

No. 04

REPUBLIC OF THE PHILIPPINES
BASIC DESIGN STUDY
ON
PILOT RURAL ENVIRONMENTAL
SANITATION PROJECT

OCTOBER 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

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SANITATION PROJECT

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PREFACE

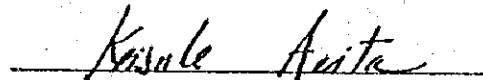
In response to the request of the Government of the Republic of the Philippines, the Government of Japan decided to conduct a basic design study on the Pilot Rural Environmental Sanitation Project and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA sent to the Philippines a study team headed by Mr. Hiroyuki Noguchi, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs from May 27 to July 5, 1984.

The team had discussions on the Project with the officials concerned of the Government of the Philippines and conducted a field survey in Pampanga, Bulacan, Cavite and Butangas areas. After the team returned to Japan, further studies were made and the present report has been prepared.

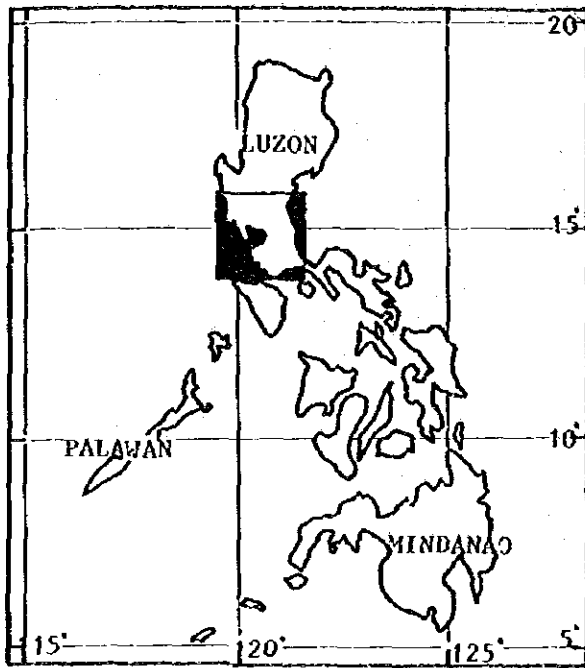
I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

October, 1984

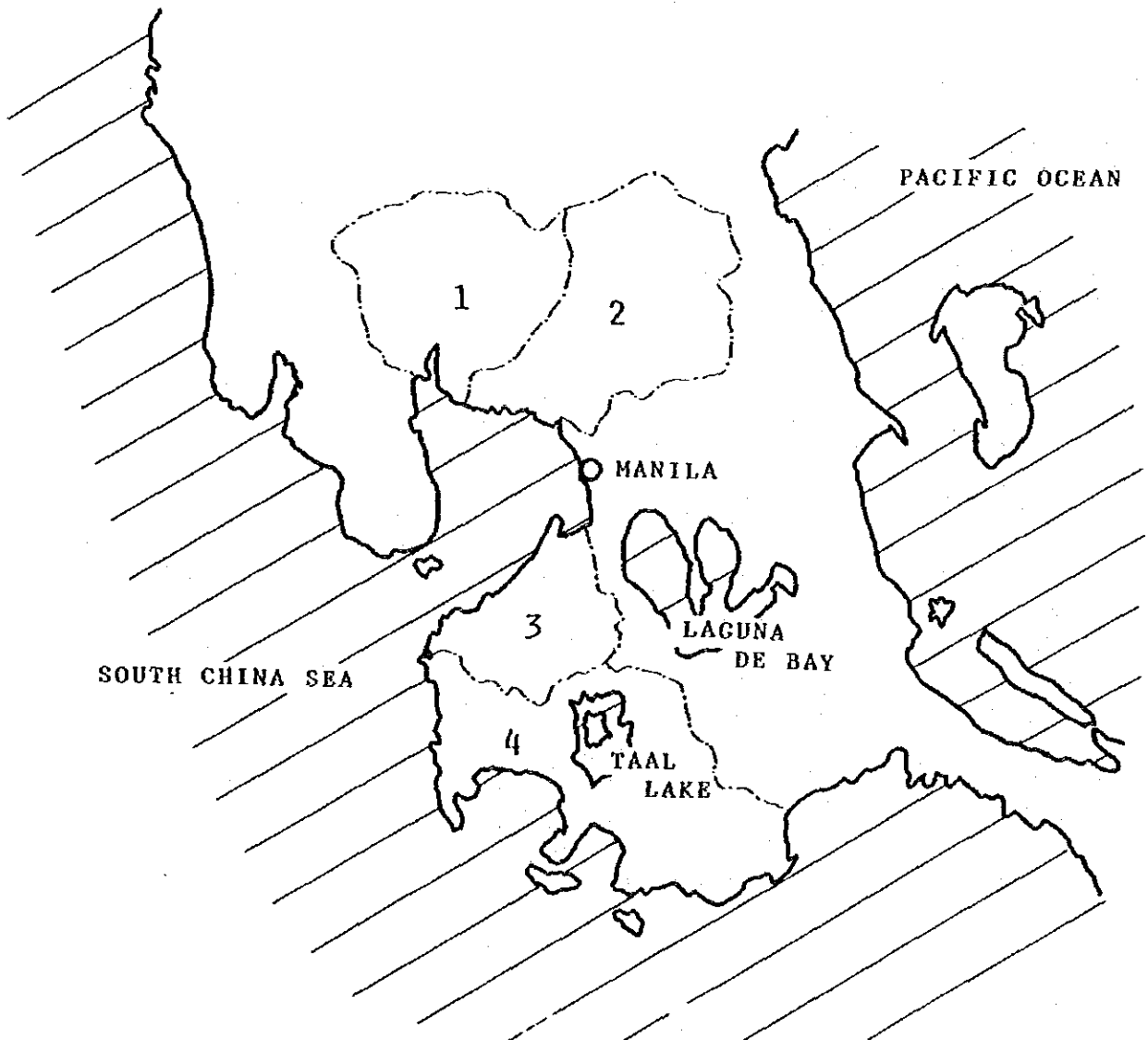
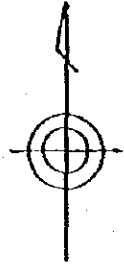


Keisuke ARITA
President
Japan International
Cooperation Agency



TARGETED PROVINCES

1. PAMPANGA
2. BULACAN
3. CAVITE
4. BATANGAS



LOCATION MAP

SUMMARY

SUMMARY

Sanitary conditions in the Philippines at present are inadequate, as indicated by the fact that the number of households equipped with toilet and water supply facilities is estimated at only about 53% of the total population. As a result, about 630 out of every 100,000 people contract contagious, and particularly water-borne diseases, while the mortality rate among the same is as high as 45/100,000. The Government of the Philippines is therefore promoting numerous national schemes aimed at improving sanitary conditions. Of particular importance are the Integrated Water Supply Program, a long-term scheme covering the period from 1980-2000, and the Rural Water Supply and Sanitation Master Plan from 1981 to 1990.

Due to various factors, such as economic recession, however, plan objectives are still being achieved. The said Government, through the Ministry of Public Works and Highways (MPWH) and the Ministry of Health (MOH) is making various efforts to ensure the realization of national sanitary improvement plans. One essential part of Government policy in this regard is promoting increased awareness of the need for sanitary practises among the local people themselves, thus ensuring that the rural people do not merely receive assistance from the government but rather, are encouraged to directly participate in the improvement of their own sanitary environment. The Government of the Philippines thus requested grant aid from the Japanese Government under the latter's grant aid program to implement the Pilot Rural Environmental Sanitation Project (hereinafter referred to as the Project).

The Philippine Government selected 60 barangay sites located within 4 different provinces in Regions III and IV near Manila, and requested the construction of domestic water supply facilities and sanitary toilets. Based on survey results for all 60 barangays, the Study Team undertook basic design for water supply facilities in 60 sites, (including 40 sites of Level I and 20 sites of Level II), and toilet facilities for elementary schools in 52 sites.

Conditions varied from location to location. Except for flood embankment areas, the 8 barangays in Pampanga Province of Region III are

generally situated on a fertile agricultural plain which is also rich in groundwater due to the alluvial soil. As for the 15 barangay sites in Bulacan Province located in the same Region, although the same are within commuting distance from Manila, due to delayed introduction of social services, repeated inundation during the rainy season, etc., the proposed area is considered most depressed of all the selected sites.

15 barangay are located in Cavite Province in Region IV which has a wide range in elevation from the Tagaytay Plateau to the coast of Manila Bay; however, as almost all barangay are located over sedimentary rock layers, groundwater is abundant. Of the 22 sites located in Batangas Province in the same Region, those which are situated along the provincial road from Lemery to Tagaytay lack reliable groundwater supply. The rest of the area however, has a comparatively stable groundwater supply which can be utilized relatively easily.

The construction period for the above facilities is estimated at approximately 17 months commencing upon conclusion of Exchange of Notes. In addition, a 5 year period has been allotted under the Project for extension activities aimed at increasing the awareness of local people regarding sanitary practices.

All facilities constructed under the Project will be transferred to the MPWH and MOH to facilitate the achievement of project objectives. Responsibility for maintenance of school toilets, however, will be transferred to each school through the Ministry of Education, Culture and Sports upon completion of the Project. Operation and maintenance fees for water supply facilities will be borne by the recipients RWSAs while those for toilet facilities will be borne by the school authorities during the 5 year Project implementation period under the supervision of MOH.

The objective of the Project is to increase the understanding of the local people of the need for sanitary practices through the construction of the above facilities. To facilitate achievement of this goal, a bench mark survey, monitoring and feedback activities, and post evaluation will be undertaken. The cooperation of the MPWH, MOH, and Ministry of Health is essential for the same as well as that of the Research Institute for Tropical Medicine, WHO, related universities and agencies, and a short-term technical cooperation team provided by the Japanese Government.

Moreover, in order to stimulate the above activities, training programs will be provided by the MPWH and MOH for local agencies and residents concerned. Equipment required for training will be provided under the Project. Major undertakings to be covered by both Governments for the Project are presented as follows:

The Philippine Government

The Philippine Government will be responsible to facilitate smooth implementation of the Project.

The Japanese Government

The Japanese Government will be responsible for the funding and the construction of water supply and toilet facilities provision of materials and equipment required for the Project.

The present economic situation in the Philippines is severe and the possibility for sudden recovery and improvement of rural living standards based on the development efforts of the Philippine Government alone is unlikely. However, the improvement of living standards in rural areas is extremely urgent. The same will increase the awareness of sanitary practices among the local people, by whose efforts the reduction of infant morbidity and mortality due to contagious diseases, and the subsequent stabilization and security of rural life will finally be achieved.

Accordingly, the Project under grant aid cooperation from the Government of Japan is expected to have a significant impact, and speedy implementation of the same is therefore strongly recommended.

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ABBREVIATIONS

BHS	- Bureau of Health Services
BHSt	- Barangay Health Station
DEC	- District Engineers Office
LWUA	- Local Water Utilities Administration
MLG	- Ministry of Local Government
MOH	- Ministry of Health
MPWH	- Ministry of Public Works and Highways
MWSS	- Metropolitan Waterworks and Sewerage System
MWTF	- Municipal Waterworks Task Force
NIA	- National Irrigation Administration
NWRC	- National Water Resources Council
PEO	- Provincial Engineers Office
PHO	- Provincial Health Office
PMO-RWS	- Project Management Office for Rural Water Supply
PWC	- Provincial Waterworks Committee
PWDTF	- Provincial Waterworks Development Task Force
RHO	- Rural Health Office
RHU	- Rural Health Units
RWDC	- Rural Waterworks Development Corporation
RWSA	- Rural Water Supply and Sanitation Association

CHAPTER I

INTRODUCTION

CHAPTER 1 INTRODUCTION

1.1 History of the Project

In response to the United Nation's declaration of the International Drinking Water Supply and Sanitation Decade, the Government of the Philippines formulated the Integrated Water Supply Program (1980-2000) with the aim of establishing sanitary conditions and habits among its citizens, thereby improving their standard of living. This objective included the full coverage of waterworks systems in rural communities by the year 2000, implementation of which is presently underway.

The mortality rate of water-borne and related diseases is particularly high in rural areas due to poor water quality, insanitary conditions and primitive toilet facilities. Thus, grant aid for projects regarding the same was subsequently requested by the Philippine Government.

The Japanese Government, in response to the said request, accordingly dispatched a preliminary study team through JICA led by Mr. M. Sato (Ministry of Foreign Affairs) from January 6-17, 1983. Based on the resultant study report, it was recommended that a basic design study should be undertaken.

1.2 Basic Design Study Team

The dispatched Study Team was composed of 7 members, including the Team Leader, Mr. H. Noguchi (Second Economic Cooperation Division, Ministry of Foreign Affairs), Mr. M. Fukuda (Deputy Director, Ministry of Health and Welfare), Mr. Y. Shikama (JICA), and 4 experts. The Study was conducted from May 27 to July 5, 1984, with participation of each Team member shown in APPENDIX 1.

1.3 Outline of Study Activities and Minutes of Discussion

Activities for each day of the Study period are outlined in APPENDIX 2. Discussions between the Team and Philippine officials concerned are compiled in the Minutes of Discussion (APPENDIX 3) which were subsequently approved and signed on June 1, 1984 by Team Leader Mr. H. Noguchi, Mr. T. Encarnacion, Assistant Minister for Planning, MPWH and Dr. A.S. Villarosa, Acting Director, Bureau of Health Services, MOH.

