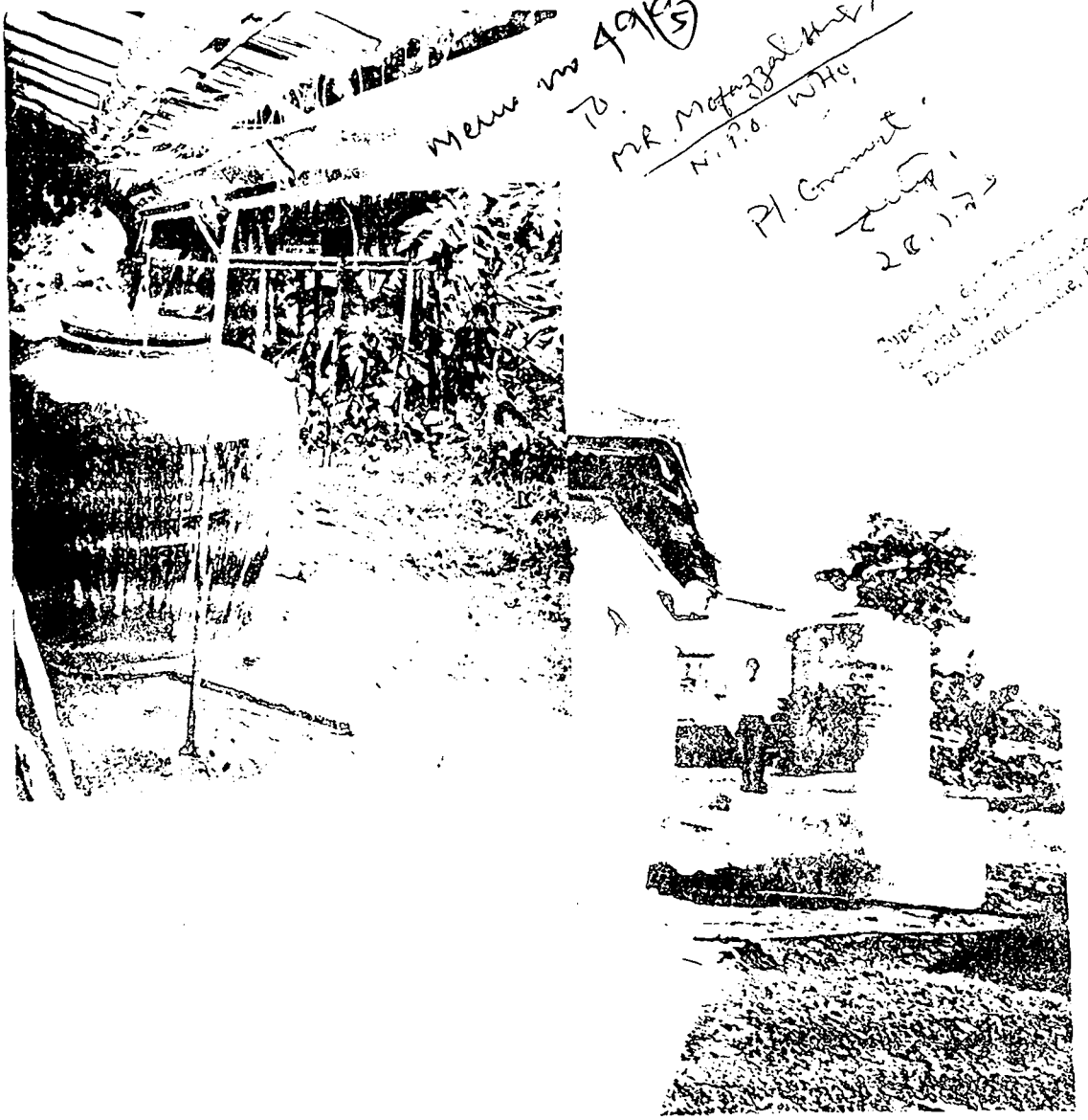
SURVEY ON STUDY FOR RAIN WATER COLLECTION AND STORAGE



DRAFT FINAL REPORT

January, 1996

SHELTECH CONSULTANTS (PVT.) LTD.
House No. 59/B, Road No. 16 (New)
Dhanmondi R/A, Dhaka-1209.

SHELTECH
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Your Ref :

Date : January 24,1996

Our Ref : SCPL/96/LTR/38

To
Mr. Fariduddin Ahmed
Superintending Engineer, DPHE
GWE & D Circle, Dhaka and
Chairman, DPHE R&D Committee

Sub: **Submission of DRAFT FINAL REPORT**

Dear Sir,

We are pleased to inform you that we are submitting the 6 of copies Draft Final Report for your early comments and queries, so that we can submit the Final Report at the earliest.

Hoping for your kind co-operation.

Thanking you.

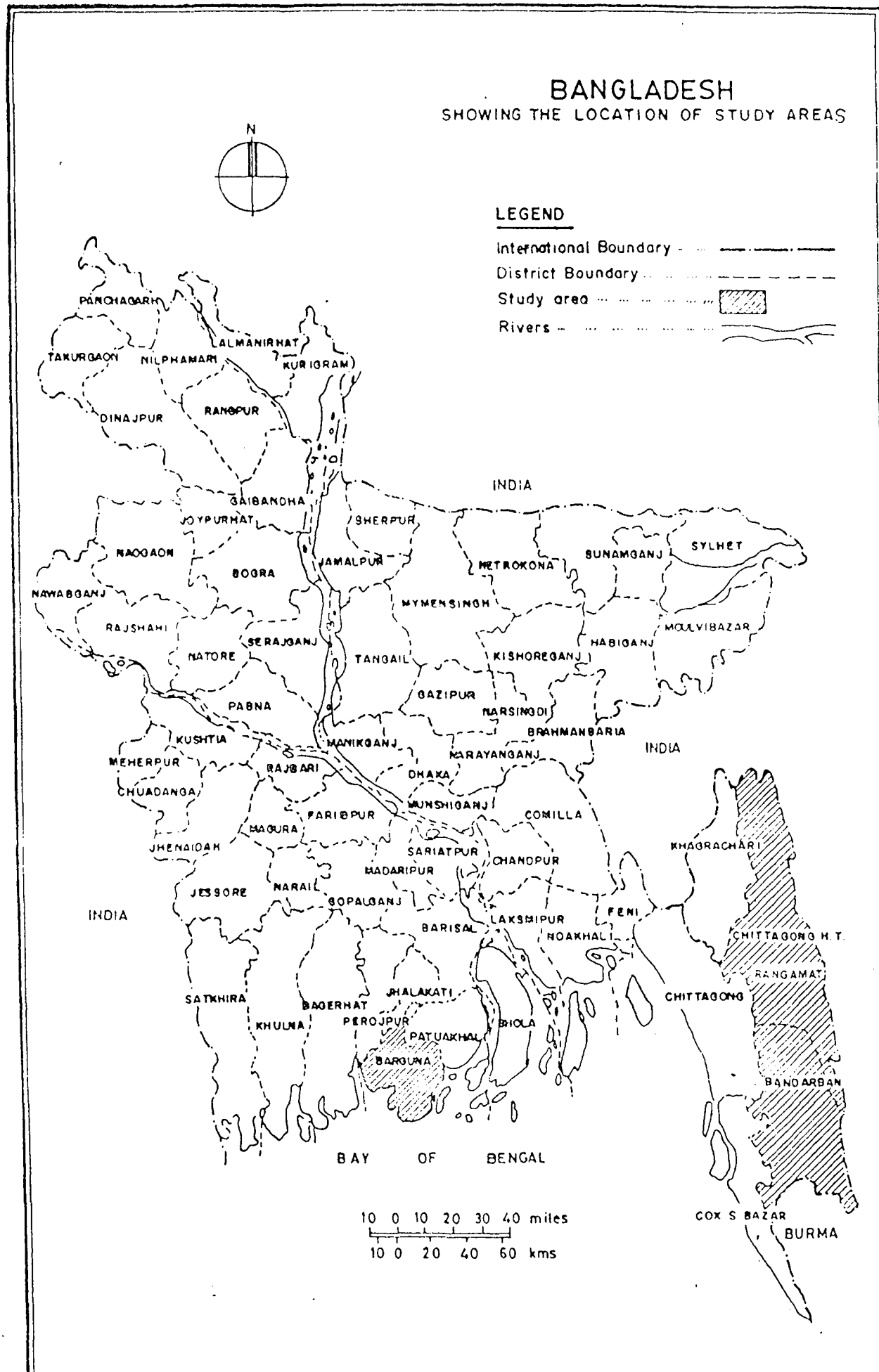
Yours Sincerely,

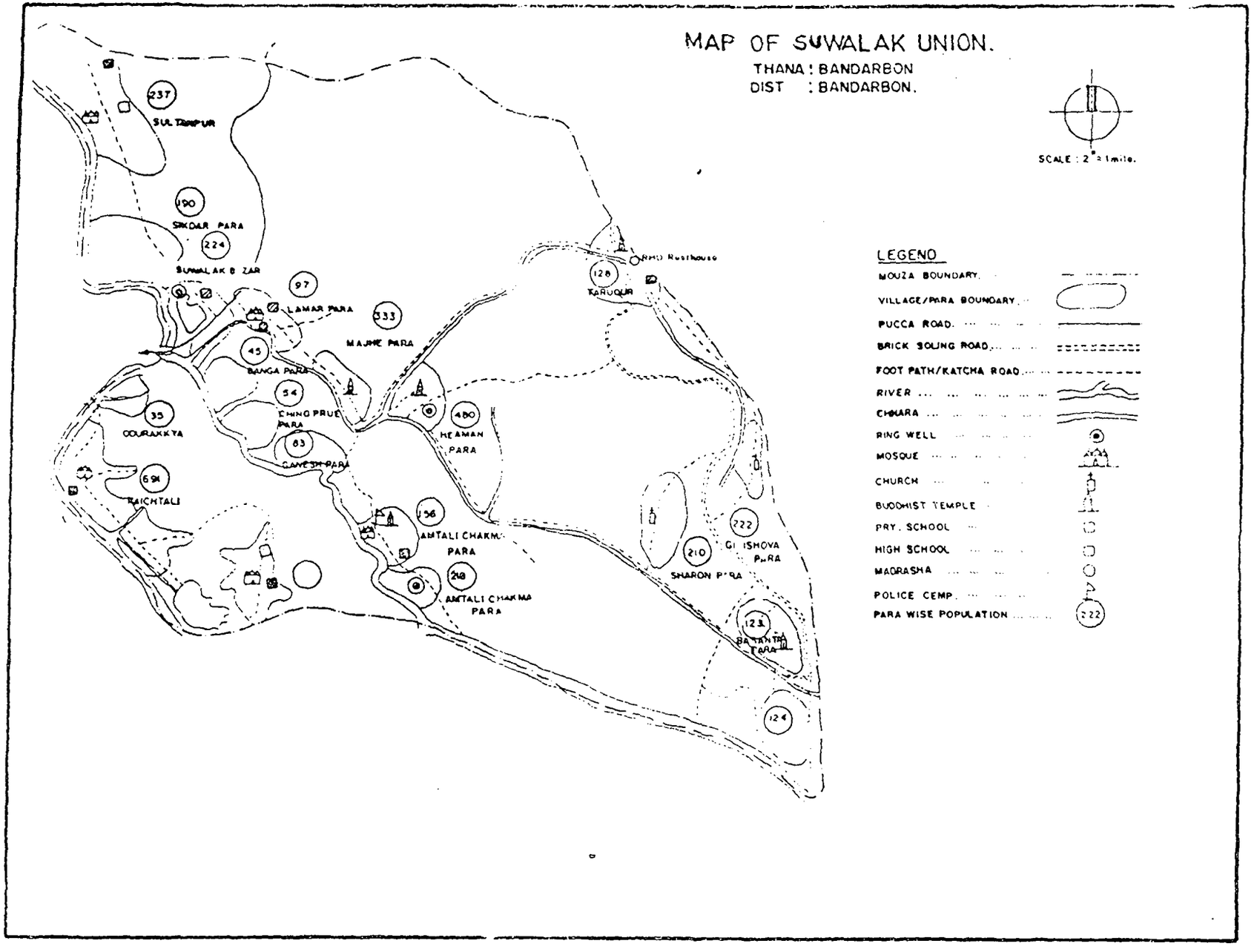
O.H. Shamim Sher
Project Director

C.C. 1. The Chief, WESS, UNICEF, Dhaka

2. Mr. Abu S. Azad, Project Officer, WESS, UNICEF, Dhaka

3. Dauda Bin Wurie, Project Officer, WESS, UNICEF, Dhaka.


BANGLADESH
SHOWING THE LOCATION OF STUDY AREAS
N
LEGEND
International Boundary
District Boundary
Study area
Rivers
PANCHAGARH
TAKURGAON
NILPHAMARI
LALMANIRHAT
KURIGRAM
DINAJPUR
RANGPUR
GAIBANDHA
JOYPURHAT
SHERPUR
NAOGAON
BOGRA
JAMALPUR
NETROKONA
SUNAMGANJ
SYLHET
NAWABGANJ
MYMENSINGH
RAJSHAHI
SERAJGANJ
MOULVIBAZAR
HABIGANJ
NATORE
TANGAIL
KISHOREGANJ
GAZIPUR
PABNA
NARSINGDI
BRAHMANBARIA
KUSHTIA
MANIKGANJ
NARAYANGANJ
MEHERPUR
RAJBARI
DHAKA
CHUADANGA
MUNSHIGANJ
COMILLA
FARIDPUR
MAGURA
KHAGRACHARI
JHENAIDAH
SARIATPUR
CHANDPUR
MADARIPUR
JESSORE
NARAIL
GOPALGANJ
FENI
LAKSHMIPUR
BARISAL
NOAKHALI
CHITTAGONG H.T.
RANGAMATI
SATKHIRA
JHALAKATI
CHITTAGONG
BAGERHAT
KHULNA
PEROJPUR
BHOLA
PATUAKHALI
BARGUNA
BANDARBAN
INDIA
INDIA
BAY OF BENGAL
10 0 10 20 30 40 miles
10 0 20 40 60 kms
COX S BAZAR
BURMA


