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ETHICAL REVIEW COMMITTEE ICDDR,B

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Principal Investigator \_\_\_\_\_ Trainee Investigator (if any) \_\_\_\_\_  
Application No. 84-036 Supporting Agency (if Non-ICDDR,B) C

Title of Study Development of Effective Project status:  
Rural Water and Sanitation Packages ( ) New Study  
for Bangladesh (Mirzapur Handpump Project) ( ) Continuation with change  
( ) No change (do not fill out rest of form)

Circle the appropriate answer to each of the following (If Not Applicable write NA).

1. Source of Population:
  - (a) Ill subjects Yes No
  - (b) Non-ill subjects Yes No
  - (c) Minors or persons under guardianship Yes No
2. Does the study involve:
  - (a) Physical risks to the subjects Yes (No
  - (b) Social Risks Yes No
  - (c) Psychological risks to subjects Yes (No
  - (d) Discomfort to subjects Yes (No
  - (e) Invasion of privacy Yes No
  - (f) Disclosure of information damaging to subject or others Yes No
- Does the study involve:
  - (a) Use of records, (hospital, medical, death, birth or other) Yes No
  - (b) Use of fetal tissue or abortus Yes No
  - (c) Use of organs or body fluids Yes No
- Are subjects clearly informed about:
  - (a) Nature and purposes of study Yes No
  - (b) Procedures to be followed including alternatives used Yes No
  - (c) Physical risks Yes No
  - (d) Sensitive questions Yes No
  - (e) Benefits to be derived Yes No
  - (f) Right to refuse to participate or to withdraw from study Yes No
  - (g) Confidential handling of data Yes No
  - (h) Compensation &/or treatment where there are risks or privacy is involved in any particular procedure Yes No
5. Will signed consent form be required:
  - (a) From subjects Yes No
  - (b) From parent or guardian (if subjects are minors) Yes No
6. Will precautions be taken to protect anonymity of subjects Yes No
7. Check documents being submitted herewith to Committee:
  - Umbrella proposal - Initially submit an overview (all other requirements will be submitted with individual studies). Protocol (Required)
  - Abstract Summary (Required)
  - Statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (Required)
  - Informed consent form for subjects
  - Informed consent form for parent or guardian
  - Procedure for maintaining confidentiality
  - Questionnaire or interview schedule \*

\* If the final instrument is not completed prior to review, the following information should be included in the abstract summary:

1. A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.
2. Examples of the type of specific questions to be asked in the sensitive areas.
3. An indication as to when the questionnaire will be presented to the Cttee. for review.

I agree to obtain approval of the Ethical Review Committee for any changes involving the rights and welfare of subjects before making such change.

*[Signature]*  
Principal Investigator


Trainee

- 5 AUG 1984

SECTION 1: RESEARCH PROTOCOL

1. Title : Development of Effective Rural Water and Sanitation Packages for Bangladesh (Mirzapur Handpump Project).
2. Principal Investigator : M. M. Rahaman  
Co-investigators : K.M.A. Aziz, K.Z. Hasan & K.M.S. Aziz
3. Starting Date : 1 October 1983
4. Completion Date : 30 September 1986
5. Total Direct Cost : US \$368,900
6. Associate Director for CSR

This protocol has been approved by the Community Services Research Working Group.

\*Signature of Acting Asso. Director for CSRWG: 

Date: 01.08.84

\* This signature implies that the Associate Director for CSR Program takes responsibility for the planning, execution and budget for this particular protocol.

7. Abstract Summary:

The study is designed to investigate the acceptability and effectiveness of water supply through a newly designed handpump, and excreta disposal by using water-seal latrine supported by a package of health education on water and sanitation and their impact on the incidence of diarrhoeal disease. The study will be conducted in Mirzapur, located about 45 miles north of Dhaka in a population of about 9,000. A half of the population would be designated as the study area and the remainder would be comparison area. Interventions in the study area will consist of newly developed handpumps, household water-seal latrines and health education. The comparison area

will have no such input. Data analysis will include an assessment of the impact of handpump water supply and water-seal latrine use, compliance of health education, volume of water consumed for household, breakdown and functional deterioration of newly developed handpumps and their maintenance. After the collection of baseline information on diarrhoea incidence, water use and defaecation practices a survey will be carried out to study the behavioural and attitudinal changes with the help of predetermined indicators. This survey will be done in a 20 percent randomly selected households of the study and comparison areas at an interval of six months. On all the under 5 children a six monthly anthropometric survey will be conducted to determine the nutritional status. To find the incidence rates of diarrhoeal diseases amongst the under 5 children a weekly surveillance to detect the diarrhoea cases and determine the aetiology of the cases will be carried out in the study and comparison areas.

8. Reviews:

- a) Ethical Review Committee: \_\_\_\_\_
- b) Research Review Committee: \_\_\_\_\_
- c) Director: \_\_\_\_\_

SECTION II - RESEARCH PLAN

A. INTRODUCTION

1. Objective: The objective of this project would be to field test a newly developed handpump-technology and determine its effectiveness and acceptability in water supply to the rural households and thereby reduce the incidence of diarrhoeal diseases when combined with household latrines and a package of water and sanitation education.