The Study Team subsequently proceeded with field surveys, collecting data and reports necessary for further study. As detailed study of general sanitary conditions in the Philippines, focusing particularly upon rural waterworks and sewage treatment, which had already been conducted during the preliminary study, the present Study mainly involved checking, confirming and supplementing the previous data. At the same time, field survey was conducted for 60 specific sites proposed in the above mentioned Minutes, with due attention given to such aspects as educational extension, monitoring, and the importance of the Project as a pilot scheme for development in other areas.

After home office work to study and prepare basic design, the study team was despatched to the Philippines to explain the results of the study presented in the draft final report.

The result of the discussion was presented in minutes of Discussion (Appendix 3 (2)), signed between Mr. Hiroyuki Noguchi (Team Leader), Mr. Teodoro T. Encarnacion (Ass't Minister for Planning, MPWH) and Dr. Aurora S. Villarosa (OIC, Bureau of Health Services, MOH) on Oct 4 '84.

1.4 Project Administration

Jurisdiction for the Rural Water Supply and Sanitation Plan instituted by the Philippine Government is shared by the Ministry of Public Works and Highways (MPWH) and the Ministry of Health (MOH). As the present Project involves formulation of a pilot model for the said Plan, the Study directly concerned both of the above ministries. The organization of MPWH and the Project Management Office for Rural Water Supply (PMO-RWS) are given in APPENDIX 4 and 5, respectively, while that for the MOH and the Bureau of Health Services including the Office of Sanitary Engineering with which the Study Team was directly concerned, is presented in APPENDIX 6 and 7, respectively.

For the present Study, the MOH was in charge of all surveys concerning sanitation, toilet facilities, water-borne diseases, water quality, monitoring, extension services, etc., while the MPWH was mainly responsible for water source, waterworks, construction related activities, training, etc. Study activities were conducted with the overall cooperation of both ministries. The names of the experts and agencies in the Philippines who supported the Study are listed in APPENDIX 8.

CHAPTER II

PROJECT AREA AND BACKGROUND

CHAPTER 2 PROJECT AREA AND BACKGROUND

2.1 Present Health and Sanitation Conditions

2.1.1 Population

Population of the Philippines in 1978 was approximately 45.53 million, with a birth rate of 30.5/1,000 and a mortality rate of 6.5%. The population of the 4 provinces proposed for the present Project are presented as follows:

TABLE 2-1 POPULATION OF THE FOUR PROVINCES CONCERNED

Year	Unit: population		
	1970	1975	1980
Philippines	36,684,486	42,070,660	48,098,460
Region 3	3,615,496	4,210,136	4,802,793
Pampanga	907,205	1,042,164	1,181,590
Bulacan	737,975	899,529	1,096,046
Region 4	4,456,340	5,213,843	6,118,620
Batangas	926,308	1,032,009	1,174,201
Cavite	520,180	628,321	771,320

On the other hand, the population density for the same period is as tabulated below:

Table 2-2 POPULATION DENSITY

Year	Unit: population/km ²		
	1970	1975	1980
Philippines	122.3	140.2	160.3
Region 3	198.3	230.9	263.4
Pampanga	416.0	477.9	541.8
Bulacan	281.1	342.7	417.5
Region 4	95.0	111.1	130.4
Batangas	296.6	326.0	370.9
Cavite	404.0	488.0	599.0

The close proximity of the provinces concerned to the capital city, Manila, is reflected in comparatively large populations.

2.1.2 Present Incidence of Water-Borne and Related Diseases

Contagious disease and parasites account for 22.4% of deaths, the greater cause of mortality in the area. Approximately 34.5 persons/100,000 expire as a result of gastro-enteritis and colitis, accounting for 5.3% of total deaths. The disease and mortality rates, mainly concerning water-borne diseases, for the entire country and the above 4 provinces are given in APPENDIX 9. The disease and mortality rates for gastro-enteritis and colitis, which are already high at the national level, were above average in 2 or 3 cases in the proposed Project area, while rates for certain other diseases in each of the 4 provinces were often lower than the national average, particularly in Batangas, in which all other diseases were below average. Moreover, the seasonal fluctuation in disease and mortality rates from dry season to rainy season is clearly evident, illustrating the prevalence of insanitary conditions which result in widespread cases of gastro-enteritis and colitis during the rainy season.

Other than the above, the infant mortality rate, although decreasing, is still as high as approximately 53 infants/1,000 births for children under one year of age, that accounts for 24.0% of the total deaths. In addition, the infant mortality rate at birth is 1.2 persons/1,000. Only 24% of births take place in hospitals while 76% take place in the home. Moreover, in over half of all births, medically trained person are not present at the time of delivery.

The above conditions represent a comparatively low standard of health and sanitary conditions, particularly in the rural areas where establishment of hospital facilities is retarded and adequate medical treatment is often unavailable. Diarrhea outbreaks occur frequently and the MOH office in each barangay distributes packages of medicine for the same including salt solution and some nutrient content. In general, identification of water-borne diseases through domestic facilities alone is difficult and therefore in some cases stool samples, etc., are sent as far as Japan for identification.

Over the last 10 years the Government of the Philippines has made impressive strides in the improvement of public health. As recent as the early 1970s the average life expectancy at birth was 54 years, while today

it is 60 years. Moreover, the crude death rate has now declined to 6.9/1,000.

Nevertheless, even given these improvements the incidence of water-borne and related diseases still requires concentrated efforts by the central government. The MOH has compiled statistics on the number of cases and deaths resulting from leading water-borne and related diseases for the period of 1976-80 as summarized in TABLE 2-2 below.

TABLE 2-2 NUMBER OF CASES AND DEATHS FROM LEADING
WATER-BORNE AND RELATED DISEASES (1976-80)

Disease	Cases	Deaths
Gastro-enteritis and Colitis	229,579	15,529
Schistosomiasis	51,094	642
Malaria	35,553	997
Dysentery, all forms	22,099	906
Infectious Hepatitis	6,815	772
Typhoid, Paratyphoid, Salmonella Infection	3,448	688
Cholera El Tor	1,488	413
Food Poisoning	860	168
Vira Encephalitis	536	407
Filariasis	62	5

Source: MOH Statistics

As can be observed from the above table, gastro-enteritis and colitis account for over 3 times the number of deaths attributed to other related water-borne diseases, clearly indicating that eradication of the same should be the principal target within the overall objective of significantly reducing water-borne disease mortality rate.

2.1.3 Rural Condition

Present economic conditions and low standards of living in rural areas have delayed the introduction of sanitary practices with regards to safe water supply, waste and sewage disposal, inevitably resulting in poor sanitary conditions.

Although potable water and proper toilet facilities are essential for daily living, only 53% of households in the Philippines are equipped with water sealed toilets considered sanitary by the Government, While 27% have unsanitary toilet facilities (mainly simple pit latrines) and 20% have no facilities. As the total number of households in the Philippines is approximately 7 million, improved toilet facilities particularly in rural areas, are urgently required.

The water supply situation is similar. Although 53% of the total population (about 50 million) is supplied with drinking water via public waterworks, only 47% of the rural population is supplied by the same versus 82% of the urban population of Manila. Moreover, these percentages include those people who live within a maximum distance of 250m from the water source. Although in some rural communities individual private wells have been set-up, the majority are shallow wells (0-6m depth to groundwater level) and consequently the possibility of contamination by surrounding latrines of permeation of waste materials deposited on the ground surface is high.

The above conditions represent the background of the Project, the objective of which is to establish a pilot program for effective eradication of water-borne diseases.

2.1.4 Activities of Rural Health Maintenance and Diffusion of Sanitary Practises

The administrative organization for health and sanitary activities from central to rural areas is:

- Ministry of Health (MOH)
- Regional Health Office (RHO)
- Provincial Health Office (PHO)
- Rural Health Unit (RHU)
- Barangay Health Station
- Rural Water Supply and Sanitation Association (RWSA)

In the Philippines, there is one Regional Health Office (RHO) for each of the 12 regions (except Metro-Manila) under the jurisdiction of MOH. These offices are composed of ministerial branches of the government, and their principal activity is the maintenance of rural health and sanitation.

Each RHO has a Regional Training Center responsible for the training of physicians, nurses, sanitary inspectors and midwives which are subsequently attached to Rural Health Units (RHU). A laboratory is also maintained by the RHO for the training of the above, and for the examination of the samples obtained by the sanitary inspector.

There is a Provincial Health Office (PHO) for each province that controls RHUs which carry out health and sanitary activities from the municipal Health Office. Each RHU is basically composed of 1 physician, 1 nurse, 2 sanitary inspectors and 1 to 5 midwives. There are 1,500 of these organizations throughout the Philippines, and at least one RHU is located in each municipality.

The main duty of RHU sanitary inspectors is the maintenance of environmental sanitation and accordingly they are responsible for the control of drinking water, raw sewage, food, related insects and waste materials. In addition, the control of sanitation maintenance in public facilities such as parks fall under the responsibility of the same.

There are about 7,000 midwives throughout the country, more than twice the number of sanitary inspectors. Midwives are available for home visits, thereby contributing to environmental sanitary maintenance in the rural areas. In addition, Rural Water Supply and Sanitation Associations (RWSAs) are presently being organized as a private organization for the local inhabitants.

The Government of the Philippines has projected an increase in environmental sanitary maintenance and to this end plans to increase the facilities of sanitary inspectors as well as to re-train the same for longer contract terms. The retraining plan is divided into 3 Phases (I, II, and III) and Phase I of the Plan has already been completed with the support of UNICEF. Training includes not only lectures but also group-work and field inspections, subsequently followed by a test to confirm the effectiveness of the program. The training schedule is 8 weeks. The schedule for Phase II and Phase III, however, includes the study of food sanitation and nourishment but the same have not yet been fully formulated.

As described above, the Government of the Philippines is in the process of improving rural sanitation. However, shortage of education

equipment has resulted in insufficient diffusion of sanitary measures being adopted for rural inhabitants. To date significant effects in rural health maintenance and diffusion of sanitary practices have not been realized, except for the dissemination of pamphlets on sanitation and the practice of boiling drinking water.

2.2 Present Water Service Conditions

2.2.1 Institutional Organization

There are 5 agencies directly concerned with the implementation of water supply, namely, NWRC, MWSS, LWUA, RWDC and MPWH. Briefly, the area of responsibility for each is presented on the following page.

- NWRC: a multi-agency charged with coordination and regulation of all activities related to development, arrangement, control, conservation, and proper utilization of water resources
- MWSS: charged with the management of the water and sewerage system in Metro-Manila and other areas which may be subsequently added to its area of jurisdiction
- LWUA: administratively attached to MPWH for policy and program coordination, and charged with the promotion and development of water districts including review of technical plans and facilitation of financial assistance
- RWDC: charged with promotion, encouragement and assistance to rural waterworks and sanitation associations by ensuring the availability of adequate water supply services to residents of rural areas not served by MWSS or LWUA, including the extension of loans and provision of technical assistance to related associations
- MPWH: charged with the development of integrated national water supply plans and programs consistent with NWRC plans and policies; principal implementing arm of RWDC for engineering and construction

There are also several other lesser organizations/agencies concerned with the water supply system such as MLG and MOH.

2.2.2 Existing Rural Water Supply Condition

(1) Rural Water Supply Facilities

In 1981, MLG was commissioned to carry out a national survey on existing rural water supply sources and facilities aimed at the establishment of basic data to serve as an estimate of the present and future demands. The results of the survey indicated that there were approximately 64,000 water sources or dug wells serving 72,483 households (17.8%), 53,014 tube wells serving 312,016 households (76.3%), 2,218 springs serving 21,087 households (5.2%), 244 rivers/ponds from which 2,403 households (0.6%) obtain water and 38 units of rain collectors serving 38 households. Of these water sources, 55,172 are privately owned and only 18,586 are public.

Considering the different types of water sources, the average discharge is 0.37 l/s while well depth average about 10.19m. Average well depth falls under the shallow well category in as much as the representative wells inventoried are mostly privately owned. Additionally, tests conducted and records gathered showed an average water depth of 4.36m during the dry season and 4.55m on rainy days which indicate a tendency for shallow aquifers.

(2) Existing Water Service Area

It is estimated that there are over 22,000 public wells in the Philippines, nearly 16,000 of which are in the rural areas. Of the total number of wells servicing rural areas approximately 90% are considered operational. However, as many as 40% of these wells either require rehabilitation and/or replacement due to insufficient O/M of the same and the fact that most were installed between 10-20 years ago.

The table on the following page presents the population coverage of water supply facilities.

TABLE 2-3 POPULATION COVERAGE OF WATER SUPPLY FACILITIES ^{1/}

	Tubewell		Springs		Pipe System		Unserved		Total	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
1. Urban Pop.										
a. Metro Mla	0.1M	2	-	-	5.1M	80	1.2M	18	6.4M	100
b. Other Areas	1.2M	14	0.3M	3	3.4M	38	4.0M	45	8.9M	100
2. Rural Pop.	6.4M	20	5.1M	16	3.6M	11	17.5M	53	32.6M	100
Total Phil.	7.7M	16	5.4M	11	12.1M	25	22.7M	47	47.9M	100

^{1/} As of 1980

Source: MOH

As can be derived from the above table, 53% of the rural population is unserved by a public water system. As a result, other less potentially safe water supply sources must be relied upon. In view of the increased population concentration of the Philippines, many of these formerly safe water sources are now of questionable quality, contributing to the high rate of deaths due to water-borne and water related diseases. Therefore, it is necessary to expand and improve the present water supply system, especially in rural areas.