MAP OF SUWALAK UNION.
THANA : BANDARBON
DIST : BANDARBON.
SCALE : 2" = 1 mile.
LEGEND
MOUZA BOUNDARY
VILLAGE/PARA BOUNDARY
PUCCA ROAD
BRICK SOLING ROAD
FOOT PATH/KATCHA ROAD
RIVER
CHHARA
RING WELL
MOSQUE
CHURCH
BUDDHIST TEMPLE
PRY. SCHOOL
HIGH SCHOOL
MADRASHA
POLICE CEMP.
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SUWALAK BAZAR
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LAMAR PARA
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GANESH PARA
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ODURAKKYA
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HEAMAN PARA
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AMTALI CHAKMA PARA
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AMTALI CHAKMA PARA
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KARUQUR
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GI ISHOVA PARA
210
SHARON PARA
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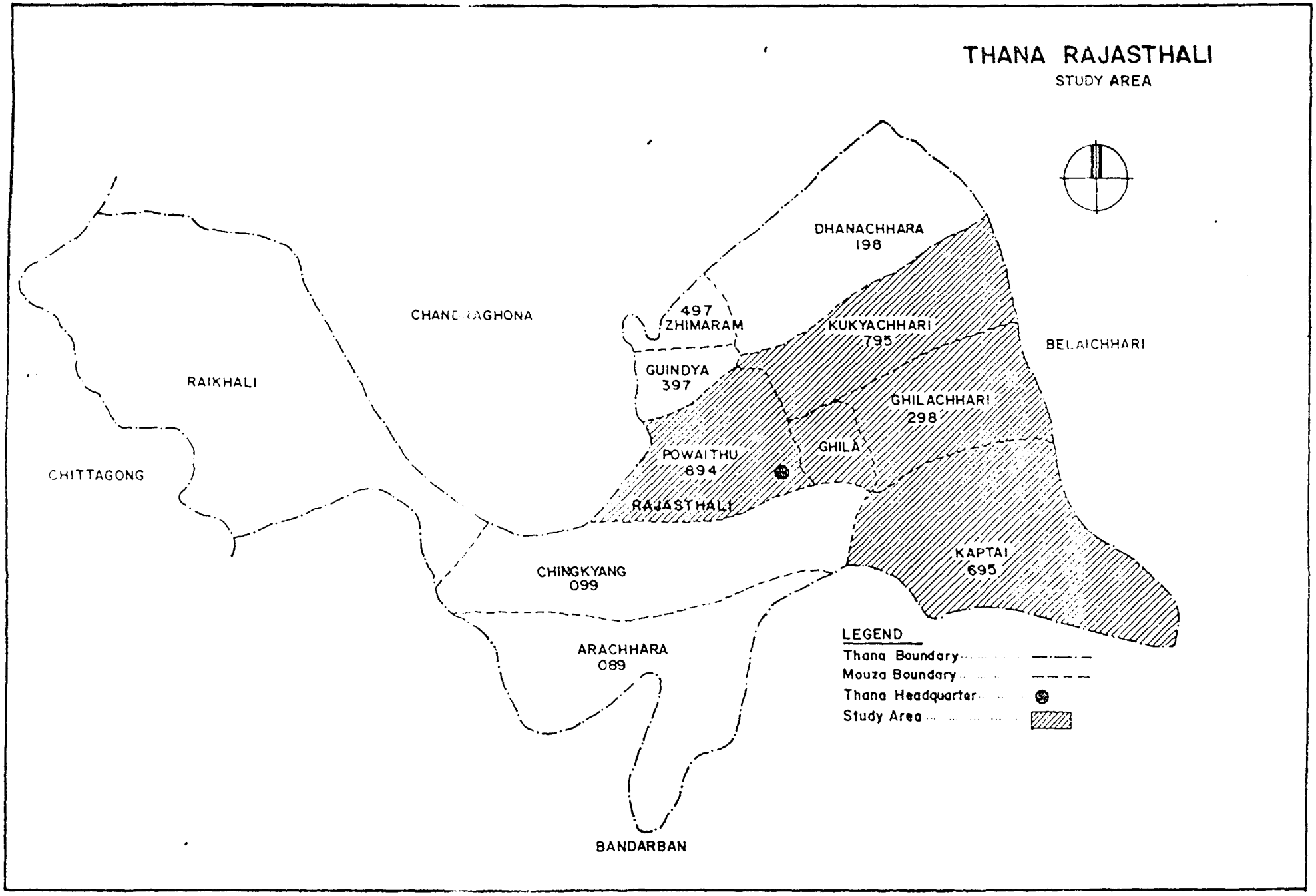
THANA RAJASTHALI
STUDY AREA
DHANACHHARA
198
497
ZHIMARAM
CHANDRAGHONA
KUKYACHHARI
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BELAICHHARI
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GHILA
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CHITTAGONG
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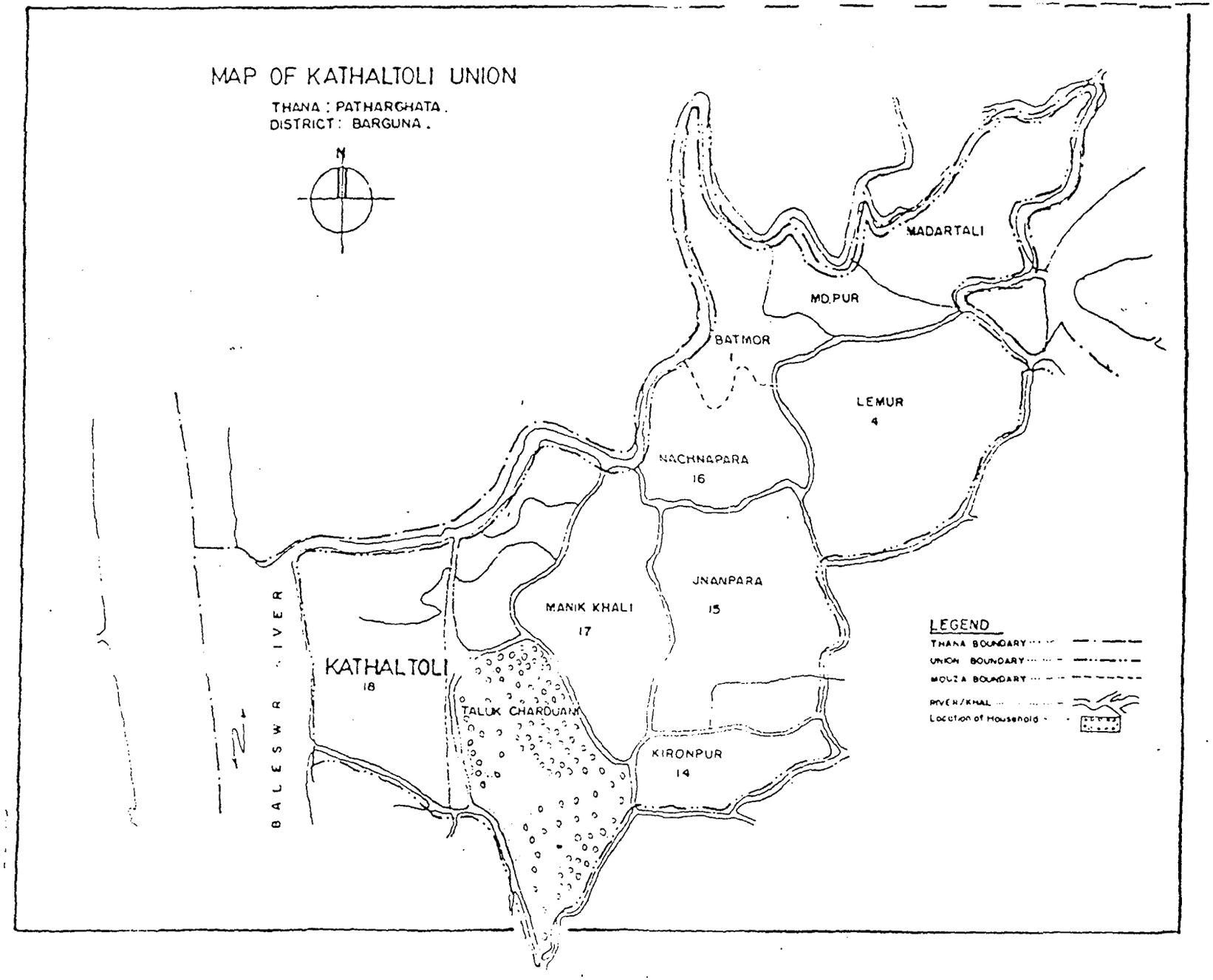
CHINGKYANG
099
ARACHHARA
089
BANDARBAN
LEGEND
Thana Boundary
Mouza Boundary
Thana Headquarter
Study Area


MAP OF KATHALTOLI UNION
THANA : PATHARGHATA.
DISTRICT : BARGUNA.
N
MADARTALI
MD.PUR
BATMOR
1
LEMUR
4
NACHNAPARA
16
JNANPARA
15
MANIK KHALI
17
KATHALTOLI
18
TALUK CHARDUANI
KIRONPUR
14
BALESWR - IVER
LEGEND
THANA BOUNDARY
UNION BOUNDARY
MOUZA BOUNDARY
RIVER/KHAL
Location of Household

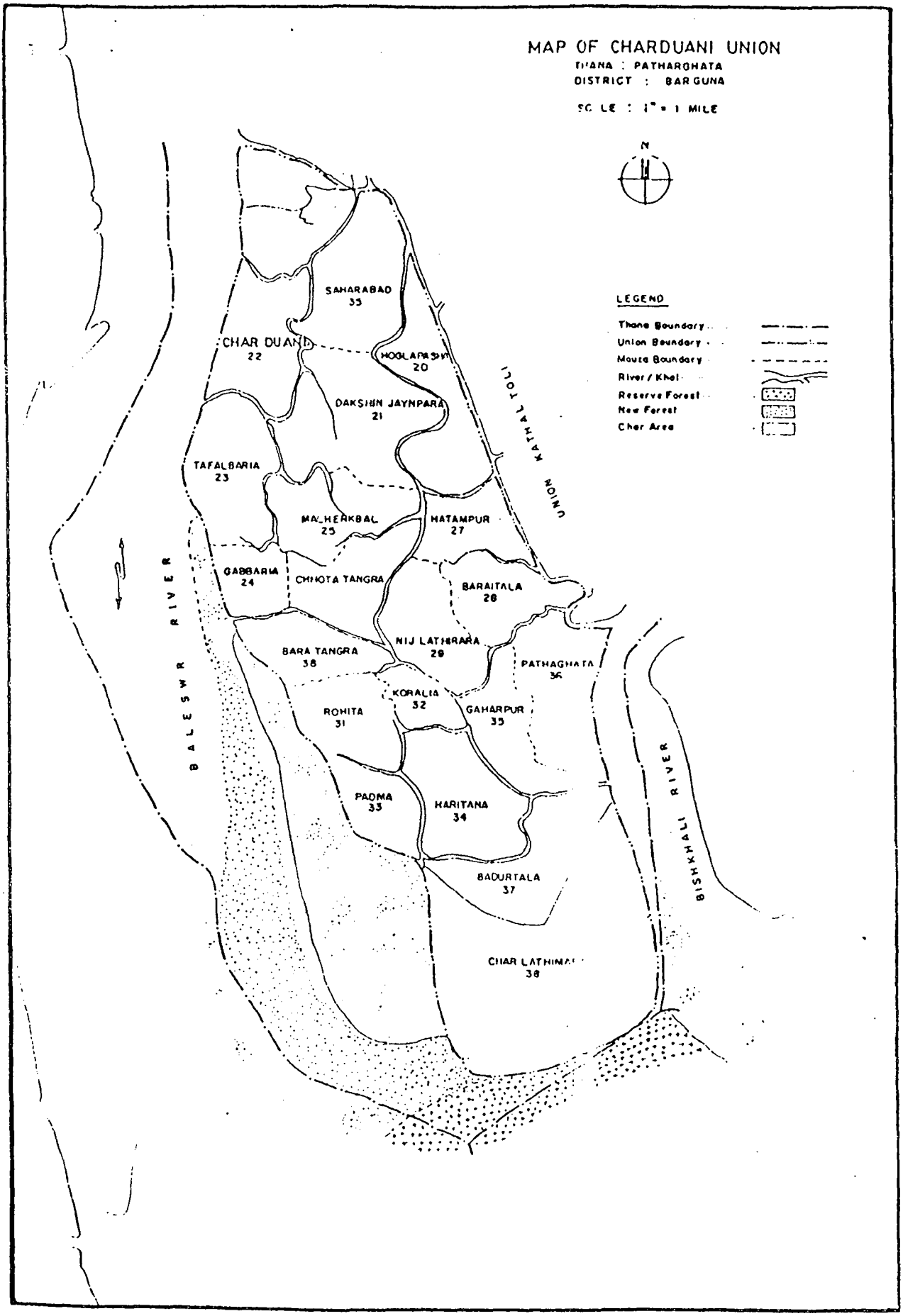


EXHIBIT - VIII

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LIST OF ACRONYMS

AMFM	-	Adult male family member
AFFM	-	Adult female family member
B	-	Boiling & Business
BME	-	Benefit Monitoring and Evaluation
CP	-	Chemical Purification
CI	-	Corrugated Iron
CWL	-	Can only write letter
CHT	-	Chittagong Hill Tracts
DAL	-	Daily agricultural labour
DNL	-	Daily non-agricultural labour
DY	-	Dysentery
DI	-	Diarrhoea
DPHE	-	Department of Public Health Engineering
DSE	-	Demographic Socio-Economic
ERT	-	Earthen reserved tank
FW	-	Fire wood
FB	-	Fishing Business
FC	-	Female children
G	-	Gas
GR	-	Graduate
H	-	Hanging
HM	-	Home made
HP	-	Herbal purification

HW	-	House wives
HSE	-	Higher Secondary School Certificate
K	-	Kalshi and Kerosine
KAP	-	Knowledge Attitude and Practice
LO	-	Land owner
M	-	Matka
MB	-	Metalic bucket
MRT	-	Metalic reserved tank
MC	-	Male children
MAL	-	Malaria
N	-	None
NS	-	No specific
O	-	Other
PP	-	Paid person
PL	-	Pit Latrine
PB	-	Plastic bucket
RCP	-	River canal pond
RAW	-	Rain water
RE	-	Religious education
RWCS	-	Rain water collection and storage
S	-	Service
SK	-	Skin disease
ST	-	Student
SSC	-	Secondary School Certificate
TB	-	Trading/business

TW	-	Tubewell
TOR	-	Terms of Reference
T.O.T.	-	Training of trainers
TY	-	Typhoid
VLOM	-	Village level operation and maintenance
WS	-	Water seal
WID	-	Women in development

EXECUTIVE SUMMARY

The project Rain Water Harvesting (RWH) was conceptualized by Department of Public Health Engineering and United Nation Children Fund (DPHE-UNICEF) to meet the demand of the population for the underserved areas of the country viz Coastal areas and Hill Tracts in their annual programme of potable water supply. The intensity of rainfall is maximum in both the areas. Hence in the Chittagong Hill Tracts, two unions of two thanas under two districts viz Ghilaichhori Union of Rajasthali Thana of Rangamati District and Suwalak Union of Bandarban Sadar Thana of Bandarban District and also Charduani and Kathaltoli Union of Patharghata thana of Barguna District were selected for the study project (under R & D programme of DPHE-UNICEF). On 15th April, 1994 for a period of 15th months (31st July 1995) Sheltech Consultants (Pvt.) Ltd. was assigned by WES section of UNICEF to carry out the study further to the extension of contract upto 31st December 1995 with a Terms of Reference. The actual project work commenced on Mid May 1994.

