. Design of an economic and biochemical monitoring system, to ensure optimum production of the plant in terms of quantity and of compost.

2. Construction of other latrines of the same type in other districts of San Pedro. For these latrines we estimate that the cost of materials should not exceed Q 700 (Q1 = US$1).

3. Preparation of program to educate the population through meetings, manuals, audiovisual materials, and radio programs.

4. Devising of a low-cost system for bio-gas use. Using the present prototype, it is planned to build a steam sauna bath. The native rural population of Guatemala is accustomed to the temascal (steam bath), but this tradition is gradually dying out in San Pedro, mostly because of lack space in the houses.

5. Securing of more information on bio-gas production. Having consulted various institutions, in particular IDRC of Canada which has been very helpful, we think we may be able to

be able to develop this activity. IDRC has informed us that in the province of Szechwan in Mainland China thousands of bio-gas plants have been constructed using a design

very similar to ours. In those regions where temperatures are low in winter it seems that gas production falls off but does not stop completely. We hope to be able to exchange experiences with the rural Chinese involved.

In addition to San Pedro, we are thinking of constructing similar plants in San José Poaquil, Quezaltenango, Carricán, Santigo Atitlán, and San Lucas Tolimán. In this way we can share our experience with other rural communities. Also, it is likely that an experimental prototype will be built at the USAC Engineering School and another in cooperation with ICADA of Quezaltenango.

With a view to training promoters and diffusing the use of this compost and bio-gas producing latrine, the first of its kind in Central America, we have translated the instructions provided by the Szechwan Committee and published them under the title: "Planta Contínua de Biogas de China, 17 pags. 9 dibujos" (China's Continuous Bio-gas Plant, 17 pages, 9 drawings).

The anaerobic composting privy

In addition to the need for communal latrines in San Pedro, we were asked by people from Santiago Atitlán whether it was possible to build a family privy with a daily capacity of 5-6 persons.

The most serious disadvantage of the conventional pit privy is that it contaminates the groundwater. Moreover, it is extremely difficult and expensive to dig a pit in the volcanic

rock on which Santiago stands.

Also, as we have noted from our analysis of possible failures of the various latrine construction programs, conventional privies are unproductive, contaminate the sourrounding area, generate no income, and do not improve agricultural productivity.

It is therefore important to reach the possibility of developing composting privies.

During the war, the Vietnamese developed a double-vault latrine, which takes up little space and is hermetically sealed after a month or two of use. The two vaults are used alternately for defecation and composting. Urine is evacuated elsewhere.

This system has a number of advantages:

- the groundwater is not contam nated
- composting is rapid
- there is less foul odor than with the aerobic privy
- little space is required
- the system is cheap

One of the members of CEMAT's staff, who also works for La Voz de Atitlán Rurul Radio Station and is a mason by trade, decided that CEMAT should build a prototype (see photo No. 4.3). This has aroused considerable interest in Santiago Atitlán. We hope to build 10 other prototypes in other communities and then proceed to widespread diffusion of this system.

We have also translated a booklet entitled: "El doble tanque septico abonero vietnamita, 4 dibujos, 5 pags". Viet Nam's

double composting septic tank, 4 drawings, 5 pages).

Aerobic privies

The Low-Cost Housing group has given us information on the Multrum type aerobic privies found in the Nordic countries. These produce compost after 6 months by a process of slippage down a gradual slope. Their daily capacity is 6-7 person, and they can be built of local material.

The San Pedro Committee also asked that a protoype of these privies be constructed, or rather a pilot privy in the area where the clinic is to be installed. It was built at the same time as the bio-gas producing privy, is of the minimum - slope types (see photo 4.5) and is installed in a wooden outhouse where it is already in use.

We have noted that with this privy the ratio of space used to number of consumers is considerably larger than with the Vietnamese model. Also it takes longer to produce compost. Lastly, since it is aerobic, the odor is stronger. We are presently looking for a smaller model, and we feel, that the Tanzania's could be quite interesting.

Training of local technicians in the productive - privy systems

One of the most important aspects of the development of alternative models in Tanzania is that experiments have to be conducted with the collaboration of the local communities themselves. This offers enormous advantages as well as disadvantages.