2. Background: The spread of any innovation is hard to predict, changing habits and the demand for potable water and excreta disposal facilities are likely to be particularly difficult because of the relative importance of different sets of persuasions, barriers, and social constraints that are only dimly perceived. Although water is a basic and felt need, its use has health implications that may go unrecognized where a germ theory explanation of disease is lacking or even rejected. Because of widely varying environmental conditions and the influences of diverse cultural beliefs and practices, water and sanitation related behaviour is extremely site-specific (Elmendorf and Buckles 1980: 1,4).

Water that is not safe for human consumption can spread disease, water that is not conveniently located results in the loss of productive time and energy by the water carrier, and inadequate facilities for excreta disposal reduces the potential benefits of safe water supply by transmitting pathogens from infected to healthy persons (Ibid. 1980: 1). The organism of the water-borne diseases reaches the water by excretal pollution and infect those who ingest this polluted water. Most forms of diarrhoeal diseases are transmitted by faecal-oral route (Bradley 1970: 286; McJunkin 1982: 9).

Studies in several developing countries document a reduction in diarrhoeal diseases brought about by better water supply and sanitation facilities (Van Zijl 1977). Privy construction in Costa Rica helped halve

the death rate from diarrhoea and enterities between 1942 and 1954 (Schliessman 1959; 381-386). In a Philippines case study, improved water supply and toilet facilities cut cholera incidence by about 70% (Philippines Cholera Committee 1971: Table 5).

Not all studies, however, show that better water supply systems and sanitation facilities result in improvements in health. Levine et al. (1976) and Curlin et al. (1977) found that tubewell water drinkers in a rural area of Bangladesh did not have lower cholera infection-rates and attributed this to regular use of contaminated surface water sources for all other domestic uses. Several studies have concluded that the source of water supply for a family matters less than might be expected (Stewart et al. 1955: 718-724). The answer to this paradox may possibly be found in the cultural practices of the populations studied. For example, drinking water is often stored in cooling jars, which are nearly always contaminated. Moreover, household members may continue to drink well or river water because of greater convenience, better taste, social patterns or its supposed special qualities (World Bank 1975: 21).

Cases can also be found where privies had little effect on the prevalence of disease (Scrimshaw et al. 1968; 60-142), or even had a negative effect (Van Zijl 1966: 252). Here, too, cultural habits may offer an explanation. A poorly maintained privy may be worse than none at all. Sanitary storage of human excreta accomplishes a great deal; within two weeks, many of the harmful bacteria die because they cannot survive for long outside the human host. USAID (1981: 37) notes that one of the principal problems in sanitation is to contain human excreta in such a manner as to remove it from the immediate environment, store it over a period of time which will carry it past the latency, multiplication, persistency period, and then dispose of it, ultimately in a way which will do no damage.

Sanitary storage of human excreta can be accomplished by providing household water-seal latrines and biologically pure water can be ensured

through the supply of handpump water at the household or homestead level. These relatively simple techniques of waste and water treatment are likely to diminish the risks of catching fecally-transmitted disease.

The application of these simple techniques at the household and community level is by no means easy. Rahim (1983: 58) observed that many of the installed handpumps in a rural area of Bangladesh were not functioning due to simple mechanical problems which could have been corrected by the villagers themselves with simple training. USAID (1981) notes that whether or not the facility is easy to operate is one of the considerations of its acceptance. It also observed that if people lack the skill and knowledge to make equipment run properly and to repair it, they may let it fall into disrepair, not because they are opposed to its use, but because they feel inadequate to deal with it.

A study (Skoda 1977: 24) in Bangladesh concluded that education and better maintenance may induce the people to more fully utilize the tubewells. The authors of this study observed that this in turn would increase the demand for water and ultimately a source with greater capacity would be required to serve the community. MIDAS (1983: 47) notes, to date, in rural Bangladesh only the concrete pour flush type (or water seal) of latrine has been found to be appropriate, acceptable and sufficiently durable. However, Skoda et al. (1977: 15) note that in 87% of households surveyed by them the children do not use any type of latrine. Even amongst the adults, it is usually the women that use a latrine. In a survey (DPHE-UNICEF-WHO 1983: 43) conducted in a village in Bangladesh water seal type latrines performed well as far as user perceptions are concerned. However, the study showed that when super-structures were poorly constructed lower usage was the result than might have otherwise been the case. This study suggested two design modifications to enhance the usage of water seal latrine by children.

If hygiene and sanitation are below a certain level, improvements in the quality and possibly even the quantity of drinking-water are unlikely

to improve health status; but combined, water supply and sanitation, together with health education, are formidable weapons in the fight to achieve improved health (WHO 1981: 10).