This project envisages three main stream of study logic, firstly to evaluate the socio-economic conditions of the household of the project area and community involvement. Secondly, to locate the potential areas for constructing rain water storage Jars/Tank and finally to monitor the performance of such special type of rural water supply aspects to its technical operation, maintenance and acceptability as a whole.

The first phase of consultants job was to survey the socio-economic status of the project areas to ensure the participation in implementing the project. A structured questionnaire was prepared to conduct the survey which included two major broad aspects: one is demographic socio-economic characteristics (DSE profile) and the other is knowledge, attitude and practice profile (KAP profile) on "Rain Water Harvesting". These two parts covered major seven factors:

i) Household information
ii) Household head information
iii) Economic condition
iv) Existing Water Supply Scenario
v) Knowledge on Rain Water Harvesting
vi) Knowledge on Sanitation and Water related diseases
vii) Attitude and practice to store rain water in Jars/Tanks (willingness to contribute in Construction).

The study revealed that the people of the project areas have been drinking rain water since long time back. People drink rain water in the rainy season, but in the dry season they hardly drink rain water because of lack of proposed storage facilities. Drinking of rain water is socio-culturally accepted both in the coastal and Hill Tract areas. Total 369 house holds (190 at CHT + 179 at Barguna) were surveyed. The socio-economic survey depicts that the average family size of 369 households was of 6 members and 98 percent lives in Kutcha houses with 72 percent thatched roof. More than 70 percent of the respondents were aged between 25 and 50, the average age being 35 years. Most of the people under the study area are farmers. The family income is low, with about 50 percent of the household income less than Tk.2,000.00. Existing water use practice shows that about 85 percent use River, Canal, Pond water in coastal belt, while 90 percent use Rain Water at Suwalak and 100 percent use spring water at Rajasthali, but almost all have knowledge rain water and they collect and store rain water for use. Very few are interested to have methodical storage facilities with participation of contribution money of Tk. 1,000.00.

Hence only 2.98 (11 Nos.) percent of the total surveyed households now have the facility of Jars and Tanks fabricated from the project and 36.67 percent of the targeted 30 numbers as per TOR. The percentage is low only due to the lack of contribution money.

Thai model ferrocement Jars/Tanks were adopted for storage of Rain Water, with the training assistance from ARD of Thailand and through UNICEF Dhaka-Bangkok. The Jars/Tanks were constructed with the help of pre fabricated mould. Due to numbers of constrainits and problems (explained in the text) only 11 could be constructed during the project period. Jars (9 Nos. CHT + 2 Nos. Barguna).

Experience during construction shows that community participation in the fabrication of Jars and Tanks was not encouraging from the Villagers. Rather a feeling was observed that the construction of Jars and Tanks were the responsibility of the consultant and DPHE. It would have been more successful if the contribution money could be limited to Tk. 500/-. Then poor people could afford the facilities and the target of TOR could be achieved. The community Tank design was not approved or finalized by the executing agency till November 1995, hence it could not be implemented.

Hence transfer of technology to villager was not so effective, but few local masons in the project area had the training for fabrication of Thai type Jars and Tanks. The villagers may fabricate in future with the help of these masons, which may be termed as capacity building in human, logistical and technical capacity growth.

The monitoring of the stored rain water in the fabricated Jars and Tanks were conducted only in the areas of Chittagong Hill Tracts. Since only two Jars were constructed in Barguna and the people were not harvesting rather they preferred PSF, so the monitoring was not performed in these two.

The monitoring started from September, 1995 and continued upto December, 1995 only at Suwalak and Rajasthali of Chittagong Hill Tracts. During the 1st period of monitoring (Sep-Oct) it was observed that there was a change of colours in stored water, but during the second period of Monitoring (Nov.-Dec.) where the water was stored for longer period, no change in colour was observed. The change in the colour of water was due to the use of unwashed roof tops and thatched roofs without polyethene cover. The water quality samples were collected by DPHE laboratory people only in Suwalak in between September -October monitoring period. The water quality result shows that the quality of stored rain water are within the acceptable range.

It may be recommended that more community education is needed to overcome the lack of awareness among villagers for the actions programme open to them under the R & D activities as Rural underserved areas water supply programme. Early involvement of villagers in decisions, including the selection of the village sanitary mason, needs, to be encouraged.

It is further recommended that, pilot study should not be made in such areas, where access is difficult and time is lost unnecessary due to logistical problem and hazardous conditions and more communication gap render in between control office and field office. Detail recommendations are in chapter - 7.

CHAPTER - 1 : INTRODUCTION

1.1 Background

Rain Water harvesting has been practiced in these region since long time. Rain Water usually impounded in small man made pans and dams offer user a free of pumping cost's water sources. However it is only recently that its potential as a source of water supply (especially for rural areas of developing countries) is being realized. Bangladesh is a tropical country and heavy rainfall due to north easterly wind occurs here during the rainy season between May to October. Inspite of the heavy rainfall, much of the water collected and consumed, especially in the rural areas of the coastal belt and the Hill Tracts is contaminated. About 20 percent of population live in these areas without adequate safe drinking water and sanitation facilities. Therefore, there is a great need to devise a suitable means for meeting the water requirements of people of these areas. The collection and storage of Rain Water (with low cost and reliable design) for domestic use adequately meet these requirements.

1.2 Rationale of the Project

The project (RWH) was conceptualized by DPHE-UNICEF (in their annual R & D Programme) to evaluate the effectiveness of research programme in meeting the demand of the potable water for the underserved population of the country viz coastal belt and Hill Tracts. The intensity of rainfall is maximum in both the areas and hence in the coastal belt, the two mouzas of two unions of Patharghata thana of Barguna District were selected. While one mouza and one union at Rajasthali and Bandarban Sadar was also selected for the study project.

The primary goal of the project is to :

- Investigate the potentiality of Rain Water Collection and storage and use, to meet safe water needs of the people where other sources of fresh water are not dependable.

- Assess the technical feasibility of RWH and to evaluate its sustainability in terms of social acceptance and economic viability.

- Involvement of Community participation to implement the project.

1.3 Terms of Reference for Consultants (TOR)

1. Purpose of assignment :

   The task will be to survey the rain water collection, storage and use in selected areas of Chittagong Hill Tracts and Barguna District, design and construct rain water collection tanks and monitor the performance.

II. Major tasks to be accomplished :

1 To investigate the potentiality of rain water collection, storage and use to meet the drinking and cooking water needs of the people, where tubewell, spring, chara are absent or not dependable.

2 Few paras from 2/3 thanas in 2 districts covering 100-125 Households CHT area and Barguna District can be selected for the study, from earlier study of water source investigation done in CHT.

3 To carry out 100% sampling of the households of the selected paras to collect the socio-economic and water sources and use data.

4 To investigate and record the type, shape, size and capacity of rain water storage tanks used presently.

5 To design and construct * tanks of different appropriate types for collection of rain water, for household (30 Nos.) as well as community system (3 Nos.).

6 To work out the technical and financial viability of rain water collection, storage facility for round the year use for various types. Families will be organized and motivated to participate in the scheme : (Payment of upto Tk.1,000.00 for household and Tk. 3,000.00 for community).

7 To monitor performance of units both technical/acceptability.

* Note : The cost will be per actual.

III. End Product: (e.g. final report article, document, etc.)
Preliminary, mid-term and final reports.

1.4 Scope of Work

This project envisages three main streams of study logic, firstly to evaluate the socio-economic conditions of the household of the project area and community involvement. Secondly, to locate the potential areas for constructing rain water storage tanks/jars and finally monitor the performance of such special type of rural water supply aspects to its technical operation, maintenance of Jars and Tanks acceptance of the stored water quality.

The first phase of the consultant's approach was the socio-economic study and identification of household members for contribution of money amounting Tk. 1000.00 to construct ferrocement Jars and Tanks at Charduani and Kathaltoli unions of Patharghata thana and Ghilaichhori and Suwalak unions of Rajasthali and Bandarban Sadar Thanas.

The study of Rain Water Harvesting (RWH) was conducted in the following selected mouzas:

Mouza	Union	Thana	District	Av.Annual Rainfall mm	H/H No. As BBS	H/H NOS. Surveyed
Hoglapasha	Charduani	Patharghata	Barguna	2200-2500	400	75
Taluk Charduani	Kathaltoli	Patharghata	Barguna	2200-2500	684	104
Gilamuk/ Ghilaichhori Kaptai/ Kukuchari	Ghilaichhori	Rajasthali	Rangamati	2700-3000	542	120
Suwalak	Suwalak	Bandarban Sadar	Bandarban	2700-3000	491	70

CHAPTER - 2 : COMMENCEMENT OF ASSIGNMENT

2.1 Barguna

The guideline of TOR, the work plan and subsequent discussion with the DPHE personnel along with close coordination of Project Officer, WESS of UNICEF, Consulting Team started their work from mid May 1994. Just after the mobilization the Consulting Team members met the local Government Administrative Officers (D.C, TNO, UP Chairman, UP Members) and local DPHE Engineers, and accordingly they were apprised of the importance and objectives of RWCS Project.

To conduct detail socio-economic survey a reconnaissance survey was conducted in two unions of Patharghata Thana, Charduani and Kathaltoli Union. During this survey the team members also met and apprised the local leaders and distinguished members of the community about the project. Three (3) women and one(1) man were selected from two villages of two unions **Taluk Charduani** and **Hoglapasha** as grassroots level workers, to communicate the messages for the requirement of rain water collection and storage. They were invited in Dhaka, and Consultant Expert Panel members trained them for a week (19-25th June 1994) about the use of safe drinking water, collection and storage of rain water. A feed back was received by the field monitor about their performance. After going back to the villages, they visited all the houses in the two mouzas and made people of the community aware of methodical rain water collection, storage and uses of all environmental cleanliness. Till August 1994 detailed socio-economic survey total 179 households of have been completed by the Consultant's field Survey Team. And a report was submitted in October on the findings of primary data collection reflecting the **social and economic condition of the areas with knowledge, attitude and practice on Rain Water Harvesting.** The report included with probable storage Tank design. Since the design was not cost effective and eventually it was not approved by the executing authorities experts from ARD of Thailand were invited by UNICEF to have technology transfer for the low cost rain water storage facilities. Accordingly a training was conducted in Barisal from 7th to 12th December, 1994 for construction of ferrocement Jars and Tanks.

After the training a reconnaissance survey was thus undertaken by the consultants at Charduani, Kathaltoli Union to explore the feasibility of Thai type Jars in Bangladesh's context and motivate the local people to bear the total expenses of Jar construction. The second phase survey showed that out of the 179 households surveyed previously 7% (13 in total) were willing to bear 100% expenses of constructing the Jars, and about 23% (42) were ready to bear 50% of the construction expenses. The field Engineer sent the survey results by post and informed the Head Office that the DPHE authorities had not sent the mould to the project area and as such pilot construction was getting delayed. Consequently the field Engineer had made 3 consecutive visits to DPHE authorities, and they did not make any move till the end of February, as such the Field Team came back to the Head Office to report. The consultants at Head Office were provided with a separate set of fabricated mould, on the 9th of March. On the 11th of March, the field team along with a Senior Sociologist set out for Barguna for motivation, and resource mobilization to enable construction.

Reaching the project area, the team observed some new developments:

Reportedly the World Food Programme had launched a programme of digging and re-excavation of old Ponds with the DPHE sponsored by UNICEF and was installing Pond Sand Filters (PSF) in these newly excavated ponds. These excavation work began during the mid February and 85% of the work of excavating 42 Ponds (of size 140' x 106' x 12') have been completed. Meanwhile, the Government has also undertaken to set up 100 cluster villages in Barguna District, and each of these villages is to be provided with a pond. The consultants were informed that 10 families at Patharghata were able to apply for a PSF on payment of Tk.2,000.00 only, the rest of the expenses were to be borne by DPHE funded by UNICEF.

The fact that major expenses of constructing Pond Sand Filter will be borne by DPHE has become a major factor in influencing a change in the **attitude** of the people towards the **Rain Water collection and Storage Project.** Their inclination is increasingly getting favorable towards the PSFs. Even though the installation cost of PSF (Tk.40,000.00) is much higher compared to the cost of Jars, the Government has taken a fresh drive to install them.

The Villages of Patharghata are located in a distant remote corner of the country, communication is extremely difficult, all the efforts undertaken over the last one year have been posed with serious challenge due to the massive intervention of PSF and the motivation for paying for the entire construction expenses of the newly conceptualized Rain Water storage Jars have been diminishing steadily.

Hence consultant with new efforts geared up the project, again the people were motivated by the monitors that the water could be collected directly in the houses. That in RWH storage system any individual can store as per the desire and demand i.e. supply and demand are met in the houses. Walking time to fetch water is also not required and women (who are the real water carriers) can meet the demand of households by themselves using the taps fitted in the Jar. 2 Jars of 1000 litre with Tk. 1000.00 contribution money have already been constructed at Hoglapasha of Charduani Union and at Kathaltoli of Kathaltoli Union. Though 9 at Charduani and 4 commitments at Kathaltoli awaited but due to unforeseen (people were not ready to pay the contribution money at the time of construction) reasons only 2 could be constructed and moreover those beneficiaries declined to pay the contribution money rather they favoured the PSF system. Though two were constructed the people are not drinking water from these two and not interested to harvest rain water and hence these were not monitored.