2.2.3 Public Investment

In the last half of the 1970s, although public investment expenditures on water supply development by the 4 principally concerned agencies of the Philippine government -- MWSS, LWUA, MPWH and NWRC -- steadily increased, the same did not keep pace with either population growth or national economic activity. In the 1980s, however, the government has been placing greater emphasis on this sector. The table on the following page clearly identifies the marked change in public investment expenditure for water supply by the Philippine government from 1975-81.

TABLE 2-4 PUBLIC INVESTMENT EXPENDITURES FOR WATER SUPPLY

unit: million pesos

	1975	1976	1977	1978	1979	1980	1981	1975-1981
MWSS	15.60	31.30	0.10	17.12	106.25	272.75	725.74	1,168.86
LWUA	21.10	51.30	112.00	111.00	91.40	165.00	109.00	660.80
MPWH	14.10	31.70	29.80	25.20	26.00	115.02	179.64	421.46
NWRC	-	-	-	0.74	9.05	3.25	4.02	17.06
TOTAL	50.80	114.30	141.90	154.06	232.70	556.02	1,018.40	2,268.18

For the period between 1975-81 total national government infrastructure investment expenditures were approximately 39,605 million pesos. On the basis of the above table, total public investment expenditures on water supply development from 1975-81 was approximately 6% of the total national expenditure. Furthermore, as the above table clearly shows the difference between public investment expenditures from 1975-79 and 1980-81 in relation to the 1975-81 time frame is an increase by almost 2.3 times, underscoring the greater emphasis being placed by the government on this sector in the 1980s.

2.3 Sewage Disposal and Treatment Condition

2.3.1 General Condition

Treatment and disposal of raw sewage and waste materials is under the jurisdiction of the Environmental Health Division, Bureau of Health Services MOH. Said Division, however, is not directly involved in actual administration of various construction works, concentrating only on general supervision. For the last several years the Division has been providing technical assistance through the services of a resident consultant from WHO for planning of sewage disposal projects in rural areas.

The aforementioned Rural Water Supply and Sanitation Master Plan proposes the establishment of sanitary toilets in every household by the year 1990 in order to eradicate water-borne diseases, and a budget of approximately US\$35.5 million has been allotted for achievement of the

same. At present, the total number of households without toilet facilities is estimated at more than 19.3% throughout the country (APPENDIX 10). Of the total number of households which have toilet facilities 27.8% are considered insanitary. Of those facilities considered to be sanitary (APPENDIX 11), the majority are water sealed or handflush type, while flush toilets equipped with septic tank are rare. Moreover, waterworks systems have been developed only in Metro Manila, while the final treatment site for the same is presently under construction. Conditions of toilet facilities in the present Project area, including both Region III and Region IV, are comparable to the national average level.

2.3.2 Rural Condition

During the rainy season, when the ground becomes saturated and the barangay are partially inundated, buried waste materials are often washed off with the overflow. In the lowlands of the Philippines where drainage is poor, inundation occurs frequently. Even though drainage ditches are dug along most roadways, etc., due to lack of maintenance, the same do not function effectively. This situation urgently requires rectification, particularly in view of the fact that the majority of water-borne diseases which occur in the rainy season are a direct result of the above conditions.

One of the reasons for delayed development of toilet facilities in the rural areas of the Philippines is insufficient water supply. Where a water source is available, a bucket of water is usually placed in the latrine, the majority of which is used to flush the toilet while a small portion is saved to wash the hands and body. Accordingly, flush toilets which use large amounts of water may be inappropriate for use in some rural areas particularly where water is usually required more urgently for other purposes. At the same time, however, ensuring that the amount of water in the commonly used handflush method is sufficient for washing hands and body after use, and fostering the custom of washing the same are minimum prerequisites required for improvement of sanitary conditions.

CHAPTER III

THE PROJECT

CHAPTER 3 THE PROJECT

3.1 Project Area

As stated earlier 60 barangays were selected from 4 provinces near Metro-Manila for project implementation. Although study was also undertaken for other suitable islands from which good monitoring results could be expected, the 4 provinces in the Metro-Manila vicinity were finally selected after overall evaluation of ease of access, transportation, adequate potential for monitoring, organization, cooperation of local residents, etc. The 4 provinces include Bulacan directly north of Manila, Pampanga to the northwest, Cavite to the south and Batangas to the south of Cavite. The 2 northern provinces are situated within Region III (Central Luzon) and the 2 southern provinces within Region IV (Southern Tagalog). A location Map is herein attached as APPENDIX 14. Average income per household is comparatively high as TABLE 3-1 shows (that of Region III is the second highest of the 12 Regions while that of Region IV is fourth highest) as are education standards.

TABLE 3-1 AVERAGE MONTHLY INCOME PER HOUSEHOLD

	Unit: P
National Average	1,845
Region III Average	2,250
Region IV Average	1,860
Manila Average	3,700

Note: based on data from the last quarter of 1983

3.2 Site Selection

The 60 sites were selected according to the following prerequisites:

- a) poor water quality and scarce water supply;
- b) prevalence of water-borne and water related diseases caused by poor sanitary conditions resulting from item a) above;
- c) substandard economic conditions but potential for increased economic standards with development of water supply; and,
- d) low development cost per capita and high population density.

Actual selection of sites was determined through normal channels of organization (APPENDIX 12) with initial selection by the Provincial Waterworks Committee (PWC), Provincial Waterworks Development Task Force (PWDTF) and the Municipal Waterworks Task Force (MWTF), subsequent announcement of the same to the central agencies concerned, followed by implementation of the present study for final confirmation with deletion and addition of sites as necessary given field findings.

In this connection, since the initial proposal, waterworks facilities have been provided or are under construction in 9 of the originally proposed sites by the Philippine Government in its efforts to develop urgently needed safe water supply. Accordingly, 9 new sites were selected in consultation with the Philippine Government and study was conducted on the same. Preliminary study results for the final 60 sites are presented in TABLE 3-2, while outlines for each proposed site in its respective barangay are presented in APPENDIX 13.

TABLE 3-2 SITES IN EACH PROVINCE

Province	No. of Municipalities	Total No. of Sites	No. of Level I Sites		No. of Level II Sites		Proposed Toilet
			Initial Proposal	Study Team Proposal	Initial Proposal ^{1/}	Study Team Proposal	
Pampanga	3	8	1	2	7	6	8
Bulacan	2	15	12	11	3	4	13
Cavite	7	15	8	10	7	5	13
Batangas	3	22	14	17	8	5	18
Total	15	60	35	40	25	20	52

^{1/} including the number of systems requested as Level III by the Government of The Philippines

The Project includes 2 types of waterworks facilities; namely, Level I (point source) and Level II (communal faucet) facilities. Initially, the Philippine Government requested 40 Level I, 10 Level II and 10 Level III, however, based on analysis of study results in the home

office, the optimum distribution pattern was determined to be 40 Level I and 20 Level II. A map of the municipalities involved in the Project is given in the Location Map while the locations of each of the 60 Project sites are shown in APPENDIX 14.

As a result of the field findings, a variety of sites were selected thereby increasing the effectiveness of future monitoring. Although exact figures on average monthly income per household for each barangay were not immediately obtainable, the same were estimated to range from about 200-1,500 pesos based on field survey results, illustrating that the 60 sites also comprise a variety of income levels from average to minimal.

3.3 General Conditions

Not all of the selected sites are totally lacking in waterworks or sanitary toilet facilities. Rather selection was based on low standard of sanitation in comparison with surrounding villages and towns. In all sites water supply and quality was unreliable due to one or a combination of several of the following; water shortage, distance from the water source or well, dependence on rainfall, use of potentially unsanitary shallow wells, etc. Although some sites selected have Level II and Level III facilities, these are available to only a limited percentage of community residents, while the remainder of the sites are located in minimally developed areas. None of the areas selected have previously received Japanese assistance (OECF) for development of facilities.

Forty-nine of the 60 sites have public elementary schools, all except 3 of which have toilet facilities. Table 3.3 presented on the following page numerates the existing toilet facilities. The majority of these facilities, however, are old and have neither windows nor wash basins resulting in highly insanitary conditions. Moreover, existing facilities do not fulfill the requirements of official Philippine building standards for schools. Accordingly, MOH, in an effort to increase participation of local residents in establishment of sanitary facilities and primary health care through training of school children, intends to build model toilet facilities in the above schools. This strategy is a novel approach certain to have a large impact on the future of the communities involved.

Table 3.3 EXISTING SCHOOL TOILET FACILITIES

Province	Number of Barangay	Number of School	Number of Pupil	Number of Seat
Pampanga	8	8	3,270	22
Bulacas	15	15	6,603	37
Cavite	15	12	3,958	31
Batangas	22	19	4,416	59
Total	60	52	17,374	149

(1) Pampanga Province

Eight sites were selected from the 3 municipalities in the southwest portion of the Pampanga delta, the greatest farming area in the Philippines. Average monthly income per household for each site ranges from P200-P1,500, representing a broad range of economic conditions. Water supply in the selected barangays was scarce and of poor quality. Although fewer sites were selected in Pampanga Province than in any other province, the same has several Level II and III sites. One site in the southern end of the province is situated on polder only accessible by boat.

(2) Bulacan Province

Bulacan Province is situated adjacent to Manila, and is in the process of commercial and industrial development. Migration of labor to Manila is frequent; however, the development of basic facilities is consequently retarded. Fifteen sites were selected in the said province, all of which are located on low lying areas subject to flooding during the rainy season. Of the 4 provinces involved in the Project, sanitary conditions in Bulacan are the least developed. Two of the selected sites are accessible only by boat.

(3) Cavite Province

Cavite Province is located directly south of Manila with Manila Bay to the west, and Tagaytay volcanic ridge to the

southeast, a popular sightseeing area. Maintenance and management of school facilities is well coordinated and educational standards are high. Fifteen sites were selected from the 7 municipalities in areas lacking adequate water supply and the same are distributed throughout the Province.

(4) Batangas Province

Twenty-two sites were selected from the 3 municipalities located around Taal Lake. In Sta. Teresita Municipality the groundwater table is very low and much effort must be expended to draw water. Talisay Municipality, located in the lowland along the shore of Taal Lake, has many shallow wells which are subject to contamination by nearby latrines and waste material while Lemery Municipality has the lowest water supply of all the 4 provinces, relying on rain water which is stored in catchment tanks during the rainy season and used during the dry season after chemical sterilization.

3.4 Natural Conditions

3.4.1 Climate

Rainfall in the Study area is as shown in APPENDIX 15. As can be seen from the same, annual rainfall in Pampanga, Bulacan and Cavite exceeds 2,000mm while only that for Batangas in the south is less than 2,000mm. Moreover, monthly rainfall during the rainy season and the months preceding or following the same ranges from 100-600mm, while the period from July to September has particularly heavy rainfall ranging from 400-600mm/month. Rainfall during the dry season (December to April on the other hand, is generally less than 50mm/month.

Although abundant rainfall results in favorable groundwater usage conditions, heavy rainfall during the rainy season results in delayed or suspended permeation. Accordingly, the optimum groundwater conditions consist of a high groundwater level and distribution of rainfall over an extended period of time while, from the view point of construction, minimal precipitation results in most efficient implementation of work. Number of days of rainfall per month is as shown in APPENDIX 16. The said appendix shows that the number of days of rainfall per month exceeds 20

days during the rainy season including the months of July, August and September. Further data on rainfall is presented in APPENDIX 17.

3.4.2 Geology

The Project Sites are situated within 4 provinces on southern Luzon Island, the largest island in the Philippines. Two of the said provinces are located 40-60km north of Manila (Pampanga, Bulacan) while the remainder are located 50-70km to the south of Manila (Cavite, Batangas).

The geology of the area includes formations from the Cretaceous Period and Jurassic Period of the Mesozoic Era, and the Tertiary Period and Quarternary Period of the Cenozoic Era. Of these, rock layers directly related to the Project area include the Tertiary and Quarternary layers as indicated in APPENDIX 18. General classification of geological periods and classifications within the Tertiary and Quarternary Periods are tabulated as follows:

TABLE 3-4 CLASSIFICATION OF GEOLOGICAL PERIOD

ERA	PERIOD		
Archaeozoic			
Proterozoic		<u>Tertiary Period</u>	
	Cambrian		Pliocene Epoch
	Ordovician	Neocene	Miocene Epoch
	Gotlandian		Oligocene Epoch
Paleozoic	Devonian	Paleogene	Eocene Epoch
	Carboniferous		Paleocene Epoch
	Permian		
	Triassic	<u>Quarternary</u>	
Mesozoic	Jurassic	Alluvial Epoch	Holocene Recent
	Cretaceous	Diluvial Epoch	Pleistocene
Cenozoic	Tertiary		
	Quaternary		

3.4.3 Groundwater

Groundwater throughout most of Luzon Island is abundant and deep wells have been installed in various locations for paddy or other irrigation use. Based on data from the existing wells, contour line drawings were made of groundwater levels as shown in APPENDIX 19.