3. Rationale: The faecal-oral transmission of the organisms of diarrhoeal diseases can be broken by ensuring acceptance and use of water supply and sanitation facilities. Water supply through the newly developed handpumps is cheaper and easy to maintain even by the household members compared to the existing handpumps. It is expected that water supply through the newly developed handpumps will compete effectively with alternative water sources, chiefly surface water, and that household latrine facilities will remove human wastes from the environment following health education. The simple and cheap handpumps for safe water supply and excreta disposal by household latrines are likely to provide health benefits by reducing the diarrhoeal morbidity and mortality.

B. SPECIFIC AIMS

The specific aims of this study will be:

1. To evaluate the acceptance of newly developed handpumps, and household latrines and their effect on the incidence of diarrhoeal diseases.
2. To determine the total amount of water discharged from every handpump and consumed by the household members.
3. To monitor the breakdown, wear and functional deterioration of the handpumps maintained by the users.
4. To evaluate the compliance of health education aiming at breaking the oral-faecal cycle in relation to water collection, storage and its use and sanitation practices.
5. To determine the long term impact of consistent use of latrines on helminthic infestation.

6. To determine the long term impact of the water and sanitation programme on rate of weight gain in children below 5 years of age.

C. METHODS AND PROCEDURE

Study site: An area is being selected in Mirzapur of Tangail district with a population of about 9000 (Appendix 1) of which 50% will form the study area and the remaining 50% will form the comparison area. It is assumed that through the package of interventions in the study area, minimum reduction of diarrhoeal incidences will be about 20%. To evaluate this reduction approximately 615 children under 5 years of age will be required in the study as well as in the comparison area (Appendix 2). Mirzapur is situated about 45 miles north of Dhaka city and connected by a motorable road. Like any other typical village of Bangladesh people here mostly depend on tubewell for drinking purposes, and on surface water for most of other domestic and personal purposes. For defaecation purpose they usually have a fixed place within the homestead. Some people, especially males and children, also sometimes use the open field or bushes for the same purpose. In this area the number of tubewells and water-seal latrines are limited. Most of the people of this area are agriculturists. During dry season all the households are accessible by foot and during monsoon for 2-3 months country boat is mostly needed for movements within the village.

Research design: The study area will be provided with adequate number of newly developed handpumps and household water-seal latrines along with education on water use and sanitation practices. The comparison area will have no input from the project. Both the areas will be provided with free treatment facilities for diarrhoeal diseases from the Kumudini Hospital located at Mirzapur. The Kumudini Hospital runs a diarrhoea treatment centre in collaboration with the ICDDR,B.

Consultation with the Community

The study design will take into consideration the local behavioural patterns, especially, in relation to personal and community hygiene. A



two-way flow of information will take place between the project implementation staff and community before the delivery of handpumps and water-seal latrines. This will help evolve a strategy in delivery of handpumps and water-seal latrines which will facilitate community participation in the fulfillment of the project objective. Without neglecting the importance of institutional arrangements and training, the community will be involved in planning for operation and maintenance of the technologies delivered. The community will be encouraged to seek a clearer understanding of responsibilities before the handpumps and water-seal latrines are installed. There will be social incentives in the form of status as a honorary consultant at the community level, and public recognition for service.

#### Intervention Technologies

Newly developed handpumps: Newly developed handpumps will be installed to provide adequate service to small groups of population. These handpumps will have the following characteristics:

- a) non-suction mode of pumping;
- b) low-cost;
- c) small scale;
- d) locally manufactured;
- e) highly reliable;
- f) maintained and repaired by users; and
- g) adaptable for multipurpose water usage.

Two hundred newly developed handpumps supplying multi-use water facilities are planned for the study villages. With the installation of these handpumps the distance between the house and water source will come within a reasonable range. The total amount of water discharged from every handpump will be measured. Breakdown, wear and functional deterioration of the handpumps will be monitored and designed modifications will be introduced as and when necessary.

Improvement of storage facilities: Measures will be taken to improve the storage facilities of water to prevent the improper handling of water. The measures will be introduction of : (a) fitting stop-cocks or taps in large pitchers or containers; (b) water pitchers coated with sustained-release harmless disinfectant; (c) ferrocement jars/plastic containers (carboys); (d) water pitchers with filters; and (e) use of rain water with safe storage practices.

Water-seal household latrine: For the safe disposal of excreta every household of the study area will be provided with a water-seal latrine. This latrine includes concrete base with a squatting plate having a water trap through a goose-neck at the bottom of the base. The Public Health Engineering of Bangladesh in collaboration with the UNICEF are distributing these latrines in Bangladesh in a limited scale. To facilitate distribution the water-seal latrines will be manufactured at different sites within the study area. The household members will be motivated to purchase water-seal latrines at a subsidized rate.

Education on water use and sanitation: The education on water use and sanitation practices will aim at breaking the faecal-oral cycle in transmitting the enteric organisms. The health education will be provided only in the study community targetting the household members responsible for procurement and handling water with special emphasis to the mothers of under 5 children. A package of education on water use and sanitation will be developed keeping in view the social and cultural factors influencing people's responses to water supply and excreta disposal.

