

**WATER AND SANITATION
FOR HEALTH PROJECT**



**COORDINATION AND
INFORMATION CENTER**

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Telephone: (703) 243-8200
Telex No. WU 64552
Cable Address WASHAID

The WASH Project is managed by Camp Dresser & McKee Incorporated. Principal Cooperating Institutions and subcontractors are: International Science and Technology Institute; Research Triangle Institute; University of North Carolina at Chapel Hill; Georgia Institute of Technology—Engineering Experiment Station.

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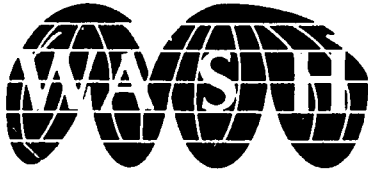
EVALUATION OF CARE/INDONESIA WATER SUPPLY PROJECTS

WASH FIELD REPORT NO. 83

MAY 1983

Prepared For:
USAID Mission to the Republic of Indonesia
Order of Technical Direction No. 136

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Carolina at Chapel Hill;
Georgia Institute of Tech-
nology—Engineering Experi-
ment Station.

May 10, 1983

Mr. William P. Fuller
Mission Director, USAID
Jakarta, Indonesia

Attention: Mr. Walter North

Dear Mr. Fuller:

On behalf of the WASH Project I am pleased to provide you with 10 (ten) copies of a report on the Evaluation of CARE/Indonesia Water Supply Projects.

This is the final report by Robert Gearheart and is based on his trip to Indonesia from February 21 to March 4, 1983.

This assistance is the result of a request by the Mission on December 22, 1982. The work was undertaken by the WASH Project on February 10, 1983 by means of Order of Technical Direction No. 136, authorized by the USAID Office of Health in Washington.

If you have any questions or comments regarding the findings or recommendations contained in this report we will be happy to discuss them.

Sincerely,

Dennis B. Warner, Ph.D., P.E.
Director
WASH Project

cc. Mr. Victor W.R. Wehman, Jr., P.E., R.S.
AID WASH Project Manager
S&T/H/WS

DBW:cdej

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EVALUATION OF CARE/INDONESIA
WATER SUPPLY PROJECTS

Prepared for the USAID Mission to the Republic of Indonesia
under Order of Technical Direction No. 136

Prepared by:

Robert A. Gearheart, Ph.D.

May 1983

Water and Sanitation for Health Project
Contract No. AID/DSPE-C-0080, Project No. 931-1176
Is sponsored by the Office of Health, Bureau for Science and Technology
U.S. Agency for International Development
Washington, DC 20523

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Chapter 1

INTRODUCTION AND METHODOLOGY

1.1 Introduction

The activities described in this report came about as a result of a cabled request from the USAID Mission in Jakarta (No. 18964, 22 December 1982) in which the Mission expressed its wish to "draw upon WASH services to assist CARE to develop a scope of work for the evaluation of accomplishments to date of the CARE rural water project (underscoring added)." As a result of this cable WASH Order of Technical Direction No. 136 was issued on 10 February 1983 to enable the project to send a consultant to Indonesia.

1.2 Methodology

The WASH consultant visited Indonesia in late February and early March of 1983 to assist in developing a scope of work for the evaluation. Discussions were held with USAID and the CARE project office in Jakarta to arrange site visits and to identify factors to be considered in developing the scope of work for the evaluation. Discussions were also held with Government of Indonesia officials involved in rural water supply development.

The focus of initial discussions with USAID, CARE, and Indonesian Government officials involved with Rural Water Supply programs (INPRES) was their perception of a project evaluation and their needs in terms of project management, training, and technology transfer. Discussions with Indonesia officials centered around the need for GOI to observe the CARE projects and to incorporate their successful aspects into Government programs and the need for the Government to evaluate their own programs in terms of the CARE model. Discussions were also initiated with School of Public Health Officers (APK) regarding incorporating rural water supply planning and implementation in their curriculum for training Pusat Kesehatan Masyarakat (PuskesMas) administrators.

As many projects as possible were visited to observe the effectiveness of the projects in terms of planning, design, construction, village participation and acceptance, and operation and maintenance.

Four days were spent in Mataram on the Island of Lombok, visiting one gravity system in the construction phase and two gravity systems already constructed. One deep well handpump project was also observed in a transmigration village. Site visits included discussion with village leaders, field officers, and community members.

Two days were spent on Bali visiting two gravity systems, several rooftop catchment projects, and Indonesian Government projects in rural water supply development.

One day was spent in Bandung inspecting a gravity water supply system and a deep well AID handpump which was installed three years ago by Georgia Institute of Technology.

Three days at the end of the assignment in Jakarta were set aside for discussions with the USAID PVO and HDN office to develop contacts with GOI program people in rural water supply and a presentation of findings to CARE/ Jakarta.

Chapter 2

BACKGROUND

CARE has been operating in Indonesia since 1967 initially in food assistance, training of hospital and health personnel, and school construction. In response to a disaster relief request in 1977 from Bali and Nusa Tenggara Barat (NTB) CARE initiated community development programs. At the present time CARE has programs in seven provinces of Indonesia with additional areas under consideration (see Table 1). The present emphasis is on rural community drinking water programs and sanitation facilities through the construction and/or development and installation of gravity water systems, storage reservoirs, piped water systems, handpumps, rainwater catchment tanks, and public toilets.

CARE maintains a field office in each province staffed by a Chief Representative, a Program Officer, and four to five field officers plus administrative staff. (CARE Bali, though, is being phased out and after January will only maintain two or three field officers/supervisors). CARE Indonesia Headquarters in Jakarta is staffed by the Country Director, Program Coordinator, and administrative staff (see Appendix C). Complete detailed records on individual projects are maintained by the field offices, and the Jakarta office maintains only information pertaining to general programming matters.

Baseline data, especially on health status, for each project site are not available in most cases or are unreliable so they are usually not kept by the field offices.

Table 1
CARE/Indonesia Water Supply and Sanitation Projects
(\$000)

AREA	FY	USAID/I	CARE	GOI	TOTAL	M&F*	PROJECT COMPONENTS
Bandung	79	\$122.7	\$126.9	\$ 72.9	\$ 321.	\$ 54.8	2 GS 53 HPD 26 SF
West Java	80 82	482.8	317.6	259.7	1,030.2	658.5	550 HPS 34 GS 41 FW
Bali	80 82	317.7	386.1	175.3	879.2	371.7	34 FCR 25 GS 21 HPS
Nusa Tenggara Barat	80	602.9	286.3	224.5	1,113.6	310.8	9 GS 280 HPS

GS - Gravity Systems
 HPD - Handpump Tubewells
 SF - Sanitary Facilities
 HPS - Handpump
 FCR - Ferrocement Rainwater Catchment

*"Materials and Equipment"--most of which originates in-country

Chapter 3

PROJECT DEVELOPMENT AND IMPLEMENTATION

3.1 Coordination with Other Agencies

CARE project planning and implementation procedures are coordinated at present through the provincial planning agency. Projects are identified through several mechanisms, and CARE determines the technical feasibility of supplying water through gravity water systems, deep well handpumps, or other means. The final determination involves close coordination by CARE of the community, the provincial planning agency, or other responsible agency.