Approximately 90% of the Project sites are located within the above contour maps and accordingly data from the same can be used in basic groundwater development planning. The remaining 10% are located in mountainous areas where deep wells are either non-existent or unusable due to low groundwater table. Groundwater present conditions and development approach for each area are presented in this section hereinafter.

(1) Pampanga Province

1) Lubao

Two barangays were selected for development from Lubao Municipality--Sta. Cruz and Bancal Pugad. Groundwater in the former is extracted by existing artesian wells at a depth of 100m. In Bancal Pugad on the other hand, although potable water is obtained from wells 146.0m deep, water supply is insufficient due to its location on polder. This water shortage will therefore be alleviated by salt water permeation protection works to prevent infiltration of seawater into the wells.

2) Florida Blanca

Of the 4 barangays in this municipality, Camatchille is located at a range of EL 300-350m, and consequently existing shallow wells cannot provide adequate water supply. Therefore drilling of deep wells within elastic rock will be necessary. The remaining 3 barangays are located on the alluvial delta where groundwater will be easily extracted from the agglomerate rock and sandy tuff of the same.

3) Porac

In Dolores barangay, the existing springs will be the main water supply source, while in Jalung barangay, which is located at the end of the mountain range, water will be

extracted from elastic rock via deep wells. Data on groundwater conditions in Pampanga Province is presented in APPENDIX 20.

(2) Bulacan Province

1) Paombong

Eight barangays were selected from this municipality, 2 of which are located on polders; namely, Masukol and Binakod. As both sites are composed of alluvial soil rich in groundwater, a supply of good quality water will be obtained by installing deep wells (120-200m) with salt permeation protection works.

2) Obando

In this municipality also, 2 of the 7 barangays selected are located on polders; Binuangan and Salambao. As in Paombong, these sites are located on alluvial soil and thus good quality water will be obtained thereat. Data for the above municipalities in Bulacan Province is tabulated in APPENDIX 21.

(3) Cavite Province

Groundwater in the 15 barangay selected from 7 municipalities of this province is plentiful with a present well intake of more than $1,000\text{m}^3/\text{d}$ per day for crop irrigation. Groundwater is replenished by percolation from paddy fields and therefore a well depth of 50-120m will be utilized in the Project. (Refer to APPENDIX 22 for additional detailed presentation of groundwater conditions in Cavite).

(4) Batangas Province

1) Lemery

Groundwater is presently used in only 3 of the 7 barangay sites; namely, Arumahan, Bagong-poc, and Gulod. Groundwater will be drawn for the M. Dahilig and Masalisi areas, but appears economically impossible for Mayasong and

Niugan. The estimated groundwater table for these sites is shown in the cross-sectional diagram, APPENDIX 23.

In the said diagram, A-A' shows the groundwater table for Arumahan, while B-B' represents the groundwater table for Gulod, and Masalisi. The latter site is considered to have potential for groundwater utilization but as can be seen from the diagram boring up to 150m in depth will be necessary and actual utilization would depend on maximum and minimum groundwater levels of the same.

Line C-C' follows the provincial road from Lemery to Cavite and includes M. Dahilig, Mayasang and Niugan. Collection of groundwater in the latter 2 is considered impractical due to elevations exceeding 400m. In the said cross-section, use of hand pumps is impossible in areas over EL 200m where the distance from ground surface to natural groundwater level exceeds 100m. Use of submerged well pumps, although possible, will incur greater operation and maintenance fees for end-users due to the large lift required. Therefore, except for Arumahan, Bagong-pooe and Gulod, groundwater development for the remaining sites is not considered practical for this project.

2) Sta. Teresita

The 6 barangay selected are located at the edge of the mountain range where groundwater will be extracted from agglomerate rock and sandy tuff. Well sites will be carefully selected to avoid failures in geological structure that have occurred at the existing Cuta East well.

3) Talisay

All the 9 barangays, excluding Miranda which is located in a mountainous area and supplied by spring water, are near Taal Lake. Therefore pitcher-type pumps will be commonly used and uncontaminated groundwater may also be obtained from deep wells. Refer to APPENDIX 24 for further data regarding groundwater conditions in Batangas Province.

3.5 Existing Water Resources

Detailed well water supply conditions for each barangay are presented in APPENDIX 25. From these tables it can be seen that the main water sources are (i) wells, (ii) rain water and (iii) springs, in that order, with wells accounting for approximately 90% of the total.

Rain water is widely used in Batangas Municipality, particularly in the barangays situated near the edge of the mountainous area, where wells do not always provide stable water supply and groundwater sometimes cannot be reached even by drilling deep wells. Moreover, in some areas existing wells no longer satisfy water demands due to a drop in the groundwater level creating water shortages. In such areas, well water is presently supplemented with rain water to compensate for the shortage.

Springs are used for water supply when located sufficiently close to the community and, in many cases, water from the same is hauled for distances of more than 200-300m. In the present Study area, for example, residents of Dolores in Batangas Province haul water from a nearby spring for a minimum distance of 200m and a maximum of 1,500m. Although wells were dug in the center of the barangay in 1958, these have ceased to provide sufficient water supply for the residents and consequently the majority of the same spend a large amount of time and energy hauling water from the spring.

Extraction of groundwater from wells where possible is the simplest means of obtaining good quality domestic water supply. In many of the barangay studied however, existing well facilities of Levels I, II and III no longer provide adequate supply due to population increase, well deterioration, etc. Consequently, water use is restricted to certain hours in most areas within Level II areas (communal faucet) to compensate for the resultant shortage. In many cases, daily water supply is limited to 5 cans per household (18ℓ/can) even though the faucet is left running during water hours. Places where water can be used freely as needed are extremely rare. Even in areas with abundant groundwater supply, community water supply is often contaminated due to the predominant use of shallow wells.

A survey of groundwater quality was conducted during the Study period, and results of PH, ammonia (NH₄) and nitrous acid (NO₂) tests are

given in APPENDIX 26. The discoloration method was used for measurement of the same. A Cm-1K measuring gauge was used to measure electrical conductivity. Although water quality in deep wells was good, ammonia content in many shallow wells was high.

CHAPTER IV

BASIC DESIGN

CHAPTER 4 BASIC DESIGN

4.1 Well Design

Water demand will likely increase in the future along with increasing population and diversification of water usage, necessitating the construction of diversion dams and intake works at some future date. In the immediate future (within the next 5 years), however, significant change is not expected with the present demand. Accordingly, development of inexpensive and easily utilized groundwater, rain water and natural spring resources is considered most appropriate for water supply planning under the present Project, with particular emphasis on development of deep tube wells (30-200m) which provide optimum reliable water supply in terms of quality and quantity.

Tube wells are comparatively easy to install with the use of a well drilling rig. Moreover, use of the said wells in the Project area itself is common and accordingly the same type will be used in the present Project. Details of proposed Level I facilities are presented in APPENDIX 27 while those for Levels II and III are shown in APPENDIX 28.

Wells for Level I facilities should, in principle, have the following specifications (refer to APPENDIX 27):

- Well-casing diameter: 6100-150mm
- depth: approx. 60m (30-300m)
- casing type: non electrolytic corrosion pipe
- strainer: slit screen (aquifer portion only)
- packing gravel: 2-10m gravel or crushed stone (aquifer portion only)
- sanitary seal: cement mortar grout to about 6m below ground surface, hard clay from 6m below ground surface to the aquifer
- pump: standard cylinder-type manual pump for up to 130m lift, submerged well pump for lifts greater than 130m

Components of Level II well facilities are as follows (see APPENDIX 28):

- casing diameter: 6150-250mm
- depth: 60-350m
- casing type: non electrolytic corrosion pipe
- strainer: line type screen (aquifer portion only)
- packing gravel: 2-10m gravel or crushed stone (aquifer only)
- sanitary seal: cement mortar grout up to approx. 6m below ground surface; hard clay until the upper portion of the aquifer
- pump: submerged well pump

4.2 Waterworks Design

Waterworks plan and design standards are basically the same as first proposed in the Master Plan and subsequently by LWUA, RWDC, OECF, USAID, etc., with only a slight difference in detail. Based on the above sources and discussions with MPWH, the Study Team formulated the following standards for the present Project.

(1) Standard Facilities and Water Supply Capacity

Altogether 60 systems for 60 barangay are proposed as follows.

1) Level I (point source): 40 sites

Level I facilities consist only of simple wells with service areas of within 250m and for about 50 recipient households depending on well capacity and population density. Per capita water supply is designated at 40ℓ/day.

2) Level II (communal faucet): 20 sites

This system consists of distribution pipes leading from the water sources to communal faucets including well pumping station, main pipeline, water tank, distribution line and communal faucets. One faucet will serve an average of 4-6 households within a distance of approximately 25m. Beneficiaries will number about 100 households on the average while daily per capita water supply will be 80 to 100ℓ/day. A typical schematic diagram of the system and sketch of pumphouse are presented as APPENDIX 29 and 30, respectively.

(2) Design Standard Year

A 5 to 10-year period is generally used for determining the design standard year. For the present Project, a 5-year period is used.

(3) Determination of Number of Beneficiaries

Although there are a variety of methods for estimating the number of beneficiaries, PMO-RWS population data was used as a standard for the present Project, with a yearly population increase rate of approximately 3% (16% for a 5-year period). The number of

beneficiary household units was confirmed in the field, and average population per household is designated as 6.

(4) Design Water Supply

Daily average supply is designed to equal total population multiplied by daily water supply.

- Maximum daily water supply = 1.3 x daily average supply
(1/4 of the above is designated for storage tank capacity and 100% can be lifted by pump)
- Maximum usage period = 2.5 x average daily water supply + 24 hours (used to determine pipe diameter)

(5) Hydraulic Pressure of End-faucets

Hydraulic pressure of end-faucets are designed at 5 psi (3.5m) where 2-storey buildings are not likely to exist. The same is designed at 10 psi (10m) where 2-storey buildings do exist or may exist in the near future. A typical hydraulic pressure faucet is presented as APPENDIX 31.

(6) Storage Tank

An overhead reinforced concrete storage cubic tank was selected for all Level II systems and 4 Level I systems which are to be pumped by motor or engine. The proposed basic design of the storage tank is given as APPENDIX 32.

(7) Pipes

Pipes laid on earthen or sandy beds will be poly vinyl chloride (PVC), while those laid on rock beds will be steel tubes, the latter being preferred on the basis of past performance. All pipes will be embedded.

(8) Applied Standards

ISO standards are predominant in the Philippines and will be the preferred standard for use in the present Project.

(9) Pump Operation Period

Pump operation is designated at 8-16 hours/day.

4.3 Toilet Facilities Design

As previously discussed, sanitary standards of present toilet facilities in elementary schools in the Project area are low. Data collected in the field during the present Study clearly shows that the existing facilities do not adequately satisfy the minimum safety and sanitation standards for school buildings as published in 1951 by the Health Department.

The MOH, with grant aid assistance under the present Project, is promoting development of adequate facilities by design and installation of model sanitary toilet facilities. A total of 5 schools were selected as pilot sites by the Study Team upon review of data collected. During the field study it was found that 2 of these schools were already equipped with waterworks and toilet facilities. It was decided, however, that inclusion of the same within the Project would increase the effectiveness of subsequent monitoring activities.

Although flush toilets are the most preferred type, 11-13ℓ of water are required with each use versus 2ℓ required for water sealed toilets and therefore installation of the former would not be preferable for future extension. Accordingly, it was determined that flush toilets will be installed only at one school for each province as a demonstration scheme while water sealed toilets will be installed at the remaining 48 schools. All toilet facilities will have a septic tank and secondary sewage disposal system. Floors will be concrete, and inside and outside walls will be concrete blocks with plaster and paint finish. The buildings will be tin-roofed with glass jalousie windows in the wall for light and ventilation. The basic design of the above proposed plan for the 3 types of toilets are presented as APPENDIX 33.

In addition to the above, the following items are also included in the MOH school building standards:

- urinals and wash basins in all facilities
- 1 toilet and 1 urinal for every 50 males
- 1 toilet for every 30 females
- appropriate number of windows at least 50cm² in size to allow sufficient ventilation and light particularly in each cubicle
- non-slip floor with cement, cement tile or clay tile finish

- 1 lavatory per 50 persons wherever the same are not installed within the school building itself
- sanitary pit latrines in all schools with no water supply, located at least 30m from the school building including a walkway

The last item above, however, has no bearing on the Project at present as all schools selected have a water supply. Basic factors in calculation of water requirements per toilet are as follows:

flush toilet	12ℓ/flush
water sealed	2ℓ/flush
sink	0.5ℓ/capita

In general, an estimated 20% of pupils go to the toilet, and 50% urinate, at school toilet facilities. Based on this data, septic tank capacity was estimated as presented in APPENDIX 34.

4.4 Outline of Planned Facilities

An outline of the Project facilities is set in below. Detailed of the same are provided in APPENDIX 35 (1) - (4).

TABLE 4-1 PROJECT SITES

Prefecture	Design Grade		Number of Elementary School Toilet sites
	Level I	Level II	
Panpanga	2	6	8
Bulacan	11	4	13
Cavite	10	5	13
Batangas	17	5	18
Total	40	20	52

4.5 Equipment Required

A list of materials and equipment required is attached in APPENDIX 35 (5) after study of the items presented in the Minutes of Discussion, APPENDIX 3.