#### Research Techniques

Census: A household census will be conducted in the study and comparison areas at the beginning of the study. The census information on the members of every household will include name, age, sex, marital status, relationship

with the head of the household, education, primary and secondary occupations. Information on the source of water with distance and place of defaecation with distance for male, female and children in the household will also be included in the census. Births, deaths, in- and out-migrations, marriages will be registered routinely at a monthly interval by the Health Assistants.

Microbiology laboratory: A field microbiology laboratory will be set up at Mirzapur to isolate the bacterial organisms like Vibrio cholerae, Salmonella, and Shigella spp. For identification of rotavirus and Toxigenic E.coli, samples will be routinely sent to the ICDDR,B laboratory at Dhaka. Water bacteriology will be carried out in the field laboratory. This laboratory will be set up under the technical supervision from the Microbiology Laboratory of ICDDR,B at Dhaka.

#### Diarrhoea and Dysentery Surveillance

Diarrhoea<sup>1</sup> and dysentery<sup>2</sup> surveillance will be aimed at under 5 children of both the study and comparison areas. A weekly surveillance will be conducted by the Female Community Worker. To avoid any probable worker bias in collecting information on diarrhoea and dysentery every Female Community Worker will routinely rotate at an interval of three months in the surveillance area. A structured form will be utilized for recording the incidence and symptoms of diarrhoea and dysentery. The field workers especially the Female Community Workers will be given on the job training in interviewing techniques for finding diarrhoeal cases. They will also be trained similarly in the techniques of collecting rectal swabs and in streaking the swabs on the plates at the bed side. Rectal swab will be collected from the prevalent cases of diarrhoea and dysentery. Two rectal

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<sup>1</sup>Diarrhoea is broadly defined here as three or more loose or watery and effortless motion in 24 hours with or without vomiting and it is usually not accompanied by abdominal pain or fever.

<sup>2</sup>Dysentery is defined as frequent passage of mucoid and or bloody stool with accompanying abdominal pain, tenesmus and in some cases fever as well.

swabs will be obtained from every prevalent case. One will be used to streak on the Salmonella-Shigella agar and McConkey's agar plates at the bed side and another into the phosphate-buffer saline (for rotavirus). For isolation of cholera vibrios, rectal swabs will be collected from the affected persons having watery motion in bile peptone medium. From the field the media will be transported to the field laboratory at the close of the field work.

### Bacteriological Techniques

The standard technique will be used for diagnosing Shigella, Salmonella and V.cholerae. Three colonies of E.coli will be collected from McConkey's plates for determining enterotoxigenic strains in the Dhaka laboratory by using Y-1 adrenal cell and Chinese Hamster ovary cell assays for LT toxin and infant mouse assays for ST toxin. Rotavirus will be diagnosed by using ELISA technique in Dhaka. Any diarrhoea lasting for more than one week will be subjected to microscopic examination of fresh stool for detecting the trophozoite form E.histolytica and Giardia lamblia.

Water samples collected will be subjected to bacteriological tests for the determination of coliform counts according to the standard WHO manual.

### Nutritional Status

All the children under 3 years of age in the study and comparison areas will be measured for height/length, weight and arm circumference at an interval of three months. The children aged between three years and below five years will be similarly measured at an interval of six months. The higher frequency of anthropometric measurement at the lower age level can be justified by the fact that in Bangladesh diarrhoeal morbidity rates were highest among children particularly under three years of age (Black et al. 1982; Black et al. 1982a) and declined with age (Sunoto 1982:306). The anthropometric survey

will be conducted by a trained Health Assistant. The anthropometric data will be recorded in a structured form. The quality of anthropometric data will be verified through random spot checking at the time of every survey.

#### Determination of Ova/Parasite Load

This task will be carried out annually in a 20% random sample of children under 5 years of age from both the study and comparison areas. The standard MIF technique will be used to measure the parasites and their ova load.

#### KAP Survey

A baseline information will be collected on handling and storage practices of water, especially hand washing following defaecation, food handling by women, washing utensils and soiled clothing of diarrhoea affected children. This study will be carried out at an interval of six months on a 20% randomly selected households of the study and comparison areas. The KAP/<sup>(Appendix 3)</sup>study will comprise of in-depth interviewing of the mother of under 5 children, and observation of water use and sanitation practices of the household members. Interview schedule and observation form will be used in doing the KAP survey. The KAP study will be conducted by the Female Health Assistants and the Female Community Workers of the project who are not involved in the delivery of health education messages. Through periodic KAP survey, health impact information will be indicated by behavioral and attitudinal changes of the users with respect to water consumption from the handpump, improved personal hygiene, and utilization of latrine.

#### Engineering Monitoring

The breakdown, wear and functional deterioration of all the hand-pumps in the study area will be monitored weekly with the help of mechanic under the supervision of the project Environmental Engineer. The pump mechanic will maintain a log book for recording the wear and tear and maintenance required for every handpump.