Since there are several programs supplying water to rural and urban fringe communities the coordination and procedure for project selection varies from provinces to provinces. A strong determinant in project identification is the commitment by the community to assist in construction, operation and maintenance, and management. Discussion with field staff identified at least one instance by CARE of cancelling a project due to lack of community support. The exact role community health centers (PusKesMas) plays in project identification and planning was somewhat difficult to assess. In some cases projects are suggested in communities where there is a high incidence of cholera and where there are no other projects. Apparently in some cases there is a minimum of coordination between PusKesMas and CARE in the selection and the development of projects.

In some cases project designs are reviewed by PusKesMas and by the National Planning Board (BAPAEPK) prior to implementation. In general these project identification and planning phases are flexible and do not necessarily follow any common procedure.

3.2 Community Participation

The involvement of the community is fostered early in the project identification phase by CARE field officers. Assistance by the community is used to assist in identifying sources of water and location of storage reservoirs and in field surveys for flows of spring and pipeline alignments.

3.3 Technical Planning

The technical planning for projects appears to be thorough and of a high quality. The level of detail necessary to insure a working hydraulic system and long lived system appeared to be excellent. Elements of hydraulic design such as capturing, delivery pipelines, community reservoirs, pressure relief valves, air release valves, and surface drainage appeared to be excellent both from a design and from a construction standpoint. Several hydraulic profiles were viewed and details of hydraulic design were discussed with field officers and chief representatives. The quality of the construction plans were excellent in terms of both presentation and level of detail.

The level of competence in hydraulic design and management of construction by field officers, program officers, and chief representatives was remarkably high in all offices. All chief representatives, two of the four program officers, and several of the field officers were interviewed.

3.4 Information Gathering for Project Design and Implementation

Demographic information concerning existing population of project areas and rates of increase are gathered from the Provincial Planning Agency. Assumptions on per capita water use are developed based upon levels and types of village activities and in some cases by available water. Water resource planning at present does not include extensive prediction of non-domestic uses such as home irrigation needs, animal watering, and any aquaculture activity. A water demand of 60 liters/capita/day is used for most CARE projects unless circumstances dictate otherwise. Several monitoring projects are under way in NTB to ascertain total water use from a reservoir utilizing a totalizing water meter and a daily survey of how the water is used at the site and off the site. This monitoring should provide feedback for designing future projects.

3.5 CARE's Mode of Operation

CARE's direct counterparts are the Provincial Governments or more precisely the Provincial Planning board. The Provincial Governments propose the project sites and CARE makes the necessary survey and investigation, sometimes with the government staff when they are available, before accepting the sites. Considerations for selections include technical feasibility, community willingness to participate in the implementation and maintenance, and cost effectiveness. Several sites have also been selected as a result of CARE's own observation and/or as requested by the community. Their final selection is always done in consultation with government counterparts.

When a site is selected, CARE then prepares the design with as much community participation as possible in choosing the pipeline course and selecting location for the public reservoirs or public standposts, etc. At the same time CARE provides extension services to the community to get their participation in providing local materials, digging pipeline trenches and back filling, etc.

The actual construction work always involves several selected villagers and they are thus trained in how the system works, how it should be maintained, and how to overcome common problems. These persons usually take charge of the operation and maintenance of the systems when they are completed.

Village leaders are also encouraged to establish a committee for the implementation of the project which should then continue to manage the system. In most cases, though, the villagers tend to use the already existing LKMD (Village Community Endurance Committee) as both an implementation and maintenance committee. The committee also establishes a users' payment system and appoints the person in charge of the operation and maintenance of the system who usually is paid in cash or in-kind.

A set of tools and several stems of pipes and certain fitting are stored near the site for maintenance purposes.

In handpump programs, the community participates in selection of handpump locations, assists the skilled drillers, and provides materials for the base. In West Java especially and sometimes in NTB two persons or more living close to the handpumps are given two-days of training in repairing handpumps. Tools are also provided, one set for a group of several pumps.

Chapter 4

SCOPE OF WORK FOR EVALUATION OF CARE/INDONESIA RURAL WATER PROJECTS

The proposed evaluation would have three distinct elements with individual but integrated objectives. The first phase of the evaluation would be managed by CARE Indonesia (see Appendix D). The goal of this phase would be to develop a "state of the program" document of CARE/AID projects in Indonesia. CARE would gather the relevant information from field offices, program offices, and chief representatives concerning their projects. The information would then be analyzed following a CARE-developed common format. This should be information CARE feels it needs in order to monitor and review projects and in turn would be used in developing new projects in rural water supply and sanitation. The information developed in this phase of the evaluation would need to be completed prior to the second phase. A realistic determination by CARE of the type of information, the timetable, and resource requirements should be made as early as possible to allow for scheduling of the second phase.

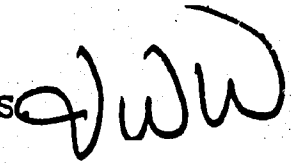
The second phase of the evaluation would consist of an evaluation team's reviewing the results of the information gathering and analysis of Phase I and the inspection of selected CARE/AID projects in the various provinces of Indonesia. The objective of Phase II is to summarize and document CARE's project evaluation in such a way as to make more visible the positive results of this project (see Appendix E). The evaluation steps CARE has taken will be reviewed, and selected rural water supply sites will be evaluated. Assessment of aspects of program management and design will be essential elements of the second phase. It is strongly suggested that the team of evaluators consist of representatives from AID/Indonesia, WASH, and Indonesian rural water supply experts (see Appendix F for suggested individuals). It is also suggested that this team spend approximately seven days visiting program sites and three days assembling and preparing the evaluation report.

The third phase of the evaluation should be handled by CARE-Indonesia and USAID/Indonesia. In this phase of the evaluation CARE should make its response to USAID concerning the evaluation findings and time should also be set aside for CARE to discuss the findings with the evaluation team. A secondary benefit of the latter activity will be the opportunity afforded the Indonesian members of the evaluation team to discuss in depth aspects of the project having relevance for the Government's water supply work.