(1) Ministry of Public Works and Highways

Various equipment will be required to realize the objective of developing thorough and comprehensive training, education and extension activities under the Project as delineated in APPENDIX 3. The justification of each item is defined in APPENDIX 36 and in APPENDIX 3. All of the items will be directly managed by the PMO-RWS under the above mentioned Ministry while costs for operation and maintenance will be included within the budgetary requests of the latter.

(2) Ministry of Health

Equipment required for effective and complete realization of the training components mentioned in 7.2 has also been requested as listed in APPENDIX 3. Items which are identical to those required for the MPWH above are already described in detail in APPENDIX 36. However, about 10 rolls of film and 1 camera will be included for actual film-making (two sets 16mm projectors), while 2 units Video Tapes and two Video Camera sets will be combined into one item; namely, 2 video sets with recorder, camera and accessories. Film-making will be conducted by experienced staff from among the Ministry's sanitary engineers. (The same applies to the MPWH above). Two sets of portable refers to generators. Points regarding the necessity of equipment items not defined in APPENDIX 36 are presented on the following page.

Audio visual vans are essential for realization of extension activities and educational programs aimed at raising people's understanding of the need for sanitary practises in as wide an area as possible. Two vacuum cars and 2 bulldozers will be used and justification of use and proposed management of the same is given in APPENDIX 37. Four units of 4-wheel drive (approximately 1,000cc) jeeps were selected as monitoring vehicles because of their low fuel consumption and efficiency (1 vehicle to be supplied per province).

CHAPTER V

PROJECT IMPLEMENTATION PLAN

CHAPTER 5 PROJECT IMPLEMENTATION PLAN

5.1 Organization of Construction Works

Organization and administrative process for design and construction work is presented in APPENDIX 38.

5.2 Construction Work

Construction work is composed of 4 major components listed below:

- well construction (excavation, pump equipment and electricity)
- waterworks facilities (RC overhead water tank, distribution pipe)
- elementary school toilet facilities (construction work)
- procurement

In consideration of the aim to complete Project construction for all 60 sites as soon as possible, a lump sum contract in which a Japanese general contractor would subcontract to specialized local companies for each of the above construction work categories and coordinate overall construction is considered the most effective contract method.

5.3 Allocation of Major Undertakings

5.3.1 Major Undertakings to be Covered by the Japanese Government

The Japanese government will be responsible for funding construction of water supply and sanitation facilities and provision of materials and equipment required. The Consultant will be responsible for the detailed design, preparation of tender documents, evaluation, and construction supervision.

The contractor will be responsible for the construction works, procurement of equipment, material and labour, and preparation of necessary reports.

5.3.2 Major Undertakings to be Covered by the Philippine Government

(1) General

- 1) With regards to products imported into the Philippines for this Project, the unloading, customs clearance and tax

exemption proceedings will be assured by the Philippine Government.

2) The products and services to be provided for the Project will be exempted from tariffs, internal tax and other official levies imposed by the Government of the Philippines.

3) The Japanese nationals who provide products and services for the Project will be given due consideration in terms of entree permits, etc. to facilitate execution of their services.

4) All acts to be executed in compliance with Philippine law such as applications, approvals, etc. which are required for the Project will be readily processed in the Philippines.

5) For the construction materials, etc. required under the Project which are to be purchased in the Philippines, arrangements will be made so that the same can be purchased at official prices set by the Government.

6) A budget which is necessary for the operation and maintenance of facilities after the completion of the Project will be secured.

(2) Land Preparation

1) Demolition or relocation of surface and underground obstacles will be arranged by the Philippine Government.

2) Land preparation, including banking at the point of each well will be arranged by the Philippine Government.

(3) Utilities

1) Electric Power

Purchase and installation of substation and power connections during the construction period and of permanent connections after completion of construction will be arranged by the Philippine Government.

2) Water Supply

Connection of the temporary water supply pipe during the construction period for the Project office will be arranged by the Philippine Government.

(4) Land Acquisition

1) Land will be acquisitioned for each site (60) and field office (3) before actual commencement of construction works.

(5) Access Roads

1) Required access roads will be constructed to each site and field office and maintained in a serviceable mode.

5.4 Construction Schedule

Although year-round construction is possible in the higher areas of the 2 southern and 2 northern provinces, construction progress during the rainy season is equal to about 70% of the dry season. Moreover, it should be noted that in the low lying areas of the 2 northern provinces, construction is only possible during the dry season.

An implementation schedule estimated from the day Exchange of Notes E/N takes place is presented in APPENDIX 39.

CHAPTER VI

OPERATION AND MAINTENANCE

CHAPTER 6 OPERATION AND MAINTENANCE

6.1 Operation and Maintenance System

Two types of facility are planned under the present Project; namely, potable water supply facilities and toilet facilities in elementary schools. The administrative system for operation and maintenance of the same is shown in APPENDIX 40 and 41 and described hereunder.

(1) Water Supply Facilities

Water supply facilities to be set-up under the Project are categorized according to scale and consist of 2 types; tubewells (Level I) and tubewells equipped with pump tank, and water line (Level II). Upon completion of drilling and installation, ownership rights for the same will be transferred to the MPWH. The ownership, right of usage and responsibility for operation and maintenance will in turn be given to the recipient RWSAs. The MPWH, however, will provide adequate instruction to RWSAs in appropriate and effective methods of operation and maintenance. In principle, recipients should bear operation and maintenance costs.

(2) School Toilet Facilities

Toilet facilities will be provided in elementary schools in the same barangays which are designated as recipients of the waterworks facilities described above. Ownership and responsibility for operation and maintenance of toilet facilities will be invested in the MOH upon completion of installation. Thereafter, the same will be transferred to the Ministry of Education and school authority.

Operation and maintenance costs will be borne by the school authority. Instruction of school principals, head teachers, teachers and PTA members in operation and maintenance of toilet facilities will be carried out through the monitoring activities of the MOH.

6.2 Monitoring

The present Project is a pilot scheme, the main objective of which is to increase the understanding of the need for sanitary practises among local people and to improve the health standards of the same through establishment of sanitary facilities and consequent reduction of contagious, and in particular, of water-borne, diseases.

Water-borne diseases are generated and spread in areas where drinking water is exposed to contamination from waste and sewage. A significant reduction in water-borne diseases is therefore expected under the present Project through establishment and maintenance of a clean, potable water supply adequately protected from contamination by sewage, etc. and through the extension of sanitary practices arising from installation of toilet facilities in elementary schools.

(1) The Need for Monitoring

As the present Project is a pilot project in sanitation, the results of the same will have a significant influence on the entire country and achievement of optimum project effectiveness is essential. It is therefore necessary to obtain a firm grasp on the effects of the Project while at the same time maximizing those effects as much as possible. For this purpose, monitoring is required, the results of which will be used as feedback to increase future Project effectiveness. Project life has been designated as 5 years to allow for careful and thorough monitoring and feedback analysis, two main focal points of the present Project.

Some of the results envisioned during the 5 year period are:

- a) reduction of the incidence of contagious diseases in rural areas;
- b) increased understanding of the need for sanitary practices;
- c) increased social awareness; and,
- d) improved standards of living in rural areas.

Present conditions, and changes which occur during the preliminary, middle and final stages of project implementation must be monitored to determine actual effects, and results of the same should be channeled back into the Project to ensure increased

effectiveness. In this way, the Project will form a firm basis for implementation of a similar project on the national level.

(2) Monitoring Approach

The "Manual on RHU Operations Information System" published by the MOH contains detailed information on monitoring methods. However, preparation of a new manual is proposed, containing those portions of the existing manual which are pertinent to the present Project and additional necessary items. Monitoring activities will include the following:

1) Bench mark survey

A bench mark survey to determine present conditions in the Project area and provide data for use in subsequent monitoring activities should be undertaken as soon as possible after Exchange of Notes.

2) Monitoring

Monitoring of project effects will be undertaken at regular intervals as follows: immediately upon completion of construction, and 3 months, 6 months, 1 year and 3 years (in dry and rainy season) after the same.

3) Feedback

Results obtained from monitoring will be evaluated and used to increase Project effectiveness until the next monitoring period.

4) Post evaluation

Final effects of the Project will be evaluated after completion of the 5 year Project period in both rainy and dry seasons and the findings of the same will be reflected in a subsequent project undertaken at the national level.

Before monitoring is undertaken, preparation of a monitoring manual in conformity with the present Project and dealing with establishment of bench marks, monitoring implementation, and other essential items, is strongly recommended. The detailed monitoring form will be prepared by MPWH and MOH considering the items

presented in the APPENDIX 40. In order to ensure comprehensive Project evaluation, monitoring should examine not only sanitary but also sociological, economical and administrative aspects of the Project. Monitoring methods for the same should also be included within the manual. To facilitate this, an organized system of mutual cooperation should be established between the government ministries concerned (MOH, MWP, Ministry of Education Culture & Sports, etc.) and, in addition, communication and close cooperation with the Research Institute for Tropical Medicine, and various universities and related research institutes will be required.

(3) Monitoring Organization

As shown in APPENDIX 6, monitoring will be undertaken primarily through the existing administrative organization of the MOH. The Study Team worked with the same during the study period in implementation of field surveys to determine such things as the incidence of disease, existing sanitary conditions, sanitary organizations, and school conditions. Despite limited time, all barangays proposed under the present Project were surveyed and necessary data obtained. This experience clearly established the capacity of the said Ministry to conduct future monitoring. However, as schools are not under the jurisdiction of the same, the cooperation of the regional office of the Ministry of Education Culture and Sports as well as the cooperation of school officials in each Project site, should be obtained through the regional office of the MOH.

In the case of monitoring water-related environmental sanitation, survey of wells and their vicinity, and of distribution facilities, drainage conditions, etc. will be required. For this purpose, the cooperation of the MPWH and RWSA is essential. Cooperation, especially of local residents, should be firmly agreed upon and ensured before the transfer of Project facilities takes place.

In addition to seeking the cooperation of the Research Institute for Tropical Medicine and various universities and research institutes, establishment of a Project Committee by the

MOH composed of members of the above would greatly contribute to establishment of monitoring, methods, data processing, etc.

6.3 Training and Feedback

Training of persons concerned with the Project and its facilities by related agencies, and careful use of feedback from monitoring results, is considered essential for maximization of Project benefits.

(1) MPWH

The MPWH will provide technical and administrative instruction to recipients of Project services including such subjects as formation of Communal Well Usage Associations, operation and maintenance of facilities, repairs, water usage, collection of operation and maintenance fees, and determination of water rates. Various materials on training methods for the above are already available such as the "Manual for RWSA Formation". Moreover, 3 experts are presently employed as instructors in sanitation.

In addition to the above, the MPWH should facilitate use of feedback from monitoring conducted by the MOH with regards to both the problems and successes of Project facilities and thereby optimize Project effectiveness.

(2) MOH

The MOH will be responsible for smooth implementation of monitoring, especially with regards to increased public concern for sanitation, the major component of the present Project. The MOH has established a training center in each region and is actively involved in the activities of the same. The training centers in Region III and IV of the Project are accordingly available for Project use. In addition to ensuring accurate monitoring, the MOH will also be responsible for training of persons concerned with Project implementation, Project recipients and school officials, teachers, etc., at the abovementioned training centers. A brief outline of the training programs for respective participants is given hereunder.

1) Project Implementation

Monitoring and sanitation extension activities will mainly be performed at the local level by nurses and midwives through barangay stations, and barangay workers. Accordingly, training of the same is essential and should include standardization of interpretation and usage of the projected new "Monitoring Manual," and of related data processing and classification, as well as methods of instruction for sanitary inspectors and experts from the Research Institute for Tropical Medicine and various other research agencies. Curriculum preparation for the above training course could be assisted by the short-term team of technical experts from Japan.

2) Project Recipients

In return for the benefits afforded by Project facilities, recipients will be required to participate in training programs provided by the MOH and MPWH, thereby increasing Project effectiveness. Training for the same will concentrate primarily upon awareness of the need for sanitary practices, and avoidance and prevention of the spread of contagious diseases.

3) School Officials

School facilities are under the jurisdiction of the Ministry of Education Culture and Sports. Those officials and agencies of the same directly concerned with the present Project are the District Supervisor's Office, municipal principals, head teachers and PTA members. Cooperation of the said Ministry is necessary for smooth Project implementation and therefore, the MOH should work closely with the district offices and municipal principals under the same, and provide instruction in sanitary education to the head teachers of each school. Head teachers and teachers should be made fully cognisant of the intentions and ideology of the MOH under the present project and assist by teaching their pupils proper sanitary practices.

4) Other

Training of MOH and MPWH staff involved in monitoring and training activities, including field surveys, questionnaires, public relations and extension activities, is also necessary. There are sufficient instructors available in the training sections of each of the above Ministries to ensure adequate training.

Project merits and demerits, as well as specific problems revealed by monitoring should be taken up by a Project Committee composed of members from the MPWH, MOH, Ministry of Education Culture and Sports, the Research Institute for Tropical Medicine, which other related agencies, and should be used as feedback in the formation of subsequent Project improvement policy. Methods for the same should be compiled by the said committee in the form of a "Feedback Manual".