### Water Use Monitoring

Water consumed per household and the volume of water pumped out through the pump will be measured through quarterly surveys with the help of apparatus, and observation by the engineering field staff. Observation will be made on the interaction of the people with the water facility. Household visits by field staff will determine if the water in storage containers is handpump or surface water. The survey will be conducted in a 20% randomly selected households of the study and comparison areas. The volume of water pumped through the handpumps will be recorded only in the study area.

### Water and Sanitation Motivation

Motivation work related to the installation of handpumps and water-seal latrine will continue for a period of 6 months in the study area during the second and third quarters. Community and household members will be involved in making the site selection for the installation of handpumps and latrines respectively.

### Training

There will be one-month intensive on the job training for the field staff following their recruitment. Training will be provided in interviewing, data and sample collection techniques.

### Evaluation

To determine the acceptability and effectiveness of the provision of water supply through the newly developed handpump, and excreta disposal by using water-seal latrine certain specific data will be collected. These will include: (1) household census; (2) vital events registration; (3) incidence of diarrhoeal diseases; (4) KAP survey on behaviour and attitude related to water use and defaecation practice; (5) anthropometric data on under 5 children; (6) volume of water pumped through the handpumps; (7) per household consumption of water; (8) recording of wear and tear of the handpumps and water-seal latrine; and (9) information on the worm load.

### Data Management

All data forms completed in the field will be scrutinized at the Mirzapur field office and will be sent to Dhaka monthly for punching and verification. Vital events and the incidence of diarrhoea and dysentery will be hand tabulated on a monthly basis in the field to keep an account of the progress of activities.

The collected data will be processed by the Coding Assistant, Data Processing Assistant under the supervision of Programmer-cum-Statistical Officer. For data analysis the ICDDR,B computer services will be utilized.

### Data Analysis

#### A. Assessment of the impact of handpump water supply, and water-seal latrine use:

Analysis on the incidences of cause specific diarrhoea and dysentery over the study period, especially amongst the children below 5 years of age will be made. The analysis can be done on the individual, or group level. Statistical significance tests will be used to measure the impact of the given interventions in the study area in reducing the incidence of diarrhoea, dysentery, and worm load amongst children aged 2-4 years and in increasing the velocity of weight gain of children under 5 years of age. Amongst them the changes in the nutritional status will be measured by weight for height, weight for age, and height for weight. The data from the study area will be compared with the data of comparison area.

#### B. Assessment of the compliance of health education on the uses of hand-pump and water-seal latrine:

Data obtained through periodic KAP survey will be used to measure the compliance of health education. This measurement will be done based on some pre-determined indicators. The level of compliance will be looked into in terms of the package of health education. The measurement of

compliance will be done based on some predetermined indicators. The indicators will be listed in an addendum on water and sanitation education after field observations.

- C. Assessment of the volume of water pumped through hand-pumps, volume of water consumed per household, break-down and functional deterioration of handpumps and their maintenance by the users:

Data obtained regarding volume of water pumped through the handpump, volume of water consumed per household, breakdown and maintenance of the handpump will be analysed by engineers.

#### Confounding Variables

- A. Comparability of study and comparison areas:

The selected study and comparison villages are located within 2 miles of the Mirzapur thana headquarters. Socio-economic and geographical condition in both the areas are similar. However, the mean distance of the hospital is two miles from the study village and one mile from the comparison village. Since the comparison village is nearer to the hospital, the impact of such distance, if any, would be felt favourably in the comparison area.

- B. Spill-over effect of water and sanitation education:

Though the study and comparison areas are located apart with few small villages in between there having two distinct independent approaches with the thana headquarters the spill-over of health education messages may be less than anticipated. Moreover, each of the areas are mainly served by separate markets.

- C. Worker variation in relation to diarrhoea and dysentery surveillance:

The diarrhoea and dysentery surveillance will be conducted by the Female Community Workers recruited from the community itself. Such workers being from the same locality will have easy communication with the household members. This will facilitate surveillance on diarrhoea and dysentery.



D. SIGNIFICANCE

Water plays a dominant role in the transmission of a major part of infectious diseases in Bangladesh and many other developing countries. These diseases are associated with poor personal and household hygiene, inadequate water supply and sanitation. The introduction of the new inexpensive handpump which has less wear and tear in combination with household water-seal latrine supported by a package of health education is likely to reduce the incidence of diarrhoeal diseases. The improvement of nutritional status, if any, will be an added benefit.

E. FACILITIES REQUIRED

1. Office space: A field office having four rooms will be required on rental. The office building will have a kitchen shed. A godown for storing the hardware and a garrage would be required on rental on the same premises.
2. Laboratory space: Space will be required to establish a field laboratory. The Kumudini Hospital at Mirzapur may be requested to make available a suitable space within its building and the ICDDR,B collaborative diarrhoea treatment centre.
3. The Kumudini-ICDDR,B collaborative diarrhoea treatment centre will provide treatment for diarrhoeal diseases occurring in the study and comparison populations.
4. Laboratory support will be needed for rotavirus and E.coli indentification from the Dhaka ICDDR,B microbiology laboratory.
5. Logistical support:
  - a) one motor vehicle (diesel operated Toyota Hiace or Pick-up)
  - b) two 100cc Honda Motor-cycles
  - c) two bi-cycles

6. Major items of equipment:

- a) two Incubators
- b) two Refrigerators
- c) one electric sterilizer (Autoclave machine)
- d) two Microscopes
- e) equipment for making distilled water
- f) six electric Ceiling Fans and two Table Fans
- g) 150 water quantity monitoring apparatus
- h) one electric and one manual type-writers

F. COLLABORATIVE ARRANGEMENTS

The Handpump Research Advisor and his team from the World Bank, Dhaka will provide technical support related to handpump and water-seal latrine.