WATER AND SANITATION FOR HEALTH (WASH) PROJECT
ORDER OF TECHNICAL DIRECTION (OTD) NUMBER 136
10 February 1983

FEB 10 1983

TO: Dr. Dennis Warner, Ph.D., P.E.
WASH Contract Project Director

FROM: Mr. Victor W. R. Wehman Jr., P.E., R.S. 
AID WASH Project Manager
AID/S&T/H/WS

SUBJECT: Provision of Technical Assistance Under WASH Project
Scope of Work for USAID/Indonesia and CARE/Indonesia

REFERENCE: A) Jakarta 18964, dated 22 Dec 1982
B) WASH Telex No. 522, dated 24 Jan 83
C) WASH Telex No. 525, dated 25 Jan 83
D) WASH Telex No. 533, dated 7 Feb 83
E) WASH Telex No. 534, dated 8 Feb 83

1. WASH contractor requested to provide technical assistance to USAID/Indonesia as per Ref A, para 1-4. Consultant to work in close concert with USAID/Indonesia PVO officer or his representative.
2. WASH contractor/subcontractor/consultants authorized to expend up to 22 person days of effort over a four (4) month period to accomplish this technical assistance effort.
3. Contractor authorized to expend up to 18 person days of international/domestic per diem to accomplish this technical assistance effort.
4. Contractor to coordinate with ASIA/TR/HNP (Jalil Karam), ASIA/PD/ENGR (Hasan Hasan) and Indonesia Desk Officer and should provide copies of this OTD along with periodic progress reports as requested by ASIA Bureau staff or S&T/H/WS staff.
5. Contractor authorized to provide up to one (1) international round trip from consultants home base to Washington D.C. (for briefing) to Jakarta, Indonesia and return to consultants home-base through Washington D.C. during the life of this OTD.
6. Contractor authorized local travel within Indonesia as necessary and appropriate to accomplish this technical assistance effort NTE \$2300 without the prior written approval of the AID WASH Project Manager.
7. Contractor authorized to obtain local secretarial, graphics, reproduction or local professional services in Indonesia as necessary and appropriate to accomplish this effort NTE \$1100 without the prior written approval of the AID WASH Project Manager. These services are in addition to the level of effort specified in para 2 and 3 above.

(2)

8. Contractor authorized to provide for car or vehicle rental or hire to facilitate effort. Contractor authorized to travel by aircraft in Indonesia to facilitate effort. Costs for local Indonesian travel NTE \$1900 without the prior written approval of the AID WASH Project Manager.
9. WASH contractor will adhere to normal established administrative and financial controls as established for WASH mechanism in WASH contract.
10. WASH contractor should definitely be prepared to administratively and/or technically backstop field consultants and subcontractors.
11. New procedures relating to subcontractor cost estimates and contractor justification for selection of consultants remains in effect.
12. Contractor to provide field draft coordinated report to USAID/Indonesia PVO Officer in English before consultant returns to U.S. Final report to be in English and to be due to USAID/Indonesia and S&T/H/WS within 30 days of return of consultant to the U.S.
13. Mission and ASIA/TR(PD) staff should be contacted immediately and technical assistance initiated as soon as convenient to USAID/Indonesia.
14. Appreciate your prompt attention to this matter. Good luck.

ACTION
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Department of State

INCOMING
TELEGRAM

PAGE 3!
ACTION AID-00

JAKARTA 18964 220503Z

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	STMD-01	SAST-01	ENCR-01	HHS-03	STEN-01	RELC-01	STHP-01
	DAEN-01	MAST-01	ASSP-02	7032 45	823		

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TO SECSTATE WASHDC 7963

UNCLAS JAKARTA 18964

C O R R E C T E D C O P Y (TEXT: PARA III)

AIDAC

FOR CARL MCJUNKIN

EO 12356: N/A

SUBJECT: EVALUATION CARE INDONESIA RURAL KATER SUPPLY
PROJECT

1. HAVE AGREED WITH ELLIS FRANKLIN, DIRECTOR OF CARE/INDONESIA AS TO UTILITY OF AN EVALUATION OF CARE'S RURAL WATER PROJECT. SINCE 1980 CARE HAS CONSTRUCTED 70 SMALL SCALE RURAL WATER SYSTEMS COMPRISING 520 WELLS AND NUMEROUS GRAVITY FLOW SYSTEMS IN OVER 100 VILLAGES SPREAD OVER THREE PROVINCES AT A COST OF ABOUT DOLS. 2.5 MILLION. SIMILAR ACTIVITIES ARE IN APPROVAL PROCESS FOR AID FINANCING FOR THE NEXT YEAR, BUT DIRECTION OF PROGRAM UNCERTAIN THEREAFTER. AN EVALUATION OF ACCOMPLISHMENTS TO DATE WOULD HELP ESTABLISH WHAT MAKES SENSE FOR THE FUTURE.

2. MISSION WOULD LIKE TO DRAW UPON WASH SERVICES TO ASSIST CARE TO DEVELOP A SCOPE OF WORK FOR THE EVALUATION. MISSION CURRENTLY ENVISIONS THE MAIN PURPOSES OF THE EVALUATION TO BE TWO FOLD. ON THE ONE HAND THE MISSION AND CARE WOULD LIKE TO ASSESS THE COST EFFECTIVENESS AND IMPACT OF COMPLETED WORKS. SECONDLY THE MISSION WOULD LIKE TO ASSIST CARE TO CONSIDER A STRATEGY FOR LEVERAGING THEIR RESOURCES TO IMPACT ON GOVERNMENT WATER PROGRAMS.

3. MISSION ESTIMATES THAT THE SCOPE OF WORK COULD BE DEVELOPED IN 10-15 MAN DAYS. THIS SHOULD ALLOW EVALUATION CONSULTANT TIME TO REVIEW THE CARE PROGRAM, VISIT SITES AND MEET WITH CONCERNED PARTIES. THE MISSION WOULD HOPE THAT SERVICES OF A CONSULTANT LIKE BOB GEARHEART, WITH PRIOR INDOONESIAN EXPERIENCE, WOULD BE AVAILABLE IN JANUARY OR EARLY FEBRUARY. THE MISSION WOULD HOPE THAT THE EVALUATION COULD BE CARRIED OUT IN MARCH OR APRIL OF 83. CARE HAS ALREADY DONE CONSIDERABLE PREPARATORY WORK ON A PROTOTYPE OF A SCOPE.