6.4 Operation and Maintenance Costs

The Project may be broadly divided into the following categories:

- Waterworks
- Toilet Facilities
- Monitoring & Training

Operation and maintenance schemes will be planned for each of the above items.

(1) Waterworks (tubewell, pump, tank, water line)

1) Project implementation

A possible outline of organization for the waterworks portion of the Project is as shown in APPENDIX 40.

2) Estimated Cost

The required facilities and cost for Level I and II are tabulated on the following page.

Level I Facilities (tubewell with hand pump)

Item	Amount
Number of Barangay	40
Number of Households	2,580
Population	18,000

Operation and Maintenance Cost (hand pump facilities)

Unit: Pesos		
Item	Calculation	Amount
Depreciation	230/yr x 37systems	8,510
Labor Cost	6persons x 2days x 0.5/yr x 63 x 37	13,986
Truck	2days x 700 x 0.5/yr x 37	25,900
Machine Loss	80 x 2days x 0.5/yr x 37	2,960
Total		74,296

$$\text{Cost per household} = \frac{P74,296}{2,580} = P29/\text{yr} \\ = P2.4/\text{mo}$$

Level II Facilities

Item	Amount
Number of Barangay	20
Number of Households	3,985
Population	28,000

Operation and Maintenance Cost (submersible pump facilities)

Unit: Pesos		
Item	Calculation	Amount
Depreciation	16,000 x 0.05/yr x 21systems	16,800
Labor Cost	8persons x 2days x 0.05/yr x 63 x 21	1,059
Truck	2days x 700 x 0.05/yr x 21	1,470
Machine Loss	2days x 80 x 0.05/yr x 21	168
Electricity	4hr x 5.5kW x 1.5 x 365 x 21	252,945
Water Line Repair	800/km/yr x 53km	42,400
Total		314,842

$$\text{Cost per household} = \frac{P314.842}{3,985} = P79/\text{yr} = P6.6/\text{mo}$$

(2) **Toilet Facilities**

1) **Organization**

A possible outline for organization of operation and maintenance of toilet facilities is shown as APPENDIX 41.

2) **Estimated Cost**

Cost estimate for operation and maintenance of toilet facilities is tabulated below.

Operation and Maintenance Cost (toilet facilities)

Unit: Pesos		
Item	Calculation	Amount
Maintenance	230/yr x 52schools	11,960
Vacuum Truck	2trucks x 300/day x 26days x 12mo	187,200
Bulldozer	2machines x 450/day x 26days x 12mo	280,800
Total		479,960

Based on the above calculations, approximately P480,000 is estimated for annual toilet maintenance and operation costs.

(3) Monitoring and Training

1) Organization

Monitoring and training should be administered by an organization directly connected to the existing MOH. To strengthen and support the activities, a data processing analysis section and a sanitation training section should be established within the said organization.

2) Estimated Cost

Cost of monitoring and training is tabulated as follows:

Operation and Maintenance Cost (monitoring and training)

		Unit: Pesos
Item	Calculation	Amount
Car	4vehicles x 300/day x 26days x 12mo	374,400
Staff	10persons x 80/day x 26days x 12mo	249,600
Depreciation	8,000P x 12mo	96,000
Total		P720,000

An estimated P720,000 is considered necessary to cover annual monitoring and training costs. Based on the above calculations, the total cost requirement for toilet operation and maintenance and sanitation monitoring and training to be provided by the Philippine Government is estimated at P1,200,000 per year.

CHAPTER VII

EVALUATION

CHAPTER 7 EVALUATION

Based upon analysis of Study results, the Project effect can be evaluated as numerated hereafter.

- 1) Construction of sixty (60) water supply facilities and fifty-two (52) toilets with lavatories in sixty (60) barangay located in four (4) provinces will benefit six thousand and six hundred (6,600) households and seventeen thousand (17,000) pupils.
- 2) Participation of barangay people in rural sanitation can be facilitated by training the public school children primary health care and sanitary practices.
- 3) Recipient barangays will serve as multiplier agents for other barangay within the four (4) selected provinces to adopt the sanitary practices that are learned and practiced by their neighboring barangay.
- 4) Extension of sanitary toilet facilities will prevent the spread of contagious diseases brought about by contamination of drinking water.
- 5) Projects aimed at improvement of sanitary living standards of the people in the proposed area are rarely implemented due to financial and economic problems.

CHAPTER VIII

CONCLUSION AND RECOMMENDATIONS

CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

8.1.1 Necessity of the Project

Based on the findings made by the Study Team, which are enumerated in Chapter VII, it is imperative to implement the Pilot Rural Environmental Sanitation Project.

It is evident that the implementation of the Project will provide safe and potable water, and sanitary facilities to the recipient barangays which will improve their sanitary conditions. Hence, diseases related to poor sanitary conditions will be reduced if not totally eliminated.

Existence of such facilities will increase the level of awareness of the people of the need to change and improve their attitudes and practices with regards to sanitation.

8.1.2 Facilities, Equipment and Construction Works Necessary for the Project

- (1) Under the Japanese Grant Aid System the Government of the Republic of the Philippines will be provided with sixty (60) water supply systems consisting of forty (40) and twenty (20) systems of Level I and II, respectively, in the barangays that were selected by the Philippines Government. In addition, 52 toilet facilities will be installed at several school sites. Likewise, necessary equipment for monitoring, training, and operation and maintenance will be provided.
- (2) Immediately after conclusion of the Exchange of Notes, detailed design including the Tender Documents and Specifications will be prepared by a Japanese Consultant within four (4) months. The construction is expected to be completed within 13 months by a selected Japanese contractor.

8.2 Recommendations

- (1) It is recommended that an inter-agency committee composed of senior officials from the Ministry of Health (MOH) and the

Ministry of Public Works and Highways (MPWH) be formed by the Philippine Government. The primary responsibility of the committee would be to monitor and evaluate the progress of project implementation for about five (5) years.

- (2) In addition, effective operation and maintenance of the facilities and equipment could be supervised by the concerned agencies through the interagency committee in order to collect successful results, of the training and monitoring activities.
- (3) The proposed inter-agency committee would also be responsible for the proposed immediate organization of RWSAs at the selected sites of the Project after the conclusion of the Exchange of Notes.
- (4) The disinfection of the water supply system should be carried out through the inter-agency committee in accordance with the results obtained by the water quality test.
- (5) It is further recommended that the MOH is expected to place higher priority on the selected project areas to improve the present toilet conditions of the rural inhabitants under their on-going program.
- (6) Technical assistance for monitoring activities is recommended to facilitate more effective implementation of the said activities.

APPENDIXES

LIST OF PARTICIPANTS IN THE STUDY

ASSIGNMENT	NAME	ORGANIZATION
Team Leader	Hiroyuki NOGUCHI	Ministry of Foreign Affairs
Environmental Sanitation Specialist	Masaharu FUKUDA	Ministry of Health and Welfare
Project Coordinator	Yoshifusa SHIKAMA	Japan International Cooperation Agency (JICA)
Water Supply Specialist	Yoshio TAGUCHI	CHUO KAIHATSU CORPORATION (CKC)
Design Engineer	Takafumi SUZUKI	C K C
Well Development	Shun WATANABE	C K C
Hydrogeologist	Susumu HONDA	C K C

LIST OF JAPANESE OFFICIALS WHO SUPPORTED THE STUDY

ASSIGNMENT	NAME	ORGANIZATION
Resident Representative	Akihiro Mitarai	MNL Office JICA
Staff	Toichi Iwata	MNL Office JICA
1st Secretary	Ryoji Takahara	Embassy of Japan, MNL
1st Secretary	Takashi Koezuka	Embassy of Japan, MNL

DAILY WORK SCHEDULE OF STUDY TEAM

Date	Activity
May 27 (Sun)	Arrive Manila. Preliminary meeting
28 (Mon)	Courtesy call to Embassy of Japan and JICA office, Joint Meeting with MPWH and MOH
29 (Tue)	Sub-team 1: site Survey; Cavite Sub-team 2: Collection of Maps, Preparation of Drawings
30 (Wed)	Sub-team 1: Site Survey; Pampanga; Discussion with MPWH and MOH on Proposed Minutes Sub-team 2: Collection of Data (MPWH)
31 (Thu)	Sub-team 1: Meeting with MOH Sub-team 2: Collection of Data & Reports at MPWH
Jun 1 (Fri)	"Signing of Minutes", Discussion with MPWH on Proposed Questionnaire and Schedule
2 (Sat)	Review of Data, Preparation of Schedule and Questionnaire
3 (Sun)	- ditto -
4 (Mon)	Travel to Batangas; Presentation of Questionnaire and Schedule to Ministry Concerned in the same Sub-team 1: Meeting with Batangas MOH Sub-team 2: Collection of Cadastral Maps
5 (Tue)	Travel to Balanacas; Presentation of Questionnaire and Schedule to Ministry Concurred in the same Sub-team 1: Site Survey; Balanca Sub-team 2: Collection of Castral Maps
6 (Wed)	Travel to Pampanga Sub-team 1: Presentation of Questionnaire and Schedule to Ministry Concerned in the same, Site Survey Sub-team 2: Meeting with MOH; Inspection of MWSS; Collection of Cadastral Maps
7 (Thu)	Travel to Cayte Sub-team 1: Presentation of Questionnaire and Schedule to Ministry Concerned in same; Site Survey Sub-team 2: Collection of Cadastral Maps
8 (Fri)	Travel to Manila; Report to Embassy of Japan and JICA Office; Report Preliminary Site Selection to MPWH
9 (Sat)	Discussion with MWPB of detailed Schedule, detailed Survey Items, and Checklist
10 (Sun)	Preparation of above; Review of Data Collected
11 (Mon)	Travel to Batangas; Collection of Reports at District Municipal Office; Groundwater Survey at 1 Site; Review and Preparation of Data

Date	Activity
Jun 12 (Tue)	Divide into 3 sub-teams to Conduct Groundwater Survey of 8 Sites
13 (Wed)	Groundwater Survey of 9 Sites
14 (Thu)	Sub-teams 1 & 2: Groundwater Survey of 4 Sites Sub-team 3: Meeting with District Engineers of each Province to Discuss Groundwater Data Collection in Pampanga, Balanca, Cavite Sub-team 4: Collection of Data on Sanitation in Batangas
15 (Fri)	Travel to Manila Sub-teams 1 & 2: Groundwater Survey of 3 Sites Sub-team 3: Meeting with District Engineers of each Province to Discuss Groundwater Data Collection in Pampanga, Balanca, Cavite Sub-team 4: Collection of Data on Sanitation in Batangas
16 (Sat)	Preparation and Presentation of Report on Data Collection
17 (Sun)	Preparation and Presentation of Report on Data Collection
18 (Mon)	Travel to Pampangas Sub-teams 1 & 2: Groundwater Survey of 6 Sites Sub-teams 3 & 4: Collection of Data on Sanitation in Batangas
19 (Tue)	Sub-teams 1 & 2: Groundwater Survey of 6 Sites Sub-teams 3 & 4: Collection of Data on Sanitation in Cavite
20 (Wed)	Sub-teams 1 & 2: Groundwater Survey of 7 Sites Sub-teams 3 & 4: Collection of Data on Sanitation in Cavite
21 (Thu)	Travel to Manila Sub-teams 1 & 2: Groundwater Survey of 3 Sites Sub-teams 3 & 4: Collection of Data on Sanitation in Balanca
22 (Fri)	Sub-teams 1 & 2: Groundwater Survey of 6 Sites Sub-team 3: Collection of Data on Sanitation in Balanca Sub-team 4: Discussion of Design with MPWH
23 (Sat)	Sub-teams 1 & 2: Groundwater Survey of 6 Sites Sub-teams 3 & 4: Discussion of Design with MPWH
24 (Sun)	Review of Data Collected (questionnaires, photographs, measurements, etc.); Second Site Selection
25 (Mon)	Sub-team 1: Continuation of above Sub-team 2: Collection of Data on Sanitation in Pampanga Sub-team 3: Discussion of Design with MPWH
26 (Tue)	Mid-term Report to Embassy of Japan, JICA; Continuation of previous work Sub-team 2: Collection of Data on Sanitation in Pampanga Sub-team 3: Discussion of Design with MPWH

Date	Activity
Jun 27 (Wed)	Sub-team 1: Additional Site Selection and Determination of Survey Schedule Sub-team 2: Meeting with MOH; Collection of Groundwater Data at NIA, NWRC
28 (Thu)	Sub-teams 1 & 2: Survey of Additional Sites Sub-team 3: Collection of Data on Construction Cost
29 (Fri)	Sub-teams 1 & 2: Survey of Additional Sites Sub-team 3: Groundwater and Construction Cost Study with MPWH, NIA and LWUA
30 (Sat)	Sub-team 1: Survey of Additional Sites Sub-team 2: Review of Data Sub-team 3: Mid-Term Report to MPWH
Aug 1 (Sun)	Review of Data Collected; Second Additional Site Selection
2 (Mon)	Sub-team 1: Survey of Additional Sites Sub-team 2: Meeting with NIA, LWUA, RWDC, NEDA Sub-team 3: Meeting with MOH
3 (Tue)	Discussion of Final Report with MPWH, MOH; Presentation of Final Report to Embassy of Japan and JICA
4 (Wed)	Sub-teams 1 & 2: Greeting, Report and Supplementation Sub-team 3: Meeting with National Census and Statistics Office and Ministry of Labor
5 (Thu)	Final Collection of Additional Data from MPWH, Leave Manila

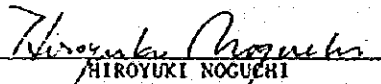
MINUTES OF DISCUSSION
ON
PILOT RURAL ENVIRONMENTAL SANITATION PROJECT
IN
THE REPUBLIC OF THE PHILIPPINES


In response to the request made by the Government of the Republic of the Philippines for the Pilot Rural Environmental Sanitation Project (hereinafter referred to as "the Project"), the Government of Japan has sent, through the Japan International Cooperation Agency (hereinafter referred to as "JICA"), a team headed by Mr. Hiroyuki Noguchi, Economic Cooperation Bureau, Second Economic Cooperation, Ministry of Foreign Affairs, to conduct a basic design study from May 27 to July 5, 1984. The team has carried out a field survey, held a series of discussion and exchanged views with the authorities concerned of the Project.