Assistance will be sought from the UNICEF Office, Dhaka and the Directorate of Public Health Engineering (DPHE) of the Government of Bangladesh, the National Institute of Preventive and Social Medicine (NIPSOM) of Dhaka, and the National Paramedic Institute, Dhaka.

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Appendix 1

Population by Age and Sex in the Study  
and Comparison Areas

Age	Study Area		Comparison Area		Total (Study+Comp. Areas)	
	M	F	M	F	M	F
0-4	331	325	319	324	650 *(13.5)	649 (14.2)
5-9	343	351	293	288	636 (13.2)	639 (14.0)
10-14	325	307	317	289	642 (13.4)	596 (13.1)
15+	1451	1424	1431	1257	2882 (59.9)	2681 (58.7)
All Ages	2450	2407	2360	2158	4810 (51.3)	4565 (48.7)

\* Values in parenthesis represent percentage taken from the total population of 9375.

## Appendix 2

The sample size  $n$  was determined using the following formula:

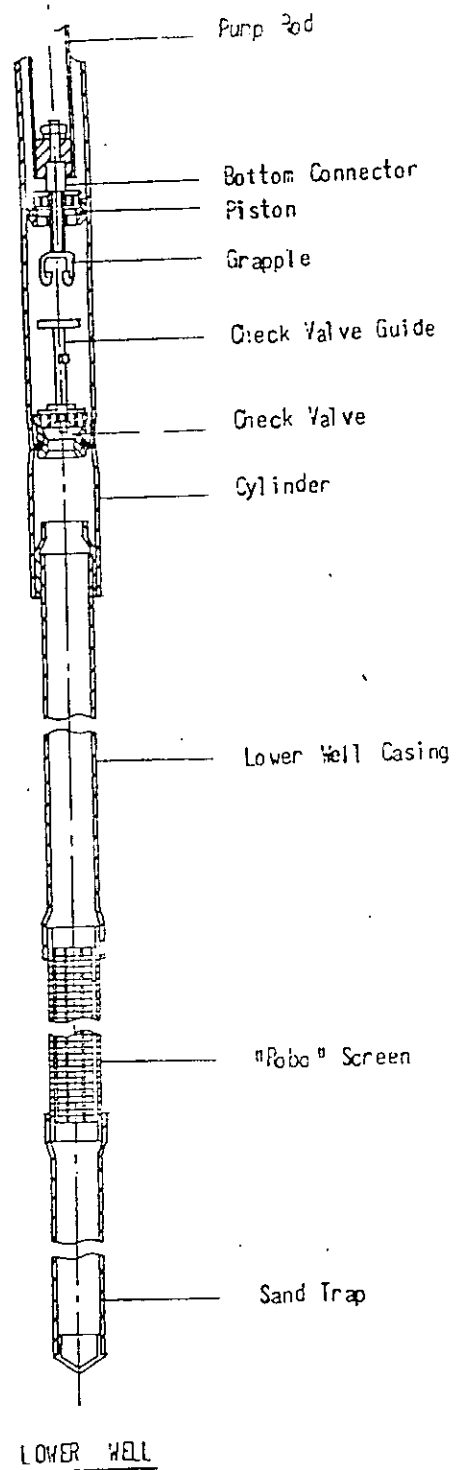
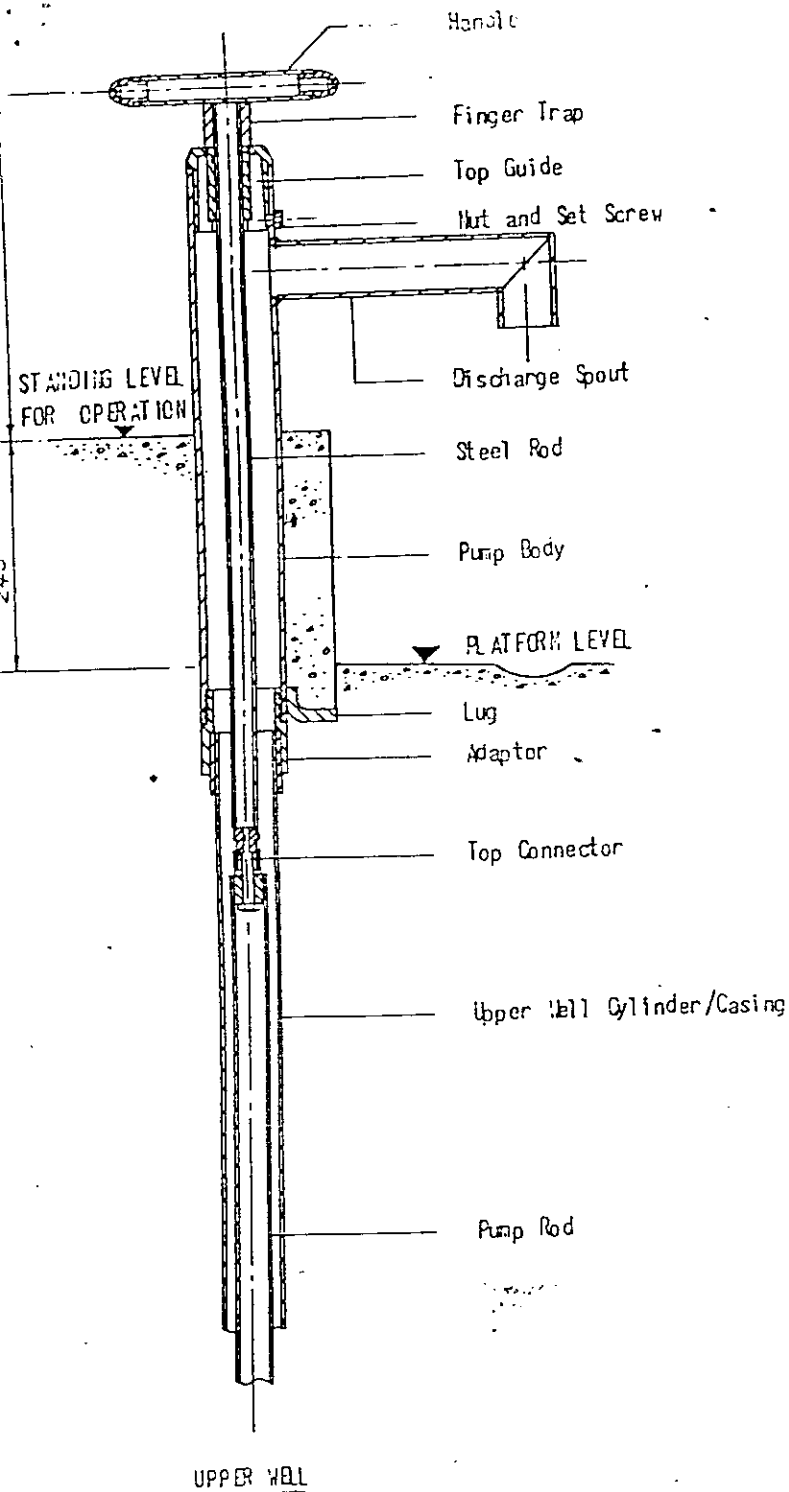
$$n = \frac{(Z_{\alpha} + Z_{\beta})^2 (p_1 q_1 + p_2 q_2)}{(p_2 - p_1)^2} \quad \text{and was}$$