4. PLEASE ADVISE ON AVAILABILITY OF WASH SERVICES FOR THIS JOB. MONJO

12/27/82
AUSTIN, agrees
W.E. [unclear]
WITTEN
Copy to Wash DC
Dimitri
12.27.82

UNCLASSIFIED

APPENDIX B

Schedule of Activities

2/21 Monday	USAID office - Ross Coggins CARE Office - Ellis Franklin & Mr. Iskandar To Denpasar 17:30 Hrs
2/22 Tuesday	Travel to Lombok CARE Program Office - Scott Faia
2/23 Wednesday	NTB Mataram
2/24 Thursday	NTB Mataram
2/25 Friday	Back to Bali Merpati - 351
2/26 Saturday	Site visit Bali - North Coast
2/28 Sunday	Site visit Bali - North Coast
2/28 Monday	Bali-Jakarta 16:30 - 18:00 GA 6
3/1 Tuesday	Jakarta-Bandung - Site visit
3/2 Wednesday	Bandung-jakarta - Report writing
3/3 Thursday	Report writing - Late morning and early afternoon
3/4 Friday	Debriefing - Late morning and early afternoon Short exit interview with AID Director

APPENDIX C

Job Description

Position: Program coordinator

Incumbent: Iskandar

Responsibilities

1. To coordinate and help supervise AIP submissions and participate in project proposal write-ups for each project. Supervise PIE submissions three times a year, monitor and follow-up with each project on evaluation of targets and intermediary goals. Help supervise, design and coordinate evaluation procedures; baseline data material, program histories, site surveys, project reports. Draft replies and/or assist with letters to and from New York Headquarters regarding programs and programming matters.
2. Government and non-Government contacts: Assist in the negotiations of new project agreements and extensions of old ones, follow-up with counterparts on program matters. Liaison with the appropriate Central Government authorities, corresponding with the Provincial Government Counterparts, through which our project activities are developed and carried out. Preparation of reports requested by Central government authorities as necessary.
3. Development of project activities to be implemented from the Jakarta office. Preparation of MYP and all other necessary CARE project papers for such projects.
4. Field visitations: Field visits to sub-offices and project activity sites to keep abreast of project progress and related sub-office programming matters.
5. Public relations and resource development activities: Assist with donor letters as program reporting, and other public relation reports, presentations and activities.
6. Training and coordination of national programming staff and assist in orientation of new international/national personnel. Assist in evaluation of sub-offices' capabilities and in introducing improvements as appropriate.
7. Additional related programming assignments as may be assigned by the director from time to time.

Job Description

Position: Program Officer

The program officer is responsible to assist the Chief Representative in the development, planning, implementation, monitoring, and evaluation of all program activities. To accomplish these tasks he is expected to travel extensively, deal with all levels of people, collect information and be culturally sensitive and aware. He must be creative and propose viable solutions to difficult problems. He must constantly strive to improve the quality of CARE's work. His duties include the following:

1. Liaison with Government

- 1.1 To arrange meetings with the Government whenever required.
- 1.2 To discuss and solve problems which may arise during project implementation with the Government.
- 1.3 To report on project activities to the Government whenever required.
- 1.4 To ensure that the government adequately understands CARE's policies, procedures and regulations.
- 1.5 To be fully informed of government development plans, programs and priorities.

2. Project Development

- 2.1 To investigate any potential program areas
- 2.2 Assisting the Chief Representative in preparation of MYP and AIP proposals.
- 2.3 To actively process and discuss the project agreement with the Government.
- 2.4 To keep abreast of current trends in development planning and philosophy, successful programs, technical advances etc. through contact with other organizations and literature surveys.

3. Project Implementation

- 3.1 To participate in project surveys, site selection and planning.
- 3.2 To review the project designs submitted by the Field Officers before they are implemented.
- 3.3 To stimulate community participation.
- 3.4 To assist in monitoring and controlling project purchases.
- 3.5 To ensure acceptable quality of construction.

- 3.6 To monitor progress and ensure timely completion of activities.
4. Project Evaluation
 - 4.1 To prepare the PI submission.
 - 4.2 To actively participate in the project evaluation including collection of baseline data and follow up surveys.
5. Supervision of Field Officers
 - 5.1 To supervise and coordinate the Field Officers in all aspects of their work and responsibility.
 - 5.2 To provide training and guidance to the Field Officers whenever necessary.
6. Public and Donor Relations
 - 6.1 To represent and explain CARE to all interested parties.
 - 6.2 To obtain favourable local publicity for CARE.
 - 6.3 To prepare reports and supply any necessary information on actual or potential donors.
7. Other tasks that are appropriate as may be assigned by the Chief Representative.

International Staff Job Description

Country: Indonesia

Position: Chief Representative NTB Province

Position Presently Filled by: A. Scott Falia

Date: January 3, 1983

I. Job Description

a. Program Development

1. Establish and maintain appropriate Government and counterpart contacts.
2. Identify and develop CARE assistance programs in cooperation with the various levels of the regional governments, communities and non government agencies as appropriate, in line with Indonesia's development plans and objectives and as appropriate to CARE capabilities and programming criteria.
3. Educate counterparts to procedures of successfully cooperating with CARE and determine counterparts ability to support a project.
4. Develop and maintain control systems to ensure that CARE's assistance is being properly utilized.
5. Seek appropriate guidance from CARE-Jakarta on program negotiations/discussions and proposal preparations, while concurrently keeping all other appropriate parties informed of the status of project discussions and/or negotiations.
6. Timely preparation of required project documents/documentation.
7. Oversee project planning, implementation and evaluation to ensure that targets and goals can/are being met, including frequent field travel.
8. Special actions as requested/required by CARE Jakarta/the Country Director.

b. General

1. Supervision of all office administration including budget planning, financial control, report submissions, vehicle control, communications, and special actions as requested/required by CARE Jakarta/the Country Director.
2. The CR should master all information contained in the CARE Overseas Operations Manual so as to be able to act as a resource of advice and information for the rest of the staff.

3. Training of National Staff in all areas of CARE operations with the objective of developing a strong, experienced and responsible National Staff so as to be able to phase down and eventually out of the full time need for International Staff positions.
4. Maintenance of appropriate Liaison with government and other international and national agencies in NTB province.
5. Assist in finding ways and means of increasing the efficiency of CARE operations.
6. Attend appropriate/CARE related functions, as the CARE NTB Chief Representative.

II. Job Qualifications

- a. Past experience and demonstrated capability with CARE programming and administrative techniques. Strengths and capabilities in organizational, communication, planning/evaluation and financial skills as well as small scale rural civil engineering techniques.
- b. Desire and ability to learn to live and work with different types of people and cultures, and to learn Bahasa Indonesia to a useful degree of competence within a short period of time.
- c. Capacity to assume responsibility for program/office management, frequent field travel, and to display qualities of leadership and human relations skills as a CARE representative. To be able to represent CARE in a manner which furthers the organization's reputation as a competent and action oriented international development agency.