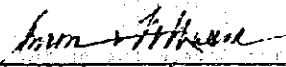
As a result of the study and discussions, both parties have agreed to recommend to their respective Governments the herewith attachments for review.

June 1, 1984

Manila

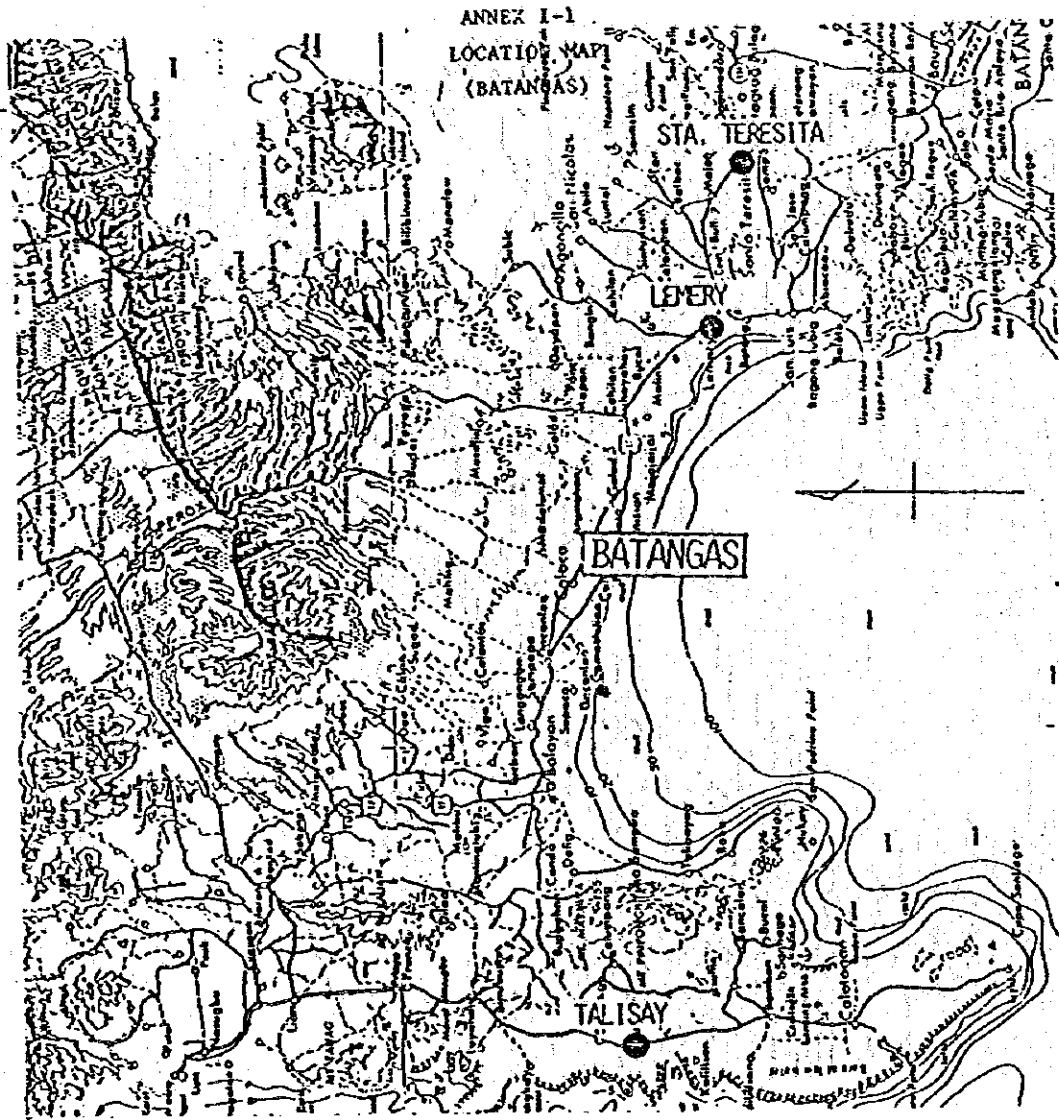

HIROYUKI NOGUCHI
Team Leader
Basic Design Study Team
JICA


TEODORO T. ENCARNACION
Assistant Minister for Planning
Ministry of Public Works and Highways


AURORA S. VILLAROSA
OIC, Bureau of Health Services
Ministry of Health

ATTACHMENT

1. The Objectives of the Project are:
 - a. To provide safe water supply system, sanitary facilities, and necessary equipment in order to improve the existing sanitary condition and to increase the level of awareness on the need of sanitary practices foremost among the school children which will have a long lasting effect in the community.
 - b. To motivate the community through the school children in effecting the concepts of the primary health care approach for full community participation in the implementation of the Project activities.
 - c. To reduce the incidence of diseases related to poor sanitary conditions and provide suitable living environment for the community.
2. The proposed sites of the Project are located in the provinces of Batangas, Bulacan, Cavite and Pampanga (hereinafter referred to as "The Project Sites"). Refer to Annexes I-1 to I-4 for the Location Maps.
3. The Japanese Survey Team will convey to the Government of Japan the desires of the Philippine Government that the former takes necessary measures to cooperate in implementing the Project and provide the facilities and other items listed in Annex II within the scope of Japanese economic cooperation programme in grant form.
4. The Government of the Philippines has understood Japan's grant aid system as explained by the Team which includes a principle on the use of a Japanese Consultancy Firm and a Japanese General Contractor for the implementation of the Project.
5. The Government of the Philippines will take necessary measures listed in Annex III on condition that the grant assistance by the Government of Japan is extended to the Project.

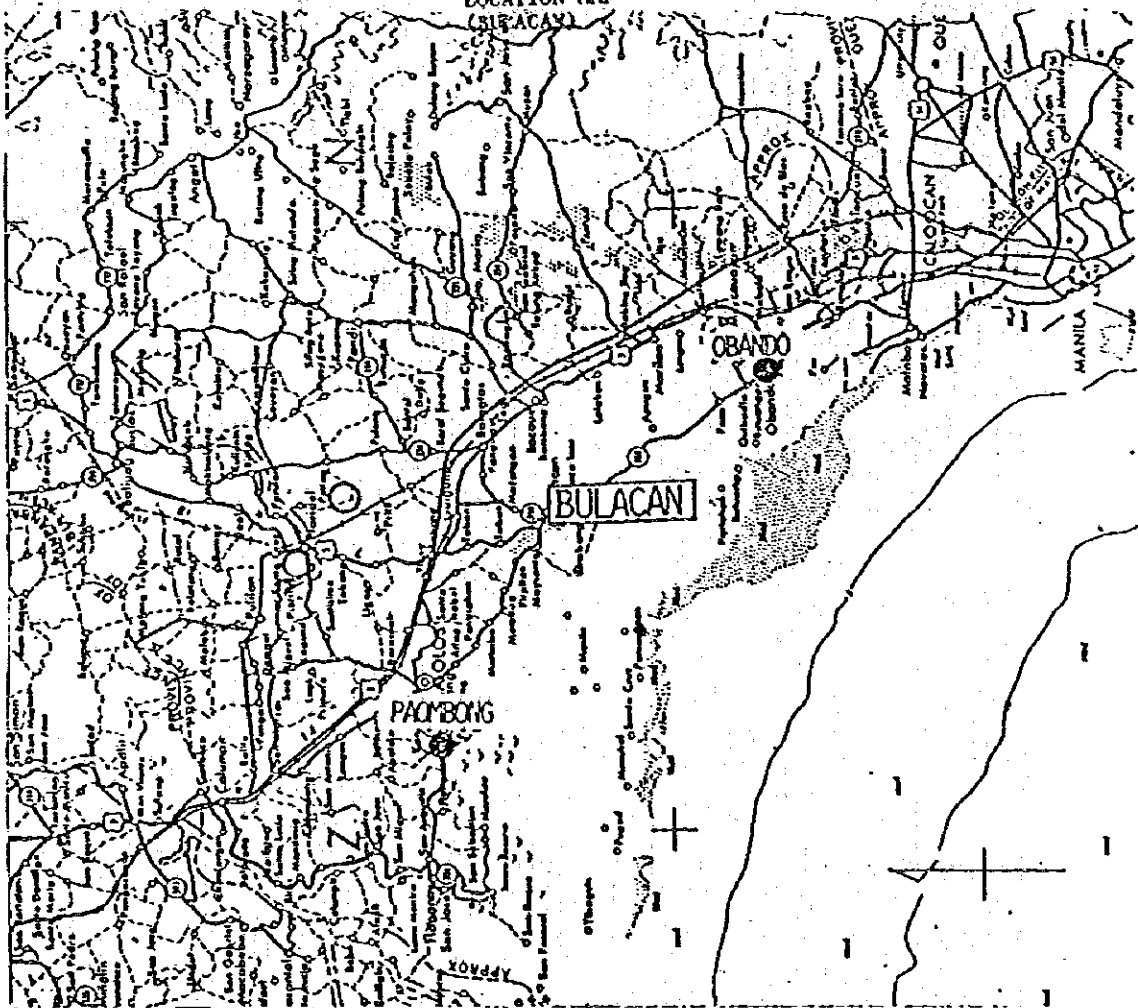


PROVINCE	MUNICIPALITY	BARANGAY	
Batangas	Lemery	Arumahan	Kasayang
		Bagong Pook	Masalisi
		Gulod	Mugan
		Maharang Dahilig	
	Sta. Teresita	Antipolo	Kalayaan
		Sihis	Poblacion
		Suzol	Sinipian
		Irukan	
	Talisay	Aya	Quiling
		Belas	Sampaloc
		Banga	Sta. Maria
		Calsoca	Tunaway
	Miranda		

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ANNEX I-2
LOCATION MAP
(BULACAN)

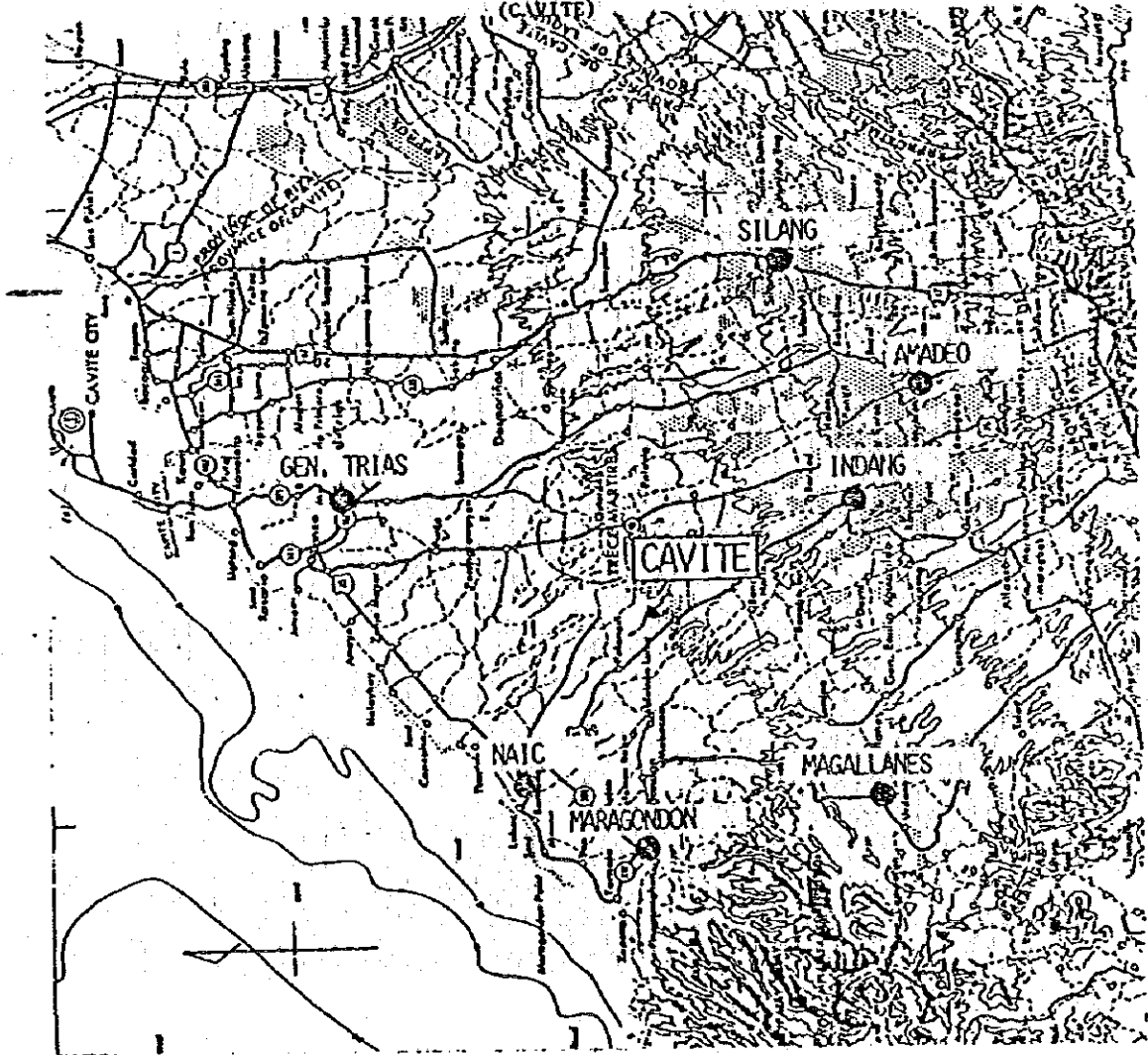


PROVINCE	MUNICIPALITY	BARANGAY
Bulacan	Paombong	<ul style="list-style-type: none"> ✓ Binakod ✓ Kapitangan ✓ Kalumot ✓ Masukol <ul style="list-style-type: none"> Pinalagdan Poblacion San Isidro I San Isidro II
	Obando	<ul style="list-style-type: none"> Binuangan Catangalan Hulo Lava M. Sra. de Salambao Faco Pag-asa