2.2 Chittagong Hill Tracts

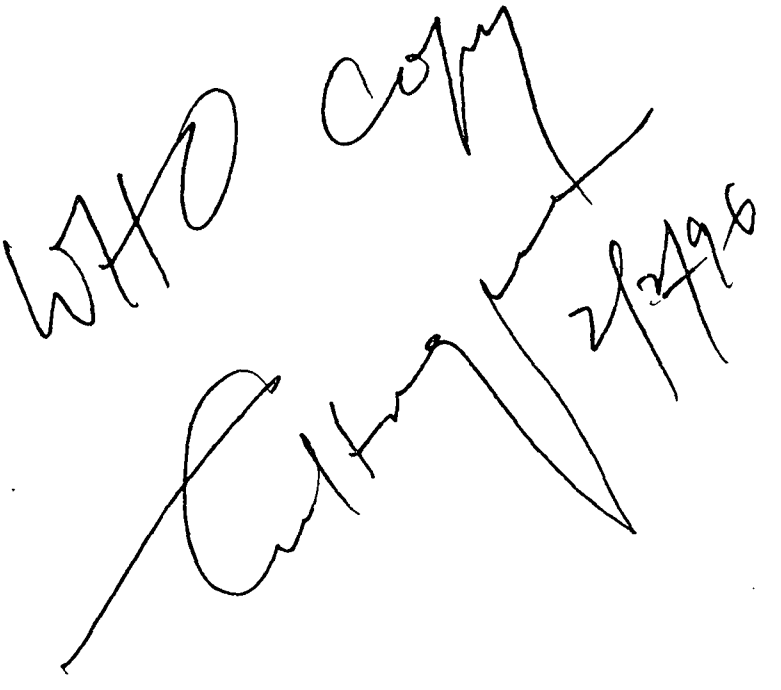
The TOR for the project envisages for the Rain Water harvesting in the areas of Chittagong Hill Tracts. Due to unavoidable circumstances the first phase of the job that is socio-economic survey in the selected thanas were delayed. Moreover the concept of low cost technology of RWH storage system offered by the consultant was not approved by the executing authorities. Three Trainers from ARD of Thailand trained the DPHE masons, SAE's and members of consultant team from 14th December to 19th December, 1994. The training for the 5 days consisted mostly practical sessions (85%) and a theory class with a video-show of construction of Jars/Tank in Thailand for one day. Pre-fabricated mould were used by the Thailand experts to built a 1000 litre Jar and a 3200 litre Tank. The

construction manual of the Jars and Tanks were distributed among the participants. Though during the training period a verbal instruction from the authorities of executing agencies was communicated to the members of the consultant for socio-economic survey at CHT, but again due to unforeseen reasons the survey could not be conducted. And only on 11th January vide letter No.118(3)/DPHE dated 8th January 1995 signed by chief Engineer, were officially instructed to go ahead with the study.

Accordingly, the consultant mobilized the survey team in the last week of January, 1995. The socio-economic survey started from 2nd week of February continued till April, 1995 for Rajasthali and for Suwalak from Mid-May to June, 1995. During this period the motivation and construction works were performed simultaneously. The time period was more due to insurgency problems and other unavoidable factors.

Total 9 Jars were constructed during the period i.e upto October, 1995, out of which were seven 1000 litre capacity Jars, one is 2000 litre capacity and one is 3200 litre tank.

These Jars were monitored to assess their performance, with a set up format prepared in compatible to field condition.



CHAPTER - 3 : SOCIO-ECONOMIC SURVEY

3.1 Introduction

The socio-economic survey was conducted as per requirement of **The Terms of Reference** (TOR) with structured Questionnaire.

The socio-economic report for Barguna (Charduani and Khathaltoli Union of Patharghata Thana) and Chittagong Hill Tracts. Rangamati (Ghilaichhori Union of Rajasthali Thana) and Suwalak of Bandarban District has been prepared in order to provide the required useful socio-economic information for use in the planning process, and it is expected that the report will generate comments, ideas and observations from people of different professional groups as well as specialists and experts from DPHE and UNICEF to be accounted and included during the finalization of study.

Substantial data were collected during the socio-economic survey and the data is being analyzed accordingly.

3.2 Objectives of the Study

The principal objective of the socio-economic study is to attempt an identification and solution of socio-economic and environmental issues particularly focussing on the Rain Water use and storage.

The socio-economic study has been carried out keeping in view the overall concept of Rain Water Harvesting (RWH) as provided in the TOR.

The findings of the socio-economic survey will provide baseline data for designing the rain water storage and can also be utilized in monitoring purposes.

The baseline information will also help to update the present information base as well as specify additional study needs.

3.3 Approach

As the methodological approach largely determines the ultimate output of any survey, the consultants were very meticulous in devising an appropriate methodological framework for the study, in order to harmonize all surveys that may be conducted. During the survey the people of the areas were motivated by showing video film and still photographs on Rain Water Harvesting system in Thailand & other areas of the World.

3.4 Finalization of the Questionnaires

The survey questionnaires incorporating all parameters relevant to the study were subjected to field tests. Field test results were thoroughly evaluated to finalize the survey instrument with reviewing modification, addition and elimination of questions in full or part, as necessary.

3.5 The Field Survey

The survey programme was undertaken by 2 and 4 local field investigators. Field monitors under the guidance of the socio-economist of the Consultant team were trained up prior to the start of the survey. The monitors were imparted orientation and training in the questionnaire, methodology and technique of interviews for a period of three days. These sessions were participated by all the senior specialists of the Consultants team.

3.6 Methodology of Socio-economic Survey

Two mouzas of Barguna district are situated very close to the Bay of Bengal, the ground water as well as surface water sources contain undesirable level of salinity for human consumption. While other two mouzas are located in the hilly areas of Chittagong Hill Tracts; where there exists serious problem of potable water both in rainy season and in dry season. Collection of drinking water is a great problem.

After a series of discussions with consultant sociologist, economist and engineers a structured questionnaire (Appendix-3) in compatible with the guidelines of TOR (clause 1 to 4) was prepared to collect primary data. The questionnaire consists of two major components: one is the Demographic and Socio-economic profile and the other is KAP profile (knowledge, attitude and practice of rain water). The Demographic and socio-economic profile consists of housing structures with roof type, age, sex, family size, occupation, education, income, expenditure and savings. While KAP profile is the knowledge on collection and use of rain water and attitude, vis-a-vis with sanitation and health hygiene awareness. This part of survey also include to motivate the users for round the year use of rain water and building the methodical storage facilities with contribution money. (Tk.1,000.00 per household and 3,000.00 for community purposes).

The selection of the sample was based on simple random survey. The villages in the study area usually consist of 3 to 4 paras. A sample unit in this case a single farm household was selected randomly at each para to produce this study. Finally with each selected household the family leader was chosen to be the interviewee. Key individuals included in the interviewees were school teachers, members of village committee, Union Chairman and non-farmers. As per TOR 100-125 households were to be surveyed both at Barguna and Chittagong Hill Tracts, but by simple random survey technique total 369 households were interviewed from the selected mouzas of Barguna and Chittagong Hill Tracts Districts (179 at Barguna and 190 (120 Rajasthali + 70 Suwalak at Chittagong Hill Tracts).

CHAPTER - 4 : SURVEY FINDINGS

4.1 Indicators for Survey

Survey findings revealed the factual data for pre-designed major two broad aspects of socio-economic study, i.e. Demographic Socio-economic conditions and KAP study (knowledge, attitude and practice on RWH).

The principal objective of the socio-economic study is to attempt an identification and solution of socio-economic and environmental issues particularly focussing on the Rain Water use and storage.

The socio-economic study has been carried out keeping in view the overall concept of Rain Water Harvesting (RWH) as provided in the TOR.

Survey findings revealed the factual data based on two broad aspects (1) DSE profile (Demographic socio-economic) and (2) KAP (knowledge attitude and practice) profile.

4.2 Demographic Socio-Economic Profile (DSE Profile)

i) Household information

ii) Household head information

iii) Economic Condition.

4.3 Knowledge Attitude and Practice Profile (KAP Profile)

i) Existing water source scenario

ii) Knowledge on Rain Water harvesting.

iii) Knowledge on Sanitation and water related diseases

iv) Attitude and practice to store water in ferrocement Jars/Tanks (Willingness to contribute money in the fabrication of Jars).

4.4 Survey Results

Results of the surveyed households at Barguna and Chittagong Hill Tracts depict the major Demographic-socio-economic profile and KAP profile on RWH. Table 4.1 to 4.6 shows the summarized socio-economic survey results of the three study areas which depicts the Demographic Socio-economic Profile and Knowledge Attitude and Practice Profile on Rain Water Harvesting in the areas.

4.5 Household Information

Housing Structure

The structural characteristic of a dwelling house is the primary indicator of socio-economic status of the house hold. The households were therefore classified into three broad types namely, pucca, Semi-Pucca, and Kutcha structures. Pucca is the building, where semi-pucca is brick wall and tin roof, while kutcha is fully tin or thatched structure. This gives a picture of the living condition of the household heads with his/her economic conditions.

The tables indicate the major indicators revealed from the analysis of the primary data collected through prepared questionnaire. The tables of the DSE profile almost conform to national standards.

The detail data and Pie Charts are shown in the Appendix-B&C

TABLE - 4.1 : DEMOGRAPHIC SOCIO-ECONOMIC PROFILE (HOUSEHOLDS INFORMATION)

		Household Information									
Study Area		Housing Structure			Roof Type				Family Members		
Mouza Union Thana	Nos. of House-hold Surveyed	Kutcha	Semi-pucca	Thatch	Thatch	Tin	Tali	Pucca	< 5	5-9	> 10
Hoglapasha Charduani Patharghata	75	73 (97.33)	---	2 (2.67)	41 (54.66)	32 (42.67)	--	2 (2.67)	16 (21.33)	44 (58.67)	15 (20.00)
Taluk Charduani Kathaltoli Patharghata	104	103 (99.00)	1 (0.96)	---	54 (51.92)	50 (48.08)	---	----	24 (23.08)	51 (49.04)	29 (27.88)
Gila/Kaptai/Kukai Ghilaichhori Rajasthali	120	120 (100.00)	----	---	117 (97.50)	3 (2.50)	---	----	27 (22.50)	84 (70.00)	9 (7.50)
Suwalak Suwalak Bandarban Sadar	70	68 (97.14)	1 (1.43)	1 (1.43)	53 (75.71)	16 (22.86)	--	1 (1.43)	23 (32.86)	43 (61.43)	4 (5.71)

TOTAL = 369

Note : i) Figures in parentheses indicate percentage.
ii) All the households are self ownership or hereditarily owned.
iii) This table depicts that above 98 percent of Household lives in Kutcha house, with 72 percent thatched type of roof. Demographic data shows that family members are about 60 percent in the range of 5-9 members with an average of 6 members per family.

TABLE - 4.2 : DEMOGRAPHIC SOCIO-ECONOMIC PROFILE (HOUSEHOLD HEAD INFORMATION)

STUDY AREA		HOUSE HOLD HEAD INFORMATION																	
		AGE GROUP			EDUCATION							OCCUPATION							
MOUZA UNION THANA	NOS H.H. SURVEYED	<25	25-50	>50	CWL/N	<V	V-X	SSC	HSC	GR	RE	NS	DAL	DNAL	LO	FB	S	TB	OTHER
Hoglapasha Charduani Patharghata	75	1 (1.33)	49 (65.33)	25 (33.34)	6 (8.00)	29 (25.33)	33 (44.00)	8 (10.67)	5 (6.67)	3 (4.00)	1 (1.33)	4 (5.33)	---	3 (4.00)	48 (64.00)	2 (2.67)	13 (17.33)	13 (17.33)	5 (6.67)
Taluk Charduani Kathaltoli Patharghata	104	6 (5.77)	67 (64.42)	31 (29.81)	---	23 (22.02)	59 (56.73)	15 (14.42)	4 (3.85)	1 (0.96)	2 (1.92)	1 ((0.96)	3 (2.88)	1 (0.96)	83 (79.81)	15 (14.42)	6 (5.77)	25 (24.04)	5 (4.81)
Gila/Kaptai/ Kukai Ghilaichhori Rajasthali	120	2 (1.66)	95 (79.17)	23 (19.16)	85 (70.83)	12 (10.00)	4 (3.33)	1 (0.83)	2 (1.67)	---	16 (13.33)	----	88 (73.34)	4 (3.34)	26 (21.66)	---	2 (1.66)	1 (0.83)	---
Suwalak Suwalak Bandarban Sadar	70	1 (1.43)	55 (78.57)	14 (20.00)	49 (70.00)	2 (2.86)	13 (18.57)	3 (4.28)	2 (2.86)	---	1 (1.43)	----	29 (41.43)	8 (11.43)	23 (32.86)	---	3 (4.28)	7 (10.20)	----

TOTAL = 369

Note : i) The figure in Parenthesis indicate percentage.

ii) This table shows that about 65 percent householdaged 25 to 50 year in the coastal region while 79 percent are in the Chittagong Hill Tracts region. The education level are 73% in the coastal region above class V and as all the surveyed house hold at CHT are tribal only 22% have the literacy rate above Class V. In the rural areas of CHT about 70% are Non-educated. The occupation data reflects that income is generated by household head through cultivation of own land ranges 73% in coastal areas and only 26 percent in Hill Tracts areas. About 62% are agricultural labour at CHT and earns wages through Jhum Cultivation in Govt. and other lands.

CW L/N	=	Can write letter/Nonliterary	DAL	=	Daily Agricultural Labour
SSC	=	Secondary School Certificate	DNAL	=	Daily Non-Agricultural Labour
HSC	=	Higher Secondary Certificate	LO	=	Land Owners
GR	=	Graduate	FB	=	Fishing Business
RE	=	Religious Education	S	=	Service
NS	=	No Specific	TB	=	Trading Business

TABLE - 4.3 : DEMOGRAPHIC SOCIO-ECONOMIC PROFILE (ECONOMIC CONDITION)

STUDY AREA		INCOME RANGE (TAKA)				EXPENDITURE RANGE (TAKA)				SAVINGS RANGE (TAKA)				
MOUZA UNION THANA	NO OF H.H SURVEYED	< 2000	2001-3000	3001-5000	> 5000	< 2000	2001-3000	3001-5000	> 5000	NO SAVINGS	< 500	501-1000	1001-2000	> 2000
Hoglapasha Charduani Patharghata	75	20 (26.27)	45 (60.00)	8 (10.67)	2 (1.12)	29 (38.67)	38 (50.67)	7 (9.33)	1 (1.33)	30 (40.00)	25 (33.33)	17 (22.67)	2 (2.67)	1 (1.33)
Taluk Charduani Kathaltoli Patharghata	104	37 (35.58)	52 (50.00)	15 (14.42)	----	52 (50.00)	46 (44.23)	6 (5.77)	----	39 (37.50)	23 (22.12)	41 (39.42)	1 (0.96)	-----
Gila/Kaptai/Kukai Ghilaichhori Rajasthali	120	82 (68.33)	34 (28.34)	3 (2.50)	1 (0.83)	83 (69.17)	35 (29.17)	1 (0.83)	1 (0.83)	116 (96.66)	-----	3 (2.50)	1 (0.83)	-----
Suwalak Suwalak Bandarban Sadar	70	44 (62.86)	24 (34.29)	1 (1.43)	1 (1.43)	44 (62.86)	24 (34.29)	1 (1.43)	1 (1.43)	69 (98.57)	-----	------	-----	1 (1.43)

• TOTAL = 369

Note : i) The figure in parenthesis indicate percentage.

ii) This table shows the economic conditions of the house holds. About 54% have the income in between Taka 2000-3000 range and expenditure scenario are of the same range while 32% have savings in the range of Tk 500-1000 in the surveyed coastal region. 66% household heads have income less than Tk. 2000 and expenditure are also the same as income, 97% have no savings in the Chittagong Hill Tracts region

TABLE - 4.4 : KNOWLEDGE ATTITUDE AND PRACTICE PROFILE : EXISTING WATER SOURCE SCENARIO

STUDY AREA		SOURCES OF WATER DRINKING AND OTHER PURPOSES						USE OF DRINKING WATER						WATER CONSUMPTION FOR DRINKING (LITRE)		
MOUZA UNION THANA	NO. OF H.H SURVEYED	RCP	RAW	TW	SP	DW/RW	Others of PSF's	RCP	RAW	TW	SP	DW/RW	Others or PSF's	< 20	20-45	> 45
Hoglapasha Charduani Patharghata	75	52 (69.33)	-	-	-	23 (30.67)	59 (78.67)	59 (78.67)	59 (78.67)	6 (8.00)	-	-	10 (13.33)	30 (25.00)	43 (35.83	2 (2.67)
Taluk Charduani Kathaltoli Patharghata	4	101 (97.12)	3 (2.88)	-	-	-	82 (78.85)	82 (78.85)	82 (78.85)	8 (7.69)	-	-	14 (13.46)	20 (19.23)	76 (73.07)	8 (7.69)
Gila/Kaptai/Kukai Ghilaichhori Rajasthali	120			120 (100.00)	-	-	-	-	-	-	120 (100.00)	-	-	75 (62.50)	45 (37.50)	-
Suwalak Suwalak Bandarban Sadar	70								63 (90.00)	10 (14.28)	26 (37.14)	34 (48.57)	-	9 (12.86)	52 (74.29)	9 (12.86)

TOTAL = 369

Note: i) The figure in parenthesis indicates percentage

ii) This table shows that the main source of water in the coastal region are river canal and ponds (RCP) i.e. 85.47 percent use this water. And it is also revealed that the same percentage of households also use the rain water (during rainy season) both for drinking and other purposes. 13.46 percent of households uses PSF's water. The scenario at Chittagong Hill Tracts is different, at Rajasthali 100 percent household use spring water as the source for drinking and other purposes. While at Suwalak 37.14 percent use spring water. And about 90% (63) households drink rain water during rainy season. About 63 percent households consumed less than 20 litre at Rajasthali while 74 percent households consumed in between 20-45 litre at Suwalak and at Patharghata thana, 66.48 percent of households member consume drinking water in between 20-45 litre.