Job Description

Position: Field Officer

The CARE Field Officer actively assist in the planning, design, implementation and evaluation of all project activities. He is CARE's link to and representative in the communities where he works. A chief and essential role of the F.O. is to animate the community to become involved in all aspects of the program and extend their interest even beyond the program. He also usually has special expertise in some technical area. His general tasks can be described as follows:

1. Investigation of New Areas of Project Development
 - a. Provide information on possible new project areas.
 - b. Seek out communities that need and can effectively use CARE assistance.
 - c. Provide relevant information and actively participate in the site selection process.
 - d. Explain to the community what CARE is and how it works.
2. Project Survey
 - a. Animate the community to become aware of the importance of the project and therefore readily involved in all aspects of the program.
 - b. Provide information for design purpose.
 - c. Provide/collect baseline data and information on community and needs.
 - d. Prepare information on potential for community participations based on the results of his animation.
3. Project Planning
 - a. Prepare detailed technical design.
 - b. Prepare detailed material lists and budgets.
 - c. Prepare a schedule of implementation in close consultation with the community.
4. Project Implementation
 - a. Monitor the receipt and use of materials.
 - b. Supervise the labor to insure satisfactory quality of construction.
 - c. Arrange for the purchase of any necessary local materials.

- d. Provide technical advice and training of the community.
- e. Maintain good relations with the community in order to get their maximum support and involvement.
- f. Prepare and submit routine implementation report as requested by his Field Office.

5. Project Evaluation

- a. Collect data relevant to the project evaluation needs.
- b. Actively participate in project evaluation.

6. Routine Tasks

- a. Maintain of vehicle assigned to him.
- b. Fulfill all routine administrative tasks such as travel reports, SCR's, beneficiaries receipt etc.

APPENDIX D

FRAMEWORK ON WATER PROJECT EVALUATION

1. General

These evaluation activities cover the following areas:

- a. Physical Condition of the Water System
- b. Available Water Flow
- c. Water Usage
- d. Water Quality
- e. Maintenance and Administration
- f. Benefits

Information on items a through d should be obtained for all water systems. For items e and f it will not always be possible to obtain detailed information. However, the sum total of all the above information will give a fairly good indication as to whether or not the water system has been properly constructed, is adequately maintained, functions as designed, and is providing some of the intended health benefits. Also, equally important, the information and process of obtaining it will lead to an improved understanding of water systems and how to better design and construct them.

Physical Condition of the Water System

A physical inspection of the water system's condition should be carried out immediately upon project completion and again six months and one year after the initial evaluation. There are four main areas of interest as follows:

- a. Condition of spring protection
- b. Condition of the pipeline
- c. Condition of reservoirs and break pressure tanks
- d. Changes or additions to the system

Items a, b, and c, should be evaluated with the aid of checklists and samples of three checklists are attached. Item d is evaluated by comparison with the original design. The original design should have noted any planned changes and the distinction between planned and unplanned changes should be clearly stated. Also any deliberate tampering with the pipeline or valves influencing water distribution should be noted

3. Available Water Flow

The available water flow should be measured immediately on project completion and again six months and one year after completion. Water flow should be measured at the source and at each distribution point when all faucets are fully open. The water flow at each reservoir is measured as part of the physical evaluation. The information on available water flow should be checked against the information on usage and population distribution to ensure that the distribution is equitable. Any noticeable fluctuations in the flow of the source which have occurred in intervening time periods should be recorded. Especially important is whether or not the system has adequate flow during the dry season. The evaluation may not be during this critical time but the users will usually be able to provide sufficient information.

4. Water Usage

Usage is measured in two ways, from information provided by the users themselves and by direct count. Two forms used for this are attached. The information provided by the users should be

obtained for all water distribution points and the forms distributed at each reservoir and standpipe. The actual count should be conducted at a representative number of distribution points, usually two, one with expected heavy usage and one with expected light usage. These forms should be utilized twice; immediately on project completion and one year following completion.

5. Water Quality

Water samples for bacterial analysis should be obtained from the water source and a representative number of the distribution points. If people normally store water in their homes before using it then representative samples should be obtained from these containers. Samples should be taken immediately upon project completion and six months and one year afterwards.

6. Maintenance and Administration

Information should be obtained on any maintenance or repair during the first year of the system's operation. The following points are of particular significance:

- a. How many times has the system been repaired?
- b. What were the repairs?
- c. What was the cost?
- d. Who repaired the system?
- e. What is the mechanism or method the community uses for repairs?
- f. Is there any routine maintenance carried out? If so, describe it.
- g. Who has possession of keys for access to valves etc?
- h. Does a committee exist for handling system operation? If not, was there one during construction of the system? If so, why was it disbanded? If there is no committee is any one individual assuming responsibility for the system?
- i. Are any charges levied for water use? If so, are there any payment problems?
- j. Have any special regulations governing water usage been adopted? If so, are they actually enforced? By what means?
- k. Are any tools and spare parts available?

1. If there have been maintenance problems what is the most probable cause?

7. Benefits

It is not possible to specifically measure the benefits of most water systems. However, useful observations are possible and desirable. The following are important considerations:

- a. Has the village had a high incidence of water associated diseases in the past? If so, what are they? Has the water system had a noticeable effect on them?
- b. Are any data available on the water quality of the water system compared to previous water sources?
- c. Is there any indication of changes in water use habits such as increased bathing or increased water usage?
- d. Have any latrines been constructed since installation of the water system?
- e. Has there been any reduction in the amount of time necessary for obtaining water?
- f. Are other sources of water used for specific uses? How does the pattern of usage change and the sources change during the dry season?
- g. Is any of the water from the system used for irrigating small vegetable gardens or trees?
- h. Have any new fishponds been constructed since installation of the water system?
- i. Have any new village industries such as

brickmaking been started since the installation of the water system? Have any existing industries expanded?

It will not be feasible to collect detailed information on all of the above items. They should be regarded as general guidelines in seeking information which, if available, will give an indication as to the effects or benefits of the water system.