found to be 615.


Where  $P_1 = 0.4$ , the monthly rate of clinical diarrhoea of a under 5 child,  $p_2$  was set to 0.32 i.e. a 20% reduction of monthly diarrhoea rate because of intervention.

The value of  $(Z_{\alpha} + Z_{\beta})^2$  was taken as 8.6 from table 4.13.1 of Snedecor and Cochran, 1967. The value of  $(Z_{\alpha} + Z_{\beta})^2$  was set in such a way that the chance of detection of such reduction is 90%.

Snedecor, W.G. and W.G. Cochran (1976). Statistical Methods. Oxford and IBH Publishing Company. New Delhi, Bombay, Calcutta.



REVISIONS				SIGNATURE	DATE
O.	DESCRIPTION	DATE	APPD.	DESIGNED BY	
1.	Connectors, Handle, Check Valve	Aug '83			
	Top Guide, Finger Trap, End			DRAWN BY	
	Cap, Grapple, Check Valve			<i>[Signature]</i>	6/11/83
	Guide, Discharge Spout,			CHECKED BY	
	Cylinder			<i>[Signature]</i>	6.11.83
				APPROVED BY	



**UNICEF**  
G. P. O. BOX 58  
DHAKA  
BANGLADESH

**BANGLADESH DEEP-SET HANDPUMP MARK I**

TITLE COMPLETE HANDPUMP AND TUBEWELL ASSEMBLY

SCALE 1 : 5	DRG. NO. T 01	REV. 1
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স্বল্পকালীন রক্ত পরীক্ষায় সম্প্রদায় অংশগ্রহণকারীদের  
কাছে পড়ে শোনার উদ্দেশ্যে লিখিত