TABLE - 4.5 : TIME TO COLLECT WATER AND KNOWLEDGE ON RWH.

	TIME REQUIRED TO COLLECT WATER						KNOWLEDGE OF RAIN WATER USE	
STUDY AREA	NO.OF H.H SURVEYED	>10	10-20	20-30	31-60	>60	YES	NO.
Hoglapasha Charduani Patharghata	24 (30.20)	19 (25.34)	25 (33.33)	7 (9.33)	-		69 (92.00)	6 (8.00)
Taluk Charduani Kathaltoli Patharghata	19 (27.88)	21 (20.19)	12 (11.54)	12 (11.54)	30 (28.85)		104 (100.00)	-
Gila/Kaptai/Kukai Ghilaichhori Rajasthali	5 (4.16)	44 (36.67)	26 (21.67)	15 (12.50)	30 (25.30)		120 (100.00)	-
Suwalak Suwalak Bandarban Sadar	64 (9.42)	6 (8.58)	-	-	-		70 (100.00)	-

TOTAL = 369

Note: i) The figure in the parenthesis indicate percentage.
ii) This Table shows that time required to collect water and knowledge on rain water. 100% households have knowledge on rain water uses. Most of the time adult female family members collect water for household use.

TABLE - 4.6 : KNOWLEDGE ATTITUDE AND PROFILE ON RWH

MOUZA UNION THANA	NO.OF H.H SURVEYED	COLLECTION OF RAIN WATER		STORE RAIN WATER		WILLINGNESS TO PAY			
								ATTITUDE AND PRACTICE OF STORAGE FOR RAIN WATER IN JARS/TANKS	
		YES	NO	YES	NO	YES	NO	1000 - 200 LITRE JARS	COMMUNITY TANKS
Hoglapasha Charduani Patharghata	75	57 (76.00)	18 (24.00)	23 (40.23)	52 (69.33)	23 (30.67)	52 (69.33)	12 (12.67)	15 (20.00)
Taluk Charduani Kathaltoli Patharghata	104	104 (100.00)	(66.35)	35 (33.65)	69 (66.35)	35 (33.65)	69 (66.35)	4 (20.23)	3 (2.88)
Gila/Kaptai/Kukai Ghilaichhori Rajasthali	120	120 (100.00)	-	120 (100.00)	-	120 (100.00)	--	15 (12.50)	30 (25.00)
Suwalak Suwalak Bandarban Sadar	70	70 (100.00)	-	70 (100.00)	-	70 (100.00)	--	5 (7.14)	--

TOTAL = 369

Note : i) The figure in Parenthesis indicates percentage.

ii) This Table shows that 100% people in both the study areas collect rain water and store it for use. But storage facilities are very crude and so they use water only on rainy season. Very few are interested to have methodical storage facilities with contribution money of Tk.1000.00 each for Jars. Though every body showed keen interest to have the facilities but they are so poor that they cannot afford the contribution money (specially in the Hill Tracts). Out of total 369 surveyed households in the both study areas only 13 percent showed interest to have community type of Tanks, but due to drought and other natural calamities they are now reluctant to pay Tk.3000.00 for community Tanks.

CHAPTER - 5 : FABRICATION OF JAR/TANKS

5.1 Introduction

The Thai type Jars/Tanks were fabricated with the supplied pre-fabricated standard mould. Consultants representative carried the mould to the remotest corners of the project area to implement the pilot project. Details of construction of Jars/Tanks with actual cost are shown in Table - 5.1.

5.2 Barguna

Only 2 Jars could be constructed in the Patharghata Thana of Barguna district. There were numbers of interventions and constraints and the unprecedent drought prevented to implement the target of the pilot project in the area. As the beneficiaries were not interested to pay the contribution money, no further fabrication was possible, the only reason why target of the TOR could not be achieved.

5.3 Chittagong Hill Tracts

After socio economic survey at Rajasthali the construction of Jars has started but due to unavoidable circumstances it was stopped. Again on August the works were started and total 2 Jars were constructed at Ghilaichhori Union out of which one is 2000 litre capacity. One 3200 litre capacity Tank was constructed in Rajasthali Headquarter with contribution money from TNO Office.

Though during socio-economic survey People of Rajasthali expressed eagerness for Community Tank but later on, (August, 1995 to Mid September) they expressed their unwillingness to pay the contribution money due to the lack of contribution money of Taka 3000.00 by each member.

During the socio-economic survey at Suwalak only 5 households expressed willingness for individual Jars and Tanks and no one could be made agreed to contribute for the community tank. The Chairman of Suwalak helped to motivate the people for more Jars and total 8 commitments were made out of them only 6 jars were constructed by August 1995, and concurrently the constructed Jars started harvesting rain water.

5.4 Experience during Construction

Besides the trained mason of DPHE, 2 local mason and 4 labours in CHT and one local mason and 2 labours in Patharghata (Barguna) received the techniques for the fabrication of the Jars. **No Villagers** either in **CHT or in Barguna** participated during the construction. Though the field monitors insisted for their participation rather the monitors participated with the trained masons. Hence the local capacity from the villager's community could not be builtup, except the above private masons and labours. Rather a feeling was observed that the villagers think it was the responsibility of consultant and DPHE.

TABLE 5.1 : CONSTRUCTION DETAILS OF JARS/TANKS

DISTRICT - BANDARBAN

Sl. No.	Thana	Union	Village/Para	Name of Household	Capacity/ Litre	Actual Cost Taka	* Cost as per UNICEF
01.	Bandarban Sadar	Suwalak	Majarpara	Mr.Kay Shing (Member)	1000	2,238.00	
02.	Bandarban Sadar	Suwalak	Majarpara	Mr.K.Chowdhori	1000	2,427.00	
03.	Bandarban Sadar	Suwalak	Headmanpara	Mr.Angching Marma (Suychaingu)	1000	2,439.00	2,000.00
04.	Bandarban Sadar	Suwalak	Headmanpara	Headman (Kiyang)	1000	2,439.00	
05.	Bandarban Sadar	Suwalak	Amtulipara	Kiyang	1000	2,362.00	
06	Bandarban Sadar	Suwalak	Chakmapara	Kiyang	1000	2,362.00	
					Total	14,267.00	

DISTRICT - RANGAMATI

Sl. No.	Thana	Union	Village/Para	Name of Household	Capacity/ Litre	Actual Cost Taka	* Cost as per UNICEF
01.	Rajasthali	Ghilaich hori	Gilamuk	Mr. Shaithong Thong Chong	1000	2,607.50	2,000.00
02.	Rajasthali	Ghilaich hori	Rajasthali Bazar	Mr. Mong Cho-thoing Marma	2000	3,112.50	3,200.00
03.	Rajasthali	Ghilaich hori	Rajasthali Thana	Rajasthali Rest House	3200	6,393.00	4,800.00
					Total	12,113.00	

Chittagong Sub-Total Cost : Tk.26,380.00

DISTRICT - BARGUNA

Sl. No.	Thana	Union	Village/Para	Name of Household	Capacity/ Litre	Actual Cost Taka	* Cost as per UNICEF
01.	Patharghata	Chardua ni	Charduani	Mr.Mukbul Hawladar	1000	2,285.00	2,000.00
02.	Kathaltoli	Chordhor i	Kathaltoli	Mr.Ukir Talukdar	1000	2,370.00	
					Total	4,655.00	

* Carrying of mould, materials and gutter costs were not including fabrication cost of UNICEF.

There is a PSF beside of this house.

CHAPTER - 6 : PERFORMANCE MONITORING OF RWH JARS/TANKS

6.1 Programme Impact

An important element in the programme is constructing of ferrocement Jars and Tanks with monetary contribution from the house holds and users. The Village Sanitary mason of DPHE is the crucial element in the programme, so that Villagers selected for that role was thought to be useful measure of the programmes input. The results were disappointing. This is because the villager's response to the activity was negative due to socio-economic condition and more over the procurement botheration of the pre-fabricated mould from DPHE stores. The consultant's observation was that though the technology is low cost, but the supply of pre-fabricated mould in mass scale will be a problem. The transfer of this technology to villagers were not successful only due to the mould systems and the fixed amount of Tk.1,000.00 as contribution money.

6.2 Monitoring Formats and Monitoring

Considering all the pros & cons of the project and the results discussed in the last workshop monitoring formats were developed. The formats cover the identity of the interviewee and household, handling, collection, storage use and maintenance criteria and water quality analysis.

The field data were tabulated in the two monitoring periods. Table 6.1 to 6.8 shows the details of monitoring. The table shows that during monitoring period of Sept.-Oct. it was found that the colour of the water was red this was due to the unwashed catchment surfaces and non use of polyethene in the thatched roofs. Then the monitoring instructed use to polyethenes and to wash the catchment areas. Accordingly in the next monitoring Nov.-Dec. 1995 it was found, that there was no change in water colour.

The monitoring revealed that the people, specially women and children using the Jar's water for drinking, cooking and washing of utensils.

The fabrication of 3200 liter tank was completed in the month of November 1995, the construction time was more due to the insurgency problems in Rajasthali. Hence this could not harvest rain water.

6.3 Water Quality Analysis

To obtain accurate, authenticate and representative data the water samples were collected only once by the personnel of DPHE Laboratory Comilla. The results of different parameter are shown in table No. 6.9. The tests were conducted from the Jar's of Suwalak Mouza only and total four samples were once analyzed.

The water samples were collected during the monitoring period of Sept.-Oct.' 95. The result shows that the parameters tested are all within the acceptable limit. Laboratory technician collected and tested the sample of infiltration gallery which shows iron and manganeze are not within the acceptable limit while rainwater samples which were stored in the Jars which were collected from the tin roof catchment areas.

RWHS PERFORMANCE MONITORING DATA

TABLE - 6.1 : IDENTITY OF INTERVIEWEE AND HOUSEHOLD

Monitoring Period September, October, 1995

Sl. No.	District	Thana	Mouza	Para	Name of H.H. Head (Age)	No. of Family Members	Occupation	Guests Stay (Days/ Month)	Roof Type			Roof Area (m^2)	Capacity of Jar/Tank (Litre)
									4 Side - 2 Side				
									Tin	Thatched	Pucca		
01R	Rangamati	Rajasthali	Gila	Gilamuk	Mr.Shaithong Thong Chong (45)	08	Business	15	x	✓ 4	x	20.71	1000
02R	Rangamati	Rajasthali	Ghilaichori	Rajasthali Bazar	Mr.Mong Chothoing Marma (37)	07	Business	08	✓ 2	x	x	15.6	2000
* 03B	Bandarban	Sadar	Suwalak	Mazar Para	Mr. Kayshing Marma (40)	07	Member	10	✓ 4	✓ 4	x	10.3	1000
* 04B	Bandarban	Sadar	Suwalak	Mazar Para	Mr. K. Chowdhori (Old Chairman) (47)	05	Business	12	✓ 4	x	x	15.5	1000
* 05B	Bandarban	Sadar	Suwalak	Headman Para	Mr. Angching (31)	06	Service	07	✓ 4	x	x	15.5	1000
* 06B	Bandarban	Sadar	Suwalak	Headman Para	Headman (45)	06	Business	10	✓ 4	x	x	15.5	1000
07B	Bandarban	Sadar	Suwalak	Amtuli Para	Kiyang (Talukder)	13	--	10	✓ 4	x	x	13.3	1000
08B	Bandarban	Sadar	Suwalak	Chackmapara	Kiyang (Bihar)	05	--	10	✓ 4	x	x	20.7	1000

Note : R for Rajasthali
B for Bandarban
* Sampled for water quality

RWHS PERFORMANCE MONITORING DATA

TABLE - 6.2 : HANDLING CRITERIA

Monitoring Period September, October, 1995

Sl No	DURING HANDLING JAR/TANK						AFTER COLLECTING FROM JAR/TANK				
	Covered with Lid		Water from Jar/Tank Taken for Use By				Collected Water Stored in				Capacity of Storage Jar (Litre)
	Yes	No	Tap	Bucket	Rope from Top	Hand	Earthen Jar	Metallic Jar	Bucket	Motka	
01R	✓	x	✓	x	x	x	✓	x	x	x	1000
02R	✓	x	✓	x	x	x	✓	x	x	x	2000
* 03B	✓	x	✓	x	x	x	x	x	✓	x	1000
* 04B	✓	x	✓	x	x	x	x	x	✓	x	1000
* 05B	✓	x	✓	x	x	x	x	x	✓	x	1000
* 06B	✓	x	✓	x	x	x	x	x	✓	x	1000
07B	✓	x	✓	x	x	x	✓	x	x	x	1000
08B	✓	x	✓	x	x	x	✓	x	x	x	1000

Note : R For Rajasthali
B For Bandarban
* Sampled for water quality

RWHS PERFORMANCE MONITORING DATA

TABLE 6.3 : USAGE AND MAINTENANCE CRITERIA

Monitoring Period September, October, 1995

Sl No	USAGE										MAINTENANCE											
	Collected Water Used for					Boiling of Water before Drinking		Observance of difference in Water Quality			Frequency of Cleaning the Jar/Tank				Frequency of Checking the Cleaniness of Gutters				Action Taken By User During Over flowing		Wastage of Water	
	Drinking	Cooking	Washing	Ablution	Other	Yes	No	Accep-table	Odour	Colour	Weekly	Fort-nightly	Monthly	Bi-monthly	Weekly	Fort-nightly	Monthly	Bi-monthly	Yes	No	Yes	No
01R	x	x	✓	x	x	x	✓	x	x	* Red	x	x	✓	x	x	x	✓	x	The Tank/Jar was not filled up with rain water during monitoring.		x	✓
02R	✓	✓	✓	x	x	x	✓	x	x	* Red	x	x	✓	x	x	x	✓	x			x	✓
* 03B	✓	X	✓	x	x	x	✓	x	x	* Red	x	x	✓	x	x	x	✓	x			x	✓
* 04B	✓	✓	✓	x	x	x	✓	x	x	* Red	x	x	✓	x	x	x	✓	x			x	✓
* 05B	✓	✓	✓	x	x	x	✓	x	x	* Red	x	x	✓	x	x	x	✓	x			x	✓
* 06B	✓	✓	✓	x	x	x	✓	x	x	* Red	x	x	✓	x	x	x	✓	x			x	✓
07B	✓	✓	✓	x	x	x	✓	x	x	* Red	x	x	✓	x	x	x	✓	x			x	✓
08B	✓	✓	✓	x	x	x	✓	x	x	* Red	x	x	✓	x	x	x	✓	x			x	✓

Note : R For Rajasthali
B For Bandarban
* Sampled for water quality
* Red = The water is collected from the unwashed roofs and so the colour was found red and more over the thatched areas were not covered by the polyethene.