EVALUATION ACTIVITIES

1. The development of questionnaires to be used in the evaluation process. This activity has already been accomplished by CARE staff.
2. Establishment of a schedule for the evaluation. Initial efforts have been made in this regard by CARE staff in coordination with USAID/Indonesia. The final schedule for the total evaluation process should be established by early May.
3. The selection of the evaluation team by USAID and CARE. The team could consist of combinations of the following representatives: USAID PVO staff, GOI water supply health officials, international water supply and sanitation officials, and a WASH consultant.
4. Identification of field sites to be visited by the team. An itinerary and an outline of the evaluation process should be forwarded to each field office to alert them of the proposed evaluation process and the role they will play in the site visits.
5. Summary of CARE's evaluation of all projects with specific information on those sites to be visited by the team. This should be packaged and forwarded to all members of the evaluation team.
6. The evaluation team should meet and be briefed by USAID and CARE prior to the site visits.
7. Interview with CARE field staff at field office to review their planning, design, operation-maintenance activities, prior to going to the sites.
8. Field visits to selected project sites. More important to see all elements of a few projects than to see portions of many projects. The process is the important element.
9. Interviews with users, non-users, and village leaders concerning project to further develop information to be used in conjunction with material developed by CARE staff.
10. Interviews with government officials at the implementation level (Provincial and District) of project

process. The local Health, Planning, and Public Works officials should be included in some aspect of the site visit. This will require coordination by the CARE staff and possibly reinforcement by higher level government officials. The value of this step is self explanatory.

11. Review of findings and a statement of preliminary conclusions to CARE staff prior to departing. Allows for correcting any findings not valid and gives staff an immediate feedback of their projects for future work.
12. Evaluation team prepares preliminary draft report with initial findings and conclusions.
13. Evaluation team presents this draft report to CARE Jakarta for their review and input.
14. Final draft report prepared as a WASH technical report and presented to CARE for their review and comments.
15. Prepare final report as a WASH technical report.

PROPOSED SCHEDULE FOR SITE VISITATION

Monday	CARE Orientation - Jakarta - 1/2 day 1/2 day travel to West Java Projects
Tuesday	Visit West Java Projects Back to Jakarta
Wednesday	Fly to Bandung 2 hr. Orientation - Chief Representative 1/2 Day Site Visit Spend Night in Bandung
Thursday	1/2 Day Site Visit Travel to Jakarta
Friday	Travel to Bali 2 Hr. Orientation - Chief Representative
Saturday	1/2 Day Site Visit
Sunday	Bali
Monday	Travel to Lombok 2 Hr. Chief Representative Orientation 1/2 Day Site Visit
Tuesday	1/2 Day Site Visit Travel Lombok to Jakarta
Wednesday	Prepare Draft Report
Thursday	Prepare Draft Report
Friday	Prepare Draft Report Discussion with CARE/AID

ESTIMATE OF TIME REQUIREMENT FOR EVALUATION

		MAN-DAYS		
		Field Time	Office Time	Total
Bandung				
FY 79	2 Small Piped System	1	1/2	
FY 82	53 Tube Wells New Systems	5	2	
		<hr style="width: 50px; margin: 0 auto;"/>	<hr style="width: 50px; margin: 0 auto;"/>	
		6	2 1/2	9
West Java Rural Water				
	550 Pumps	15	3	
	34 Piped Systems	11	2	
	41 Sanitation New Systems	12	3	
		<hr style="width: 50px; margin: 0 auto;"/>	<hr style="width: 50px; margin: 0 auto;"/>	
		28	8	36
Bali Community Development				
	34 Ferrocement Rainwater	5	2	
	25 Piped Water Systems	7	2	
	21 Hand pumps on Dug Wells	3	1	
		<hr style="width: 50px; margin: 0 auto;"/>	<hr style="width: 50px; margin: 0 auto;"/>	
		15	5	20
NTB				
	9 Piped Systems	6	2	
	280 HandPumps	10	3	
		<hr style="width: 50px; margin: 0 auto;"/>	<hr style="width: 50px; margin: 0 auto;"/>	
		16	5	21

Assume 3 Chief Representatives
4 Program Officers
13 Field Officers

20

36 Man-days or 5 days/person

RESERVOIR INSPECTION CHECK LIST

Village:

Date:

Neighborhood:

Inspector:

Reservoir No:

1. MANHOLE

a. Is there a manhole? yes ___ no ___

b. Does it have a cover? yes ___ no ___

c. Is the cover locked? yes ___ no ___

d. Is there a raised lip
supporting the cover? yes ___ no ___

e. How high and wide is the lip?

_____ cm wide _____ cm high

f. Is there a possibility of
contamination entering the manhole?
yes ___ no ___

g. Are the manhole dimensions according
to the design?

yes ___ too small ___ too large ___

2. OVERFLOW

a. Is there an overflow? yes ___ no ___

b. Is it screened? yes ___ no ___

c. Is there an elbow on the
outside? yes ___ no ___

d. Is it far enough away
from the wall? yes ___ no ___

e. Is the diameter large
enough?

yes ___ too small ___ too large ___

f. Is the inside length long
enough?

yes ___ too long ___ too short ___

g. Is the overflow higher than the inlet pipe?

yes _____ too low _____ too high _____

h. Is there proper drainage for water from the overflow?

yes _____ no _____

3. WASHOUT

a. Is there a washout?

yes _____ no _____

b. Is it closed with a valve or cover?

yes _____ no _____

c. Is the diameter large enough?

yes _____ too small _____ too large _____

d. Is the washout level the same as the base of the reservoir?

yes _____ too low _____ too high _____

4. INLET PIPE

a. Is the inlet properly installed?

yes _____ no _____

b. Is there a valve to control the inflow?

yes _____ no _____

c. Is the valve properly protected?

yes _____ no _____

d. Is there a float valve

yes _____ no _____

e. Is the inlet pipe near the manhole?

yes _____ no _____

f. Is the inlet at the proper level?

correct _____ too low _____ too high _____

g. What is the water flow into the reservoir?

_____ 1/8

5. RESERVOIR VOLUME

- a. Is the reservoir width the same as planned?
yes _____ too short _____ too long _____
- b. Is the reservoir length the same as planned?
yes _____ too short _____ too long _____
- c. Is the volume the same as planned?
yes _____ too small _____ too large _____
- d. Is there any leakage? yes _____ no _____
- e. If so where _____

- f. Is the slope of the inside floor adequate?
yes _____ no _____
- g. Is the cover bowed? yes _____ no _____
- h. Is the cover strong
enough? yes _____ no _____

6. Faucets

- a. Is the number of faucets the same as planned?
yes _____ too many _____ too few _____
- b. Is there any leakage? yes _____ no _____
- c. How many faucets functioning? _____ pieces.
- d. How high are the faucets from the
reservoir floor? _____ cm.

7. BATHING AREA

- a. What is the size of any bathing area?
_____ x _____ m.

8. FAUCET AREA

a. What is the size of the concrete floor?