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ANNEX I-3
LOCATION MAP
(CAVITE)

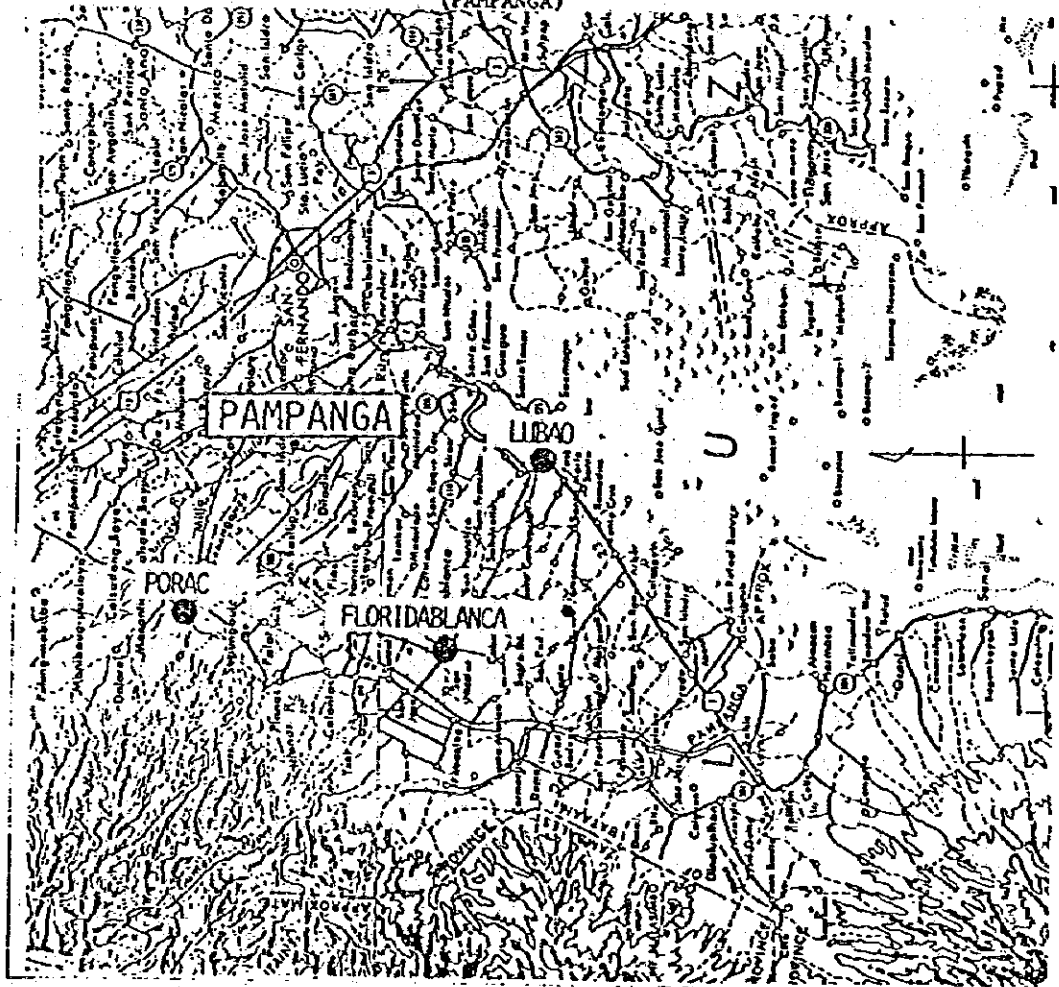


PROVINCE	MUNICIPALITY	BARANGAY	
Cavite	Amadeo	Asitín	Maitín
	Gen. Trias	Buanavista	Manggahan
	Indang	Balaybeg	Pilit
	Magallanes	Bendita	Media
	Maragondon	Pantihan	Tuley
	Naic	Luna	Pulanque
	Silang	Pasong Mangka	

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ANNEX I-4
LOCATION MAP
(PAMPANGA)



PROVINCE	MUNICIPALITY	BARANGAY
Pampanga	Libao	Sta. Cruz
	Floridablanca	Bodega Camatchilla Cuisid
	Porac	Pio Jalong

File

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ANNEX II

Items requested for the Project by the Government of the Philippines.

1. Facilities (No. of Projects)

Level I	- 40
Level II	- 10
Level III	- 10
Toilets	- 60

2. Equipment

For MPWH:

- a. 1 unit Mobile Workshop
- b. 1 set Maintenance Tools
- c. 1 unit Photocopier with enlarger and reducer
- d. 1 unit Printing Machine
- e. 1 set 16mm Projector
- f. 1 Video Set, with recorder, camera and accessories
- g. 1 set Portable Generator
- h. 2 sets Pumping Test Units
- i. 2 units Water Level Indicator

For MOH

- a. 2 units Mobile Type Audio Visual Van
- b. 2 units Copier
- c. 2 units Printing Machine
- d. 2 sets 16mm Projector
- e. 2 units Video Tapes
- f. 2 sets Video Camera
- g. 2 sets Portable Generator
- h. Disinfectants and Disinfection equipment (Amount of disinfection and type of equipment will be determined after the survey)
- i. 4 units Mechanical Excavator
- j. Vehicles for monitoring
- k. Bulldozers
- l. Savage digesters

Hm

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ANNEX III

Following arrangements are required to be taken by the Government of the Philippines.

1. To secure a lot of land necessary for the construction of facilities.
2. To provide necessary data and information for basic design.
3. To ensure prompt unloading, tax exemption, customs clearance at ports of disembarkation in the Philippines, and prompt internal transportation therein of the products purchased under the grant.
4. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the grant.
5. To undertake incidental civil works such as gardening, fencing, gates and exterior lighting, if needed.
6. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the Philippines with respect to the supply of the products and services under the verified contracts.
7. To accord Japanese national whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.



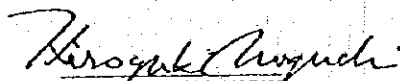
MINUTES OF DISCUSSION
ON
THE DRAFT REPORT OF THE BASIC DESIGN STUDY
OF THE
PILOT RURAL ENVIRONMENTAL SANITATION PROJECT
IN
THE REPUBLIC OF THE PHILIPPINES

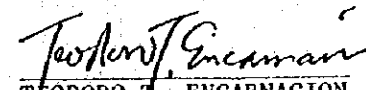
The Government of Japan has sent, through Japan International Cooperation Agency (JICA), a Basic Design Survey Team to the Republic of the Philippines from 28 September to 5th October 1984 for the purpose of presenting and explaining the draft of the Final Report of the Basic Design Study (hereinafter referred to as the Report) on the Pilot Rural Environmental Sanitation Project in the Republic of the Philippines (hereinafter referred to as the Project).

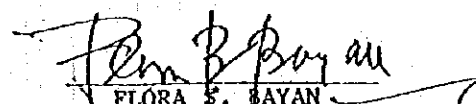
The Team held meetings with the Philippine officials to explain and discuss the contents of the Report. As a result of the discussion, both parties have confirmed the following items:

1. The Report in principle satisfies the Philippine side and appropriate alterations as agreed during the discussions will be incorporated in the Final Report.
2. The Final Report (10 copies in English) on the Project will be submitted to the Government of the Philippines by the end of December 1984.
3. The Philippine side understood the system of Japan's Grant Aid Programme and especially the arrangements to be taken by the Philippine side for the realization of the Project.

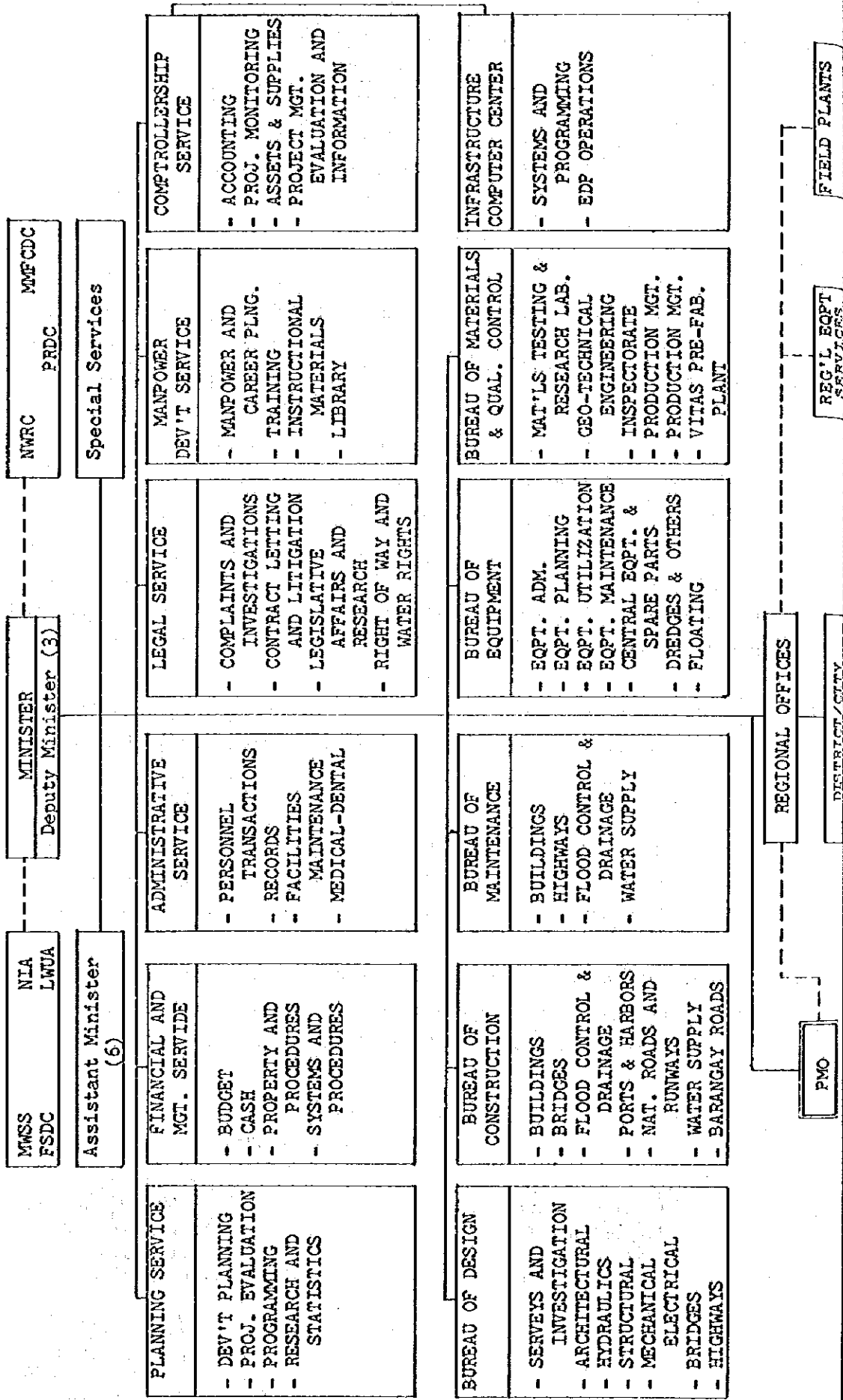
Manila, Philippines
October 4, 1984


HIROUKI NOGUCHI
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Survey Team


TEODORO T. ENCARNACION
Assistant Minister for Planning
Ministry of Public Works and Highways


FLORA S. BAYAN
OIC, Bureau of Health Services
Ministry of Health

MINISTRY OF PUBLIC WORKS & HIGHWAYS
Organization Chart



PROJECT MANAGEMENT OFFICE
Organization Chart