RWHS PERFORMANCE MONITORING DATA

TABLE 6.4 : COLLECTION AND STORAGE CRITERIA

Monitoring Period September, October, 1995

Sl No.	COLLECTION											STORAGE						
	Water Collected by			Frequency of Collection (No./Day)	Quality of Collected Water	Problem in Collection		Each Time Water Collected from Sources other than Rain Water		Observance of Leakage in Jar/Tank During Collection		Interval of Storage			Chlorination/ Disinfection after Storage		Cleaning of Catchment Surface after first Flash	
	Male	Female	Children			Yes	No	Yes	No	Yes	No	1 Week	15 Days	1 Month	Yes	No	Yes	No
01R	✓	✓	x	1 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓
02R	✓	✓	x	2 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓
*03B	x	x	x	1 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓
*04B	✓	✓	✓	2 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓
*05B	x	✓	x	1 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓
*07B	✓	x	✓	2 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓
07B	✓	✓	✓	1 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓
08B	✓	x	x	2 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓

Note : R for Rajasthali
B for Bandarban
* Sampled for water quality

RWHS PERFORMANCE MONITORING FORMAT

TABEL - 6.5 : IDENTITY OF INTERVIEWEE AND HOUSEHOLD

Monitoring Period November, December, 1995

Sl. No.	District	Thana	Mouza	Para	Name of H.H. Head (Age)	No. of Family Memb-ers	Occupation	Guests Stay (Days/ Month)	Roof Type			Roof Area (M^2)	Capacity of Jar/Tank (Litre)
									Tin	Thatched	Pucca		
01R	Rangamati	Rajasthali	Gila	Gilamuk	Mr.Shathong Thong Chong (45)	08	Business	15	x	Thatched	x	20.7	1000
02R	Rangamati	Rajasthali	Ghilaichori	Rajasthali Bazar	Mr.Mong Chothoing Marma (37)	07	Business	08	✓	x	x	15.6	2000
03R	Rangamati	Rajasthali	Ghilaichhori	Rajasthali Sadar	Rajasthali Rest House	-	-	-	✓	x	x	37.9	3200
04B	Bandarban	Suwalak	Suwalak	Mazar Para	Mr. Kayshing (Member) (40)	07	Business	10	✓	✓	-	10.3	1000
05B	Bandarban	Suwalak	Suwalak	Mazar Para	Mr.K.Chowdhori (Old Chairman) (47)	05	Business	12	✓	x	x	15.5	1000
06B	Bandarban	Suwalak	Suwalak	Headman	Mr.Angching Marma (31)	06	Service	07	✓	x	x	15.5	1000
07B	Bandarban	Suwalak	Suwalak	Headman	Headman (45)	06	Business	10	✓	x	x	15.5	1000
08B	Bandarban	Suwalak	Suwalak	Amtuli	Kiyang (Talukder)	13	-	10	✓	x	x	13.3	1000
09B	Bandarban	Suwalak	Suwalak	Chackma	Kiyang (Biher)	05	-	10	✓	x	x	20.7	1000

Note : R for rajasthali
B for Bandarban

RWHS PERFORMANCE MONITORING FORMAT

TABLE - 6.6 : HANDLING CRITERIA

Monitoring Period November, December, 1995

Sl No.	DURING HANDLING JAR/TANK						AFTER COLLECTING FROM JAR/TANK				
	Covered with Lid		Water from Jar/Tank Taken for Use By				Collected Water Stored in				Capacity of Storage Jar (Litre)
	Yes	No	Tap	Bucket	Rope from Top	Hand	Earthen Jar	Metallic Jar	Bucket	Motka	
01R	✓	x	✓	x	x	x	✓	x	x	x	1000
02R	✓	x	✓	x	x	x	✓	x	x	x	2000
03R	✓	x	✓	x	x	x	x	x	✓	✓	3200
04B	✓	x	✓	x	x	x	x	x	✓	x	1000
05B	✓	x	✓	x	x	x	x	x	✓	x	1000
06B	✓	x	✓	x	x	x	x	x	✓	x	1000
07B	✓	x	✓	x	x	x	x	x	✓	x	1000
08B	✓	x	✓	x	x	x	✓	x	x	x	1000
09B	✓	x	✓	x	x	x	✓	x	x	x	1000

Note : R for Rajasthali
B for Bandarban

RWHS PERFORMANCE MONITORING FORMAT

TABLE 6.7 : USAGE AND MAINTENANCE CRITERIA

Monitoring Period November, December, 1995

Sl No	USAGE										MAINTENANCE											
	Collected Water Used for					Boiling of Water before Drinking		Observance of difference in Water Quality			Frequency of Cleaning the Jar/Tank				Frequency of Checking the Cleaniness of Gutters				Action Taken By User During Over flowing		Wastage of Water	
	Drinking	Cooking	Washing	Ablution	Other	Yes	No	Accep-table	Odour	Colour	Weekly	Fort-nightly	Monthly	Bi-monthly	Weekly	Fort-nightly	Mont hly	Bi-monthly	Yes	No	Yes	No
01R	✓	✓	✓	x	-	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x	The Tank/Jar was no filled up with rain water during monitoring.		x	✓
02R	✓	✓	✓	x	-	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x			x	✓
03R	✓	X	✓	x	x	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x			x	✓
04B	✓	✓	✓	x	x	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x			x	✓
05B	✓	✓	✓	x	x	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x			x	✓
06B	✓	✓	✓	x	x	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x			x	✓
07B	✓	✓	✓	x	x	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x			x	✓
08B	✓	✓	✓	x	x	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x			x	✓
09B	✓	✓	✓	x	x	x	✓	✓	x	x	x	x	✓	x	x	x	✓	x			x	✓

Note : R for Rajasthali
B for Bandarban

RWHS PERFORMANCE MONITORING FORMAT

TABLE 6.8 : COLLECTION AND STORAGE CRITERIA

Monitoring Period November, December, 1995

Sl No	COLLECTION											STORAGE						
	Water Collected by			Frequency of Collection (No./Day)	Quality of Collected Water	Problem in Collection		Each Time Water Collected from Sources other than Rain Water		Observance of Leakage in Jar/Tank During Collection		Interval of Storage			Chlorination/ Disinfection after Storage		Cleaning of Catchment Surface after first Flash	
	Male	Female	Children			Yes	No	Yes	No	Yes	No	1 Week	15 Days	1 Month	Yes	No	Yes	No
01R	✓	✓	✓	3 Times	Good	x	✓	✓	x	x	✓	x	x	✓	x	✓	x	✓
02R	✓	✓	x	3 Times	Good	x	✓	✓	x	✓	x	x	x	✓	x	✓	x	✓
03R	✓	x	x	2 Times	Good	x	✓	✓	x	x	✓	x	x	✓	x	✓	x	✓
04B	✓	✓	x	3 Times	Good	x	✓	✓	x	x	✓	x	x	✓	x	✓	x	✓
05B	✓	✓	✓	3 Times	Good	x	✓	✓	x	x	✓	x	x	✓	x	✓	x	✓
06B	✓	✓	x	3 Times	Good	x	✓	✓	x	x	✓	x	x	✓	x	✓	x	✓
07B	✓	✓	✓	3 Times	Good	x	✓	✓	x	x	✓	x	x	✓	x	✓	x	✓
08B	✓	x	x	3 Times	Good	x	✓	✓	x	x	✓	x	x	✓	x	✓	x	✓
09B	✓	✓	✓	3 Times	Good	x	✓	✓	x	x	✓	x	x	✓	x	✓	x	✓

Note : R for Rajasthali
B for Bandarban

TABLE 6.9 : RESULTS OF DPHE ZONAL LABORATORY TEST FOR WATER QUALITY

SUWALAK UNION, BANDARBAN

Mode of Transport :- Private

Sample Code	Source Code	Sample Location	Source	Date of Collection	Received in Laboratory	Date of Completion of Analysis	RESULTS OF EXAMINATIONS					
							p^H	E.C s/cm	T.Alka mg/L. as $CaCO_3$	Ca-Hardness mg/L. as $CaCO_3$	Total Hardness mg/L. as $CaCO_3$	Total Iron mg/L
2250		Headman para, Buddhist Bihar Suwalak, Majher para, Bandarban	Rain Water	12-9/95	13-9/95	17-9/95	8.2	450	7	58	80	0.088
2251		Headman house. Majher para, Suwalak, Bandarban	"	"	"	"	8.5	130	8	26	40	0.077
2252		Kaoching member's house, Majher para, Bandarban	"	"	"	"	8.5	760	10	62	100	0.11
2253		Clow Chairman's House (Formal) Majher para, Suwalak	"	"	"	"	8.3	210	10	60	80	0.099
2254		Commissioner Ebrahim, Hafezgona. Municipal Area. Bandarban	Infil-tration Gallery	"	"	"	6.5	700	15	146	250	3.608

Contd...P/2

RESULTS OF DPHE ZONAL LABORATORY TEST FOR WATER QUALITY

SUWALAK UNION, BANDARBAN

Mode of Transport :- Private

Sample Code	Source Code	Sample Location	RESULTS OF EXAMINATIONS							
			Manganeze mg/L.	Chloride mg.L	MG ++ mg/L	Ca ++ mg/L	Faecal Coliform No/100 mg/L	Fre CO^2 mg/L	HCO_3	Remarks
2250		Headman para, Buddhist Bihar Suwalak, Majher para, Bandarban	0	15	5.368	23.2	0	0	8.54	Test Results acceptable
2251		Headman house, Majher para, Suwalak, Bandarban	0	5	3.414	10.4	0	0	9.76	--Do--
2252		Kaoching member's house, Majher para, Bandarban	0	40	4.272	24.8	0	0	12.2	--Do--
2253		Chow Chairman's House (Formal) Majher para, Suwalak	0	10	4.88	24.0	0	0	12.2	--Do--
2254		Commissioner Ebrahim, Hafezgona, Municipal Area, Bandarban	4.92	40	25.376	58.4	12	60	18.3	Iron & Manganese contents not acceptable

CHAPTER - 7 : CONCLUSIONS AND RECOMMENDATIONS

Safe drinking water and proper sanitation is a prime requisite for rural Bangladesh. The Department of Public Health Engineering (DPHE) in close association with the (UNICEF) United Nations Children's Fund is making continuous efforts to make safe water and sanitation facilities accessible to the people of Bangladesh. As per DPHE, GOB and UNICEF mandate provision of safe drinking water for underserved areas is of top priority. The problem of safe water is severe in southern coastal and Hilly areas. Both surface and ground water becomes very saline in the coastal areas while sources of potable water is very scarce in the Hilly areas. Although people living in coastal and hilly ares of Bangladesh have a history of collecting and using rain water but no specific study on rainwater collection use has been carried out. Accordingly DPHE-UNICEF under their (R & D) research and development programme initiated a study on the feasibility of rain water collection storage and use, which included two broad aspects, one a socio-economic survey and the other implement the pilot project i.e. construction of storage facilities. The conclusion derived from the study is outlined below;

7.1 Concept of RWH and Social Acceptance

a. The study on RWH was conducted in a limited area of Barguna, Rangamati and Bandarban districts of Bangladesh. The results authenticates the fact that the people in the area have been drinking rain water since time immemorial and the pilot project demonstrated how this can be established as a regular practice.

b. The socio-economic survey reveals that about 58 percent house hold have been drinking rain water in the rainy season. This indicates that people will be willing to drink rain water in the off season too if the methodical storage facilities can be made available. The consumption of rain water as alternate source of drinking water was socially and culturally accepted. This survey also supported the fact that women and children are the water carriers for domestic use.

c. The sociological attitude reveals that people actually prefer to drink water which they feel safe and in these areas rain water is accepted. The survey also shows that though the present motivation was limited to a small area and was not too high but people will respond to the programme, if the emphasis is changed. However the emphasis should be to contribution of money by the people. Loans can be made available for the construction of Rain Water Jars.

d. Regarding rainwater consumption, no significant unwillingness between male and female, rich and poor, educated and uneducated person was found.

7.2 Economic Viability

a. Since the people in the study area **are not economically solvent,** they were unable to build a large rain water storage facility (community Tank as designed in the pilot project) for year round consumption. Thai model ferrocement Jars/Tanks were adopted for storage facilities with the training assistance from ARD of Thailand through UNICEF Dhaka-Bangladesh. Thai model technology which is partially implemented was also not known to them but few households contributed Tk.1000.00 to fabricate 1000 and 2000 litre Jars for family storage facilities.

b. The monitoring and fabrication experience reveals that if the contribution money is limited to Tk. 500/- only than more Jars could be constructed and poor households could have the capacity for rainwater storage facility. This may solve the drinking water problem in the areas for all the people.

7.3 Experience Gained in Implementation and Monitoring

a. Experience during fabrication revealed that the heysian cloth used for construction could be used only in three Jars and accordingly the costing increases in the next fabrication.

b. People who own thatched house can use a polyethene sheet as rainwater collector on the top of roof.

c. Member of households should be properly motivated to maintain the quality of stored rainwater.

d. The sample water quality results depicts that the quality of water is acceptable as per drinking and human consumptions standards.

e. The accessories for the fabrication of Jars/Tanks would have to be available at the thana level sanitary shops.

f. The maintenance of the model Jars/Tanks are not so cumbersome.

g. At least two seasons would be required to monitor the performance of rainwater harvesting.