_____ x _____ m.

b. Is the size adequate for proper drainage?

yes _____ not enough _____ too sloping _____

9. SALURAN PEMBUANG

a. Is there a drain? yes _____ no _____

b. Is it well constructed? yes _____ no _____

c. Where does the water drain to?

ditch/river _____ soakage pit _____ other _____

d. Does the water flow smoothly

yes _____ no _____

10. QUALITY OF CONSTRUCTION

a. Is the quality of construction satisfactory? yes _____ no _____

b. Are the walls bowed or slanted? yes _____ no _____

c. Are the inside corners straight or square _____

d. Are the outside corners straight or square?

e. Is the plaster neat and without cracks?

not enough _____ yes _____ no _____

f. Are all pipes well installed?

yes _____ no _____

11. OTHERS

a. Does the reservoir have an identification number? yes ___ no ___

b. Do the users hang any complaints? yes ___ no ___

c. Are any health education messages displayed on the reservoir? yes ___ no ___

If so what are they?

d. Comments:

PIPELINE INSPECTION CHECKLIST

1. Is any PVC pipe exposed? If so at what point?
2. Is any pipe not buried? If so, is it properly secured with concrete pillars?
3. Has any leakage been observed anywhere along the pipeline? If so, at what points?
4. Is the pipeline properly secured and supported at all valley or stream crossings?
5. Are there pipeline markers for any buried pipe? If so, what are their spacing? The recommended maximum spacing is 200 m.
6. Are there washouts at all low points?
7. Are there air valves at all high points?
8. Are all valves properly protected?
9. What is the depth of all buried pipe? Check and measure it at least every 500 meters.
10. Does the pipeline pass close to any large trees whose roots may disturb it?
11. Are there control valves at all junctions?

QUESTIONNAIRE "SURVEY ABOUT WELLS"

1. Location _____
Respondent _____
Owner _____
2. Number of user _____ families _____ persons.
3. Is there any other source of water near here?
Yes/No
If yes, name the type _____
Name the distance from this well _____
4. When was this well completed? _____
How many weeks did it take to build? _____
How many persons worked to build it? _____
How deep is the well? _____
5. Who takes care of this well? _____
6. Since it was built/improved, does this well always
have water all year long? Yes/No
If no, how long is it dry? _____
7. Compared to before the well was built/improved:
Does it have more water or less?
Why?
Is the water now cleaner or less clean?
Why?
Is it easier or less easier to get water now?
Why?
8. Compared to before the well was built/improved:
Is diarrhea less now or more?
Why?

Is typhoid/cholera less or more?

Why?

9. What are the problems faced after the well is built/
improved?

10. What is the planning to increase the usefulness of
the well?

When is the planning going to be implemented?

11. Why was the well built/improved?

12. Who pointed this location?

13. What is the assistance received (from PLAN)?

Material/cash

14. From whom do you know that PLAN helps build wells?

SW/CD/MW/EW/Neighbors/Others (Specify)

APPENDIX E

Objectives of the Evaluation

To assess the effectiveness of the CARE/Indonesia project by answering the following questions:

- A. **Function:** The physical system and engineering and planning aspects of the project.
1. Is there sufficient planning information gathered and analyzed prior to project implementation?
 2. How are project selected in light of question 1 and how does the GOI stay in touch with the project as it relates to planning?
 3. How are springs and/or wells selected for sources of water?
 4. Does the capturing procedure adequately protect the water (quality and quantity) and does it consider other uses of the water?
 5. Does the boring of wells adequately supply sufficient quantity and quality of water to targeted beneficiary (drilling, protection and apron)?
 6. Does the rooftop catchment system (collection and storage) supply sufficient quantity and quality of water to targeted beneficiaries?
 7. Do deep well and shallow well pumps perform to design standards and is there a maintenance program to insure project operation after CARE leaves?
 8. Are pipelines properly constructed (bedding, connections, crossings, materials, etc.)?
 9. Are reservoirs properly constructed and maintained (taps, other connections)?
 10. Is there sufficient supervision and control of the construction management to ensure all objectives are met?
- B. **Process:** The use of the water system by members of the communities.
1. Have the deep and shallow wells increased the number of people served?
 2. Have the gravity water systems increased the number of people served?
 3. Have the rain catchment systems increased the number of people served?
 4. Have the deep and shallow wells increased the amount of water per capita and/or added new users of water in the community?

5. Have the gravity water systems increased the amount of water per capita and/or added new uses of water in the the community?
6. Have the rain catchment systems increased the amount of water per capita and/or added new uses of water in the community?
7. How is a community selected to be a CARE project?
8. How are community members involved in the selection process?
9. How are reservoir sites selected within a community?
10. How are spring sites selected?
11. How are inter-village relationships developed to successfully implement a multi-village water project?
12. How are territorial concerns as they relate to springs and pipelines handled by the initiating community and by CARE?
13. What are the water use patterns--amount and categories of use--per person per day?
14. What were the communities' existing sources of water--where would they go to get water if their system failed?
15. What is the extent of community involvement in the construction and maintenance of the wells, gravity water systems, and rain catchment systems? (Specifically how are they repaired?)
16. How is the sanitation component of the village life related to the availability of water?
17. What is the health education component of the project and how effective is the component?
18. Have there been any socio-economic effects from the actual construction of the project?
19. What are the sources of contamination after the water leaves the well?
20. What is the water used for in the household?
21. How is greywater discharged?

C. Outcome: Users perspectives

1. How many targeted and non targeted beneficiaries are there for each of the following groups?
 - a. Gravity water systems
 - b. Shallow well

- c. Deep well
 - d. Rain catchment
2. How have community members perceived the availability of clean water (compare to old source)?
- a. Income generating
 - b. Health
 - c. Time saving
 - d. Sanitation
3. What does the community see as the next step in developing their village water supply?
- a. More water
 - b. More water closer to the home
 - c. Tap in every home.

APPENDIX F

Potential In-country Evaluation Team Members

1. Wilfredo L. Reyes
World Health Organization, FKM-
P.O. box 302
Jakarta - Tel 32-13-08 Ext 266
2. Mr. Soewardi - Assistant manager RSMD
PUSDIKLAT
Jl. Hang Jebat III, Bebayoran Baru
#3F Tel 775468
also
Advisor to Widodo-
P3M - Direktorat Sanitasi
Jl. - Percetakan Negara 1
Jakarta - Tel 417608 Ext Directorate of Sanitation
3. Mr. Soebagio
UNICEF - Sarabaya - Contact through Soewardi

APPENDIX G

Tables and Summary Sheets for Evaluation Data Gathering Prepared
and presented to CARE Staff
WATER RESOURCES

1. A. Meterological Factors

- 1) Annual rainfall mm/year _____
- 2) Wet season months _____ to _____
Rainfall mm/season _____
- 3) Dry season months _____ to _____
Rainfall mm/season _____
- 4) Longest historical dry period _____ months
Year of occurrence _____
Approximate period _____

B. Groundwater Conditions

- 1) Depth of wells and water level depth for existing wells
- 2) General quality factors - Turbidity _____ Coliform _____
Iron _____ Taste & Odors _____

Well Location	Horizontal Distance	Vertical Distance	Well Depth	Waterlevel Wet Season	Waterlevel Dry Season	Month of Poorest Quality
1.						
2.						
3.						
4.						
5.						
6.						
7.						