সন্মতি পত্র  
=====

কিছুদিনের মধ্যেই আমরা আপনাকে/আপনার শিশুকে একটি নতুন কলেরা বিরোধী  
টিকার পরীক্ষায় অংশগ্রহণের আহ্বান জানাবো। আগেকার কলেরার টিকার সাথে এর  
পার্থক্য হচ্ছে, এই ঔষধ মুখে খেতে হয়, ইনজেকশনের মাধ্যমে দেওয়া হয় না।  
এটি অন্যান্য কলেরার টিকার তুলনায় অত্যন্ত পক্ষে সমান কার্যকরী, এবং গত তিন  
বছরে বহু সুচ্ছাসেবীর উপর পরীক্ষায় এর কোন মারাত্মক পার্শ্বপ্রতিক্রিয়া দেখা যায়নি।  
সম্পূর্ণ কার্যকারিতার জন্যে, প্রতিটি মাত্রার মধ্যে এক ঘাসের ব্যবধান রেখে এই ঔষধ  
অবশ্যই তিনটি মাত্রায় দিতে হবে।

যদি আপনি/আপনার শিশু এই ঔষধ পরীক্ষায় অংশগ্রহণের সিদ্ধান্ত নেন তাহলে  
আপনাকে/আপনার শিশুকে টিকা অথবা একটি ভিটামিনযুক্ত ঔষধ দেওয়া হবে, যা  
স্থানস্থায়ী হিসাবে পরিচিত। আপনি যদি রাজী হন যে, আমরা যখন টিকা বা  
ভিটামিন দিতে ফিরে আসবো - তখন আপনারা অংশগ্রহণ করবেন, তাহলে আমরা এখন  
আংগুরের অগ্রভাগ থেকে সামান্য রক্তের নমুনা নেবো। ১-২ মাসের মধ্যে আমরা  
আরেকবার নমুনা সংগ্রহ করবো, এবং তৃতীয়বার নমুনা নেনো নভেম্বর অথবা মার্চ  
মাসে। কলেরা ও অন্যান্য উদরাময় ব্যাধির প্রতিষেধক হিসাবে এই টিকা কতটা  
শক্তিশালী তা নির্ধারণে এই রক্তের নমুনাগুলো সহায়তা করবে।

আপনি/আপনার শিশু নমুনা না দিলেও মতলব হাসপাতালে আপনার/আপনার  
শিশুর স্বাভাবিক চিকিৎসার কোন প্রকটি হবে না, এবং তা সত্ত্বেও আপনি ভেক্সিন  
পরীক্ষায় অংশ নিতে পারবেন।

আমি এই পরীক্ষার পদ্ধতি এবং ভিত্তি সম্পূর্ণ বুঝতে পেরেছি এবং এতে অংশগ্রহণে  
সন্মত হচ্ছি।

তারিখ-----

স্বাক্ষর:-----

বাম রক্ষাংগুলির ছাপ-----



বুকের দুধ পরীক্ষায় সম্প্রদায় অংশগ্রহনকারীদের  
জন্যে লিখিত পত্র

আমরা আপনাকে একটি নতুন কলেরা-নিরোধী টিকার পরীক্ষায় অংশগ্রহনের  
আহ্বান জানাচ্ছি। আগেকার কলেরার টিকার পাথে এর পার্থক্য হচ্ছে, এই ঔষধ মুখে  
খেতে হয়, ইনজেকশনের মাধ্যমে দেওয়া হয় না। এই ঔষধ অনুচঃপক্ষে অন্যান্য কলেরার  
টিকার সমান কার্যকর, এবং এর কোন ক্ষত ধারাত্মক পার্শ্বপ্রতিক্রিয়া নেই।

যদি আপনি এইঔষধ পরীক্ষায় অংশগ্রহন করেন তাহলে আপনাকে ঔষধ অথবা একটি  
ভিটামিনযুক্ত ঔষধ দেওয়া হবে, যা স্থান্যহর্ষক হিসাবে পরিচিত। আপনি যদি রাজী  
হন তাহলে আমরা এখন অল্প কিছুটা বুকের দুধ এবং আংগুলের অগ্রভাগ থেকে সামান্য  
রক্তের নমুনা পরীক্ষার জন্যে নিতে চাই। আমরা ৪ সপ্তাহ ও ৩ মাস পরে আবার  
নমুনা সংগ্রহ করবো। আপনার গুলিগত অবস্থা বুঝার জন্যে আমরা আপনার উচ্চতা,  
ওজন ও উর্ধ্ববাহুর চুকের পুরুত্ব মাপতে চাই। সুবাদানের মাধ্যমে আপনার শিশুর  
স্বাস্থ্যের উন্নতিতে এই ঔষধের প্রভাব নির্ধারণে এগুলো সাহায্য করবে।

আপনি নমুনা না দিলেও ঘটনব হাসপাতালে আপনার স্নাতাবিক চিকিৎসার কোন  
প্রশ্নটি হবে না, এবং তা সত্ত্বেও আপনি এই পরীক্ষায় অংশ দিতে পারবেন।

আমি এই পরীক্ষার নিয়ম ও উদ্দেশ্য সম্পূর্ণ বুঝতে পেরেছি এবং এতে অংশগ্রহনে  
সম্মত হচ্ছি।

তারিখ-----

স্বাক্ষর-----

বাম হস্তাংগুলির ছাপ-----