7.4 Recommendations

a. More community education is needed to overcome the lack of awareness among villagers of the actions programme open to them under the rural underserved areas water supply programme. Early involvement of villagers in decisions, including the selection of the village sanitary mason, needs, to be encouraged.

b. If the existing Thailand type of storage facilities model is to implement in large scale then training for fabrication of mould would be required at grass root level i.e thana level or pre-fabricated mould would have to be supplied to the villagers from the executing agencies. **Training for local masons is a must** to fabricate the jars and tanks and them only this R & D project can go to national scale. The role of **village sanitary mason will be** appreciated more by villagers if the mason can be encouraged to take more active part in spreading information about the programme and to use his training more by actually constructing facilities with new owners.

c. To implement RWH project to a national scale or to consider it as supplementary of RWS (rural supply propramme) more under served and in accessible areas should be under action research programme of R & D activities of DPHE - UNICEF. Programmes and policies of RWH should be executed in time so that project is not delayed unnecessary and is completed in scheduled time.

d. The pilot study of R & D activities should not be made in such areas where access is difficult and where time is lost unnecessary for logistical problem and hazardous conditions. This creates more communication gap in between control office and field office.

e. The concept of the Research and Development (R&D) project for Rain Water Harvesting (RWH) of DPHE-UNICEF in their programme reflected that rain water harvesting is possible where the ground and surface water are not drinkable. But Globally there are two broad approaches. DEVELOP NEW WATER SOURCES and CONSERVE EXISTING WATER SUPPLY. To comply with these two approaches rain water is being harvested in many cities and urban areas of the world. It is noteworthy to suggest here if the rain water harvesting should be implemented concurrently with the normal water supply programmes of DPHE in the urban areas and metropolitan cities or as a separate project "Rain Water Use for other purposes" in urban areas. Then the existing water supply could be conserved. This will increase the per capita water use, waste and system loss will be less and water infrastructure rate will decrease. Moreover this will give the opportunity of urban poor to use safe water.

7.5 Conclusion

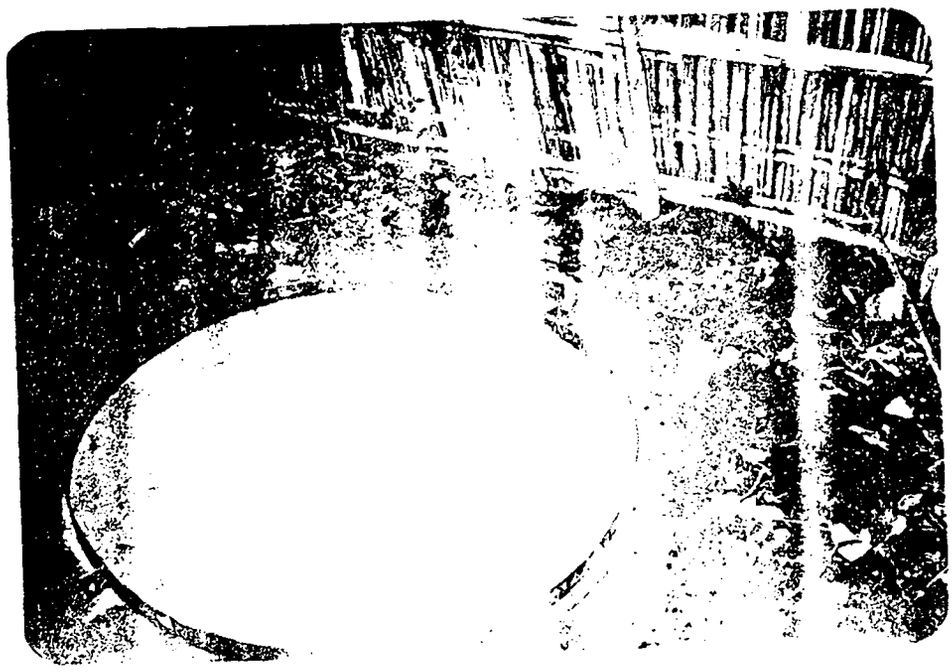
Finally it can be concluded that this research and development project for rain water harvesting at the local household level for the underserved areas can be generally summarized into two broad aspects :

a. The first is physical facilities (catchment area, guttering, storage and rain). Catchment area, guttering and storage can be provided by human efforts, whereas rain is a natural occurrence. It comes in various quantities. The times when it comes even with the most sophisticated scientific endeavour, is only a predication when and how much to expect in a given locality.

b. The second is management and training. Man has always assumed water to be an inexhaustible resource, as it is always flowing especially in those regions with perennial water courses, the notion is extended unconsciously to harvesting rainwater. One can often see running taps resulting in empty storage tanks. This calls for stringent water management practices. During the rainy season, the storage facilities receive water, which is often used in whole during the same period, thus defeating the very purpose for which the rainwater harvesting system was built - providing water during the dry spell. Whereas technicians and mason strife to optimise the criteria for physical components and whereas little can be done to increase the rain in any given areas - efforts need to be put in place to optimise management and training practice to enhance the utility of the harvested, stored rainwater.

APPENDICES

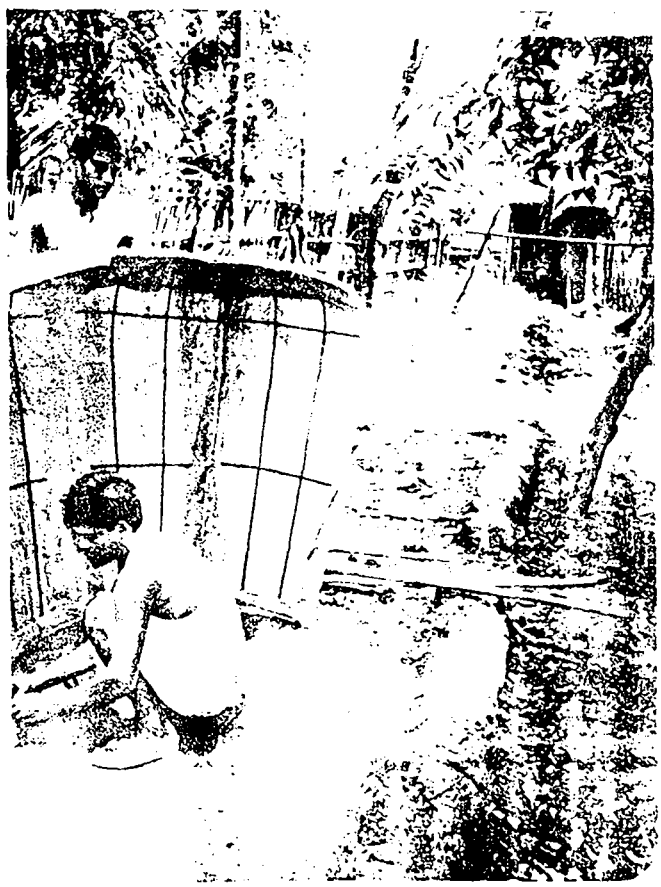
APPENDICES - A : PHOTOGRAPHS OF PROJECT ACTIVITIES



Base of the jar is ready for casting.

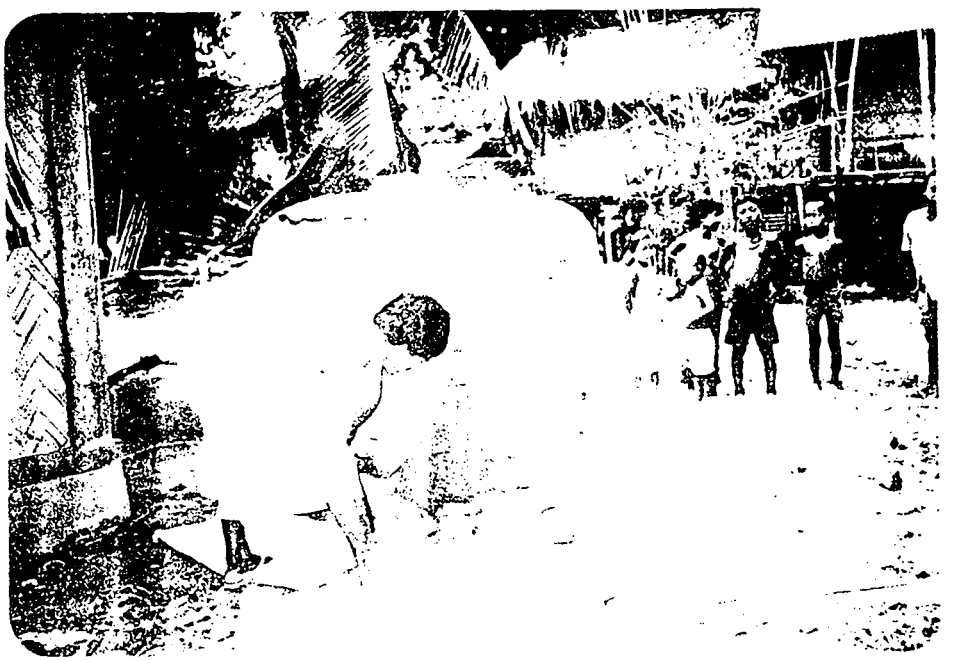
Moulds are being separated from the casted base.

Heysian cloth is sewed in the segment moulds.



Segmented moulds wrapped with heysian cloth and sewn to gether.

Slurry of mud is used for the adherence of cement plaster.

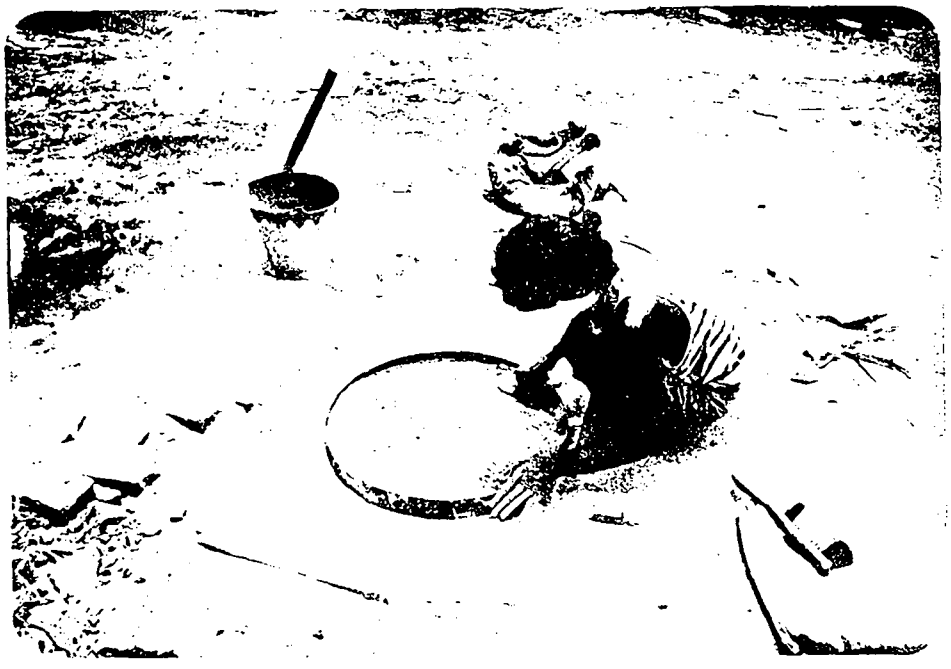


1st layer of ferrocement plasters is being laid.

18 gauge wire is being used for reinforcement.

After wrapping of 18 gauge wire second layer of ferrocement plaster is laid and [illegible] is done.

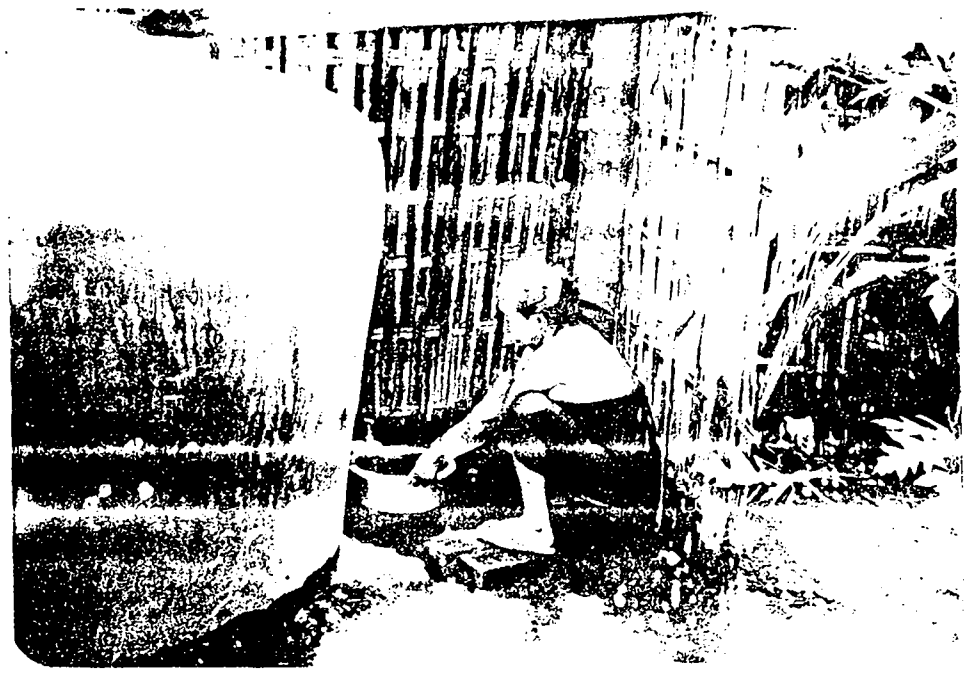
18 gauge wire is fixed in mould for casting of Jar's Cover lid.