C. Streamflow Conditions for Potential Water Supplies

1) Average annual flow _____ m³/sec

2) Minimum flow _____ m³/sec

-Month of minimum flow _____

3) Depth of water high flow _____ m

4) Depth of water low flow _____ m

5) Approximate deviation of stream
bed relative to use site _____ m

D. Spring System

1) Average annual flow _____ m³/sec

2) Minimum flow _____ m³/sec

3) Depth of flow presently
available _____ m

4) Potential depth of flow at
site _____ m

5) Approximate elevation of spring
relative to use-site _____ m

E. Water Needs

1) Per capita use _____ liters/day Family Size _____

2) Family use _____ liters/day # of Families _____

3) Community need _____ liters/day

4) Storage requirements _____

F. Irrigation Needs _____ liters/day

G. Animal Water Needs _____ liters/day

H. Commercial Needs _____ liters/day

I. Total Needs _____ liters/day Average

_____ liters/day Minimum

_____ liters/day Storage

J. Distribution of Water Use

	<u>Average Use</u>	<u>Stressed Use</u> (Dry Period, etc.)
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Drinking	_____ liters/day	_____
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Cooking	_____ liters/day	_____
---------	------------------	-------

Dish washing	_____ liters/day	_____
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Clothes washing	_____ liters/day	_____
-----------------	------------------	-------

Bathing	_____ liters/day	_____
---------	------------------	-------

Hygienic	_____ liters/day	_____
----------	------------------	-------

Culture + Religious	_____ liters/day	_____
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Others	_____ liters/day	_____
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TOTAL:	_____ liters/day	_____ liters/day
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HEALTH: Summarize data from health surveys if available or ask local health center staff to assist - confirm in the field.

A. Distance to Nearest Health Facility: _____

Number of visits per month
to health facility _____

B. Immunization Campaign

Diphtheria _____ Tetanus _____ Measles _____

Whooping Cough _____ TB _____

C. Which Illnesses, Conditions are Most Common

Number from most common to least common:

1: Most Common, 5: Least Common

1) Excessive coughing/sore throa _____

2) Malnutrition/poor nutrition _____

3) Vomiting/diarrhea _____

4) Worms, intestinal problems _____

5) Malaria _____

6) Skin disorders _____

7) Accidents _____

8) Others _____

D. Mortality

1) Average life expectancy at birth _____

2) Infant mortality (birth to one year)
Last calendar year _____

3) Under five mortality last calendar year _____

E. Morbidity

Number of cases of the following diseases - reported

- 1) Typhoid fever _____
- 2) Gastro-intestinal disorders _____
- 3) Internal parasites _____
- 4) External parasites _____
- 5) Cholera _____
- 6) Respiratory _____

ECONOMIC

1. List the crops in village and close proximity:

Crop	Growing Season	Total Production		Water Requirement	
		Existing	Proposed	Existing	Proposed
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Total Water Requirement Existing
 Proposed

2. List the animals raised in village and close proximity:

	Animals	Rearing Period	Total Production		Water Requirement	
			Existing	Proposed	Existing	Proposed
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Total Water Requirement _____ Existing
 _____ Proposed

3. Small business - Service and Manufacturing:

	Type of Business	Number of People Included	Sphere of Influence	Water Requirement	
				Existing	Proposed
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Total Water Requirement _____ Existing
 _____ Proposed

4. Description of village economic setting:

A. Average annual income - based upon
production and services

B. Percentage of annual income which
produces currency

C. Season of greatest economic activity

D. Season of lowest economic activity

POPULATION

1. A. Total Estimated Population: _____

B. Age Structure:

- Infants less than 1 year old _____

- Children 1 - 4 _____

- Other age groups:

 5 - 14 _____

 15 - 59 _____

 60 - Over _____

- Classify age groups by sex:

	Male	Female
5 - 14		
15 - 59		
60 and Over		

C. Total Households _____

D. Average Number of Individuals per Household: _____

2. A. Total Number of Households in Village _____

 Number of People _____

B. Number of Households with Individual Water Supplies _____

- 1) Hand-dug wells _____
- 2) Gravity-tap _____
- 3) Rooftop catchment _____
- 4) Others _____

C. Number of Households with Community Source _____

Number of People _____

- 1) Community hand-dug _____
- 2) Community bore well _____
- 3) Community gravity _____

CONSTRUCTION CONDITIONS AND AVAILABILITY OF MATERIALS

A. Geological Settings

1. Soil type _____ Depth of top soil _____ m.

2. Subsurface Geological Strata

Top 1 meter _____

2-5 meters _____

5-10 meters _____

10-15 meters _____

Greater than 20 meters _____

3. Type of surface rock outcroppings _____

4. River sedimentation _____ mm/years

Flooding season _____

B. Availability of Construction Material

On-site	<u>Material</u>	<u>Cost</u>	
Clay	_____	_____	
Sand	_____	_____	
Structural Wood	_____	_____	
Fiber	_____	_____	
Rock	_____	_____	
Lime	_____	_____	
Firewood/Charcoal/ Coal	_____	_____	
2. Off-site	<u>Material</u>	<u>Cost</u>	<u>Distance</u>
Clay	_____	_____	_____
Sand	_____	_____	_____
Structural Wood	_____	_____	_____
Fiber	_____	_____	_____
Rock	_____	_____	_____
Lime	_____	_____	_____
Firewood/Charcoal/ Coal	_____	_____	_____

C. Availability of Materials	<u>Location</u>	<u>Cost</u>
1) Galvanized pipe and fittings	_____	_____
2) Plastic pipe and fittings	_____	_____
3) Taps	_____	_____
4) Pulleys and rope	_____	_____
5) Buckets and pails	_____	_____
6) Hand pumps	_____	_____
7) Cement	_____	_____
8) Plumbing tools	_____	_____
9) Brazing capability	_____	_____
10) Welding capability	_____	_____
11) Reinforcement rods	_____	_____
12) Hand levels	_____	_____
13) Construction tools	_____	_____
14) Others	_____	_____
D. Human Resources		
1) Well digger (hand)	_____	_____
2) Well digger (bore-hand)	_____	_____
3) Pump installer	_____	_____
4) Pawang	_____	_____
5) Pump repair	_____	_____
6) Construction labor	_____	_____
7) Material production	_____	_____
8) Others	_____	_____