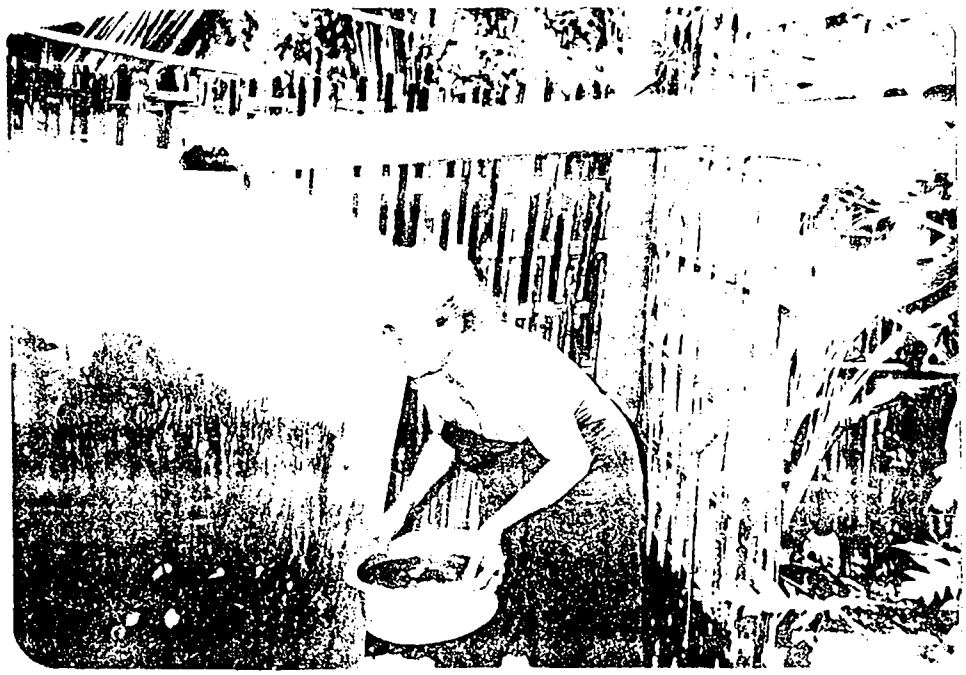
Sand is being mixed for casting.

Rain Water is being collected in the Jar through Gutter.

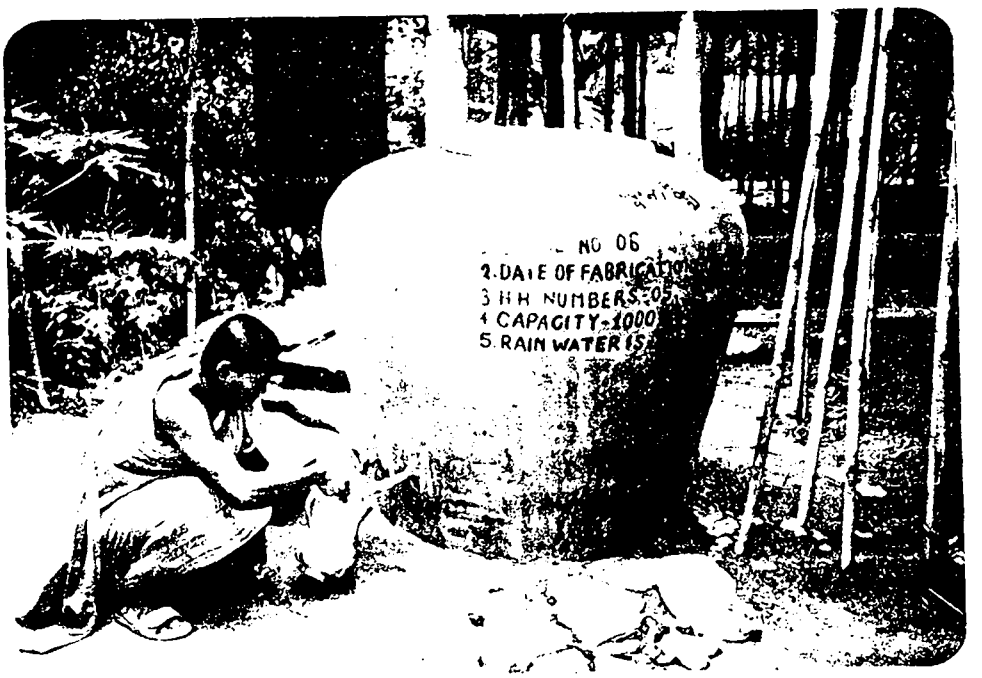
Rain Water is in use for Both Drinking and Domestic purposes by women.



Village women collecting rain water from 2000 litre jar at Rajasthan.



Gutter made of tin is fixed with 2000 litre Jar.



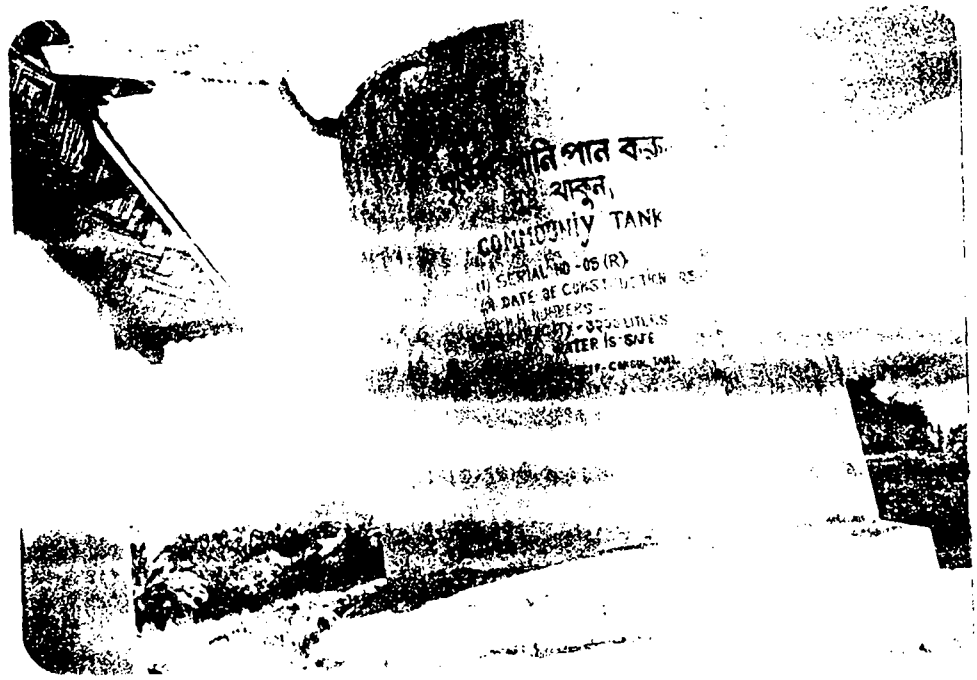
A monk is collecting rain water for drinking att Suwalak.

[illegible] a crack [illegible] repaired (Barguna).

1000 litre Jar fixed with Gutter ready for Rain Water Collection (Borguna).

Bases is being prepared with sand for casting of segment of 3200 litre Tank.

Segment under construction for 3200 litre Tank at Rajasthali.



Tin Gutter is fixed with the of PVC Pipe for rain water collection.

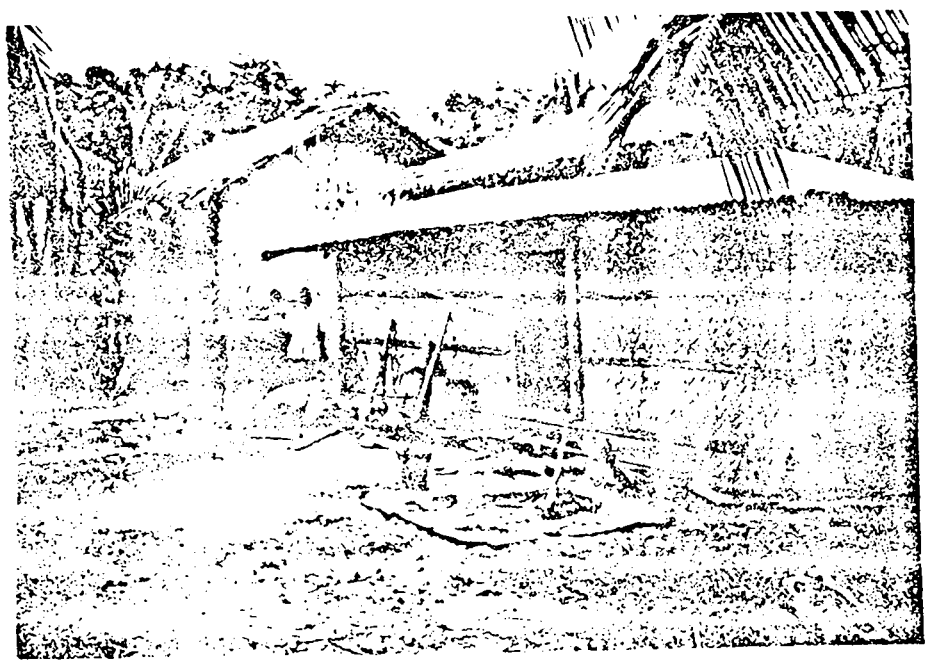
3200 litre tank constructed on cement concrete foundation.

APPENDICES - B : SURVEY FINDING OF CHITTAGONG HILL TRACTS

Households distribution by category of housing structure

Name of Mouza	Type of House							
	Kutcha	%	Semi-pucca	%	Pucca	%	Nr	%
Gila	47	39.17	-	-	-	-	-	-
Ghilachhari	10	8.33	-	-	-	-	-	-
Kaptai	48	40.00	-	-	-	-	-	-
Kukai Chari	15	12.50	-	-	-	-	-	-
Total	120	100.00	-	-	-	-	120	100

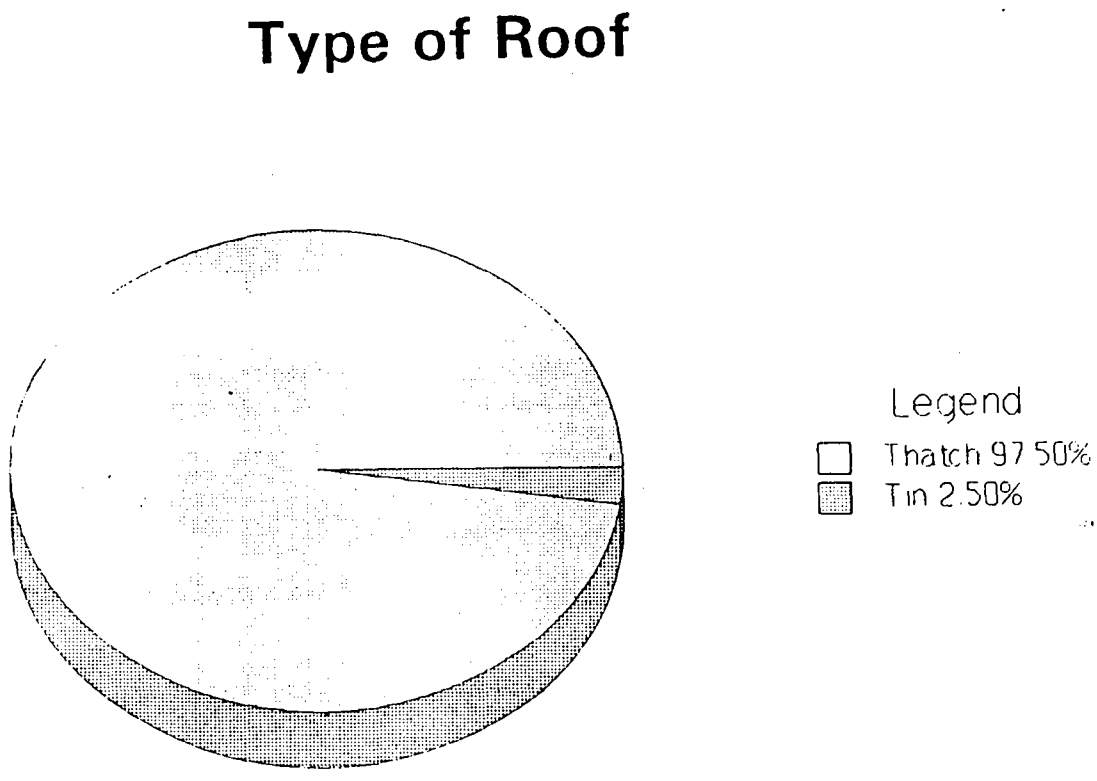
The structural characteristic of a dwelling house is the primary indicator of socio-economic status of the household. The house holds were therefore, classified into one broad types namely kutcha structures, while kutcha is fully thatched structure. Thus surveyed 120 households all are kutcha structure.



Kutcha Housing Structures at Rajasthali Areas.

Households distribution by category of housing roof.

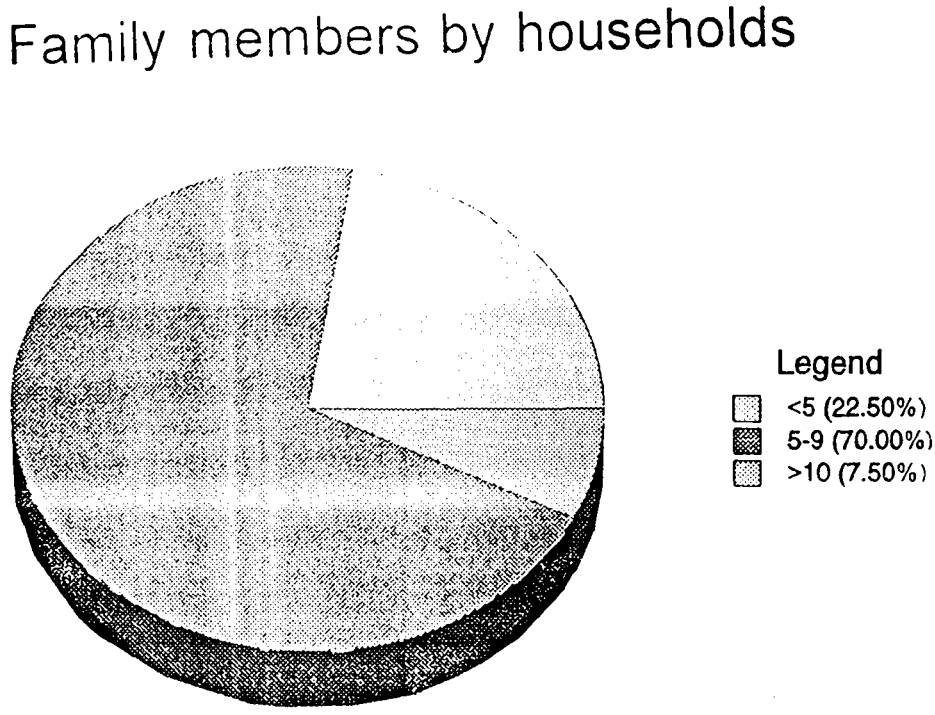
Name of Mouza	Type of Roof							
	Thatch	%	Tin	%	Tali	%	Pucca	%
Gila	46	38.33	1	0.83	-	-	-	-
Ghilachhari	10	8.33	-	-	-	-	-	-
Kaptai	46	38.33	2	1.67	-	-	-	-
Kukai Chari	15	12.50	-	-	-	-	-	-
Total	117	97.50	3	2.50	-	-	-	-



There are only 2.5 percent (3 nos.) tin roof and 97.50 percent (117 nos.) are thatched. Thatched type of roofs are covered with polythene before fixing the gutter to Jars and Tanks which are used as catchment area.

Total family members by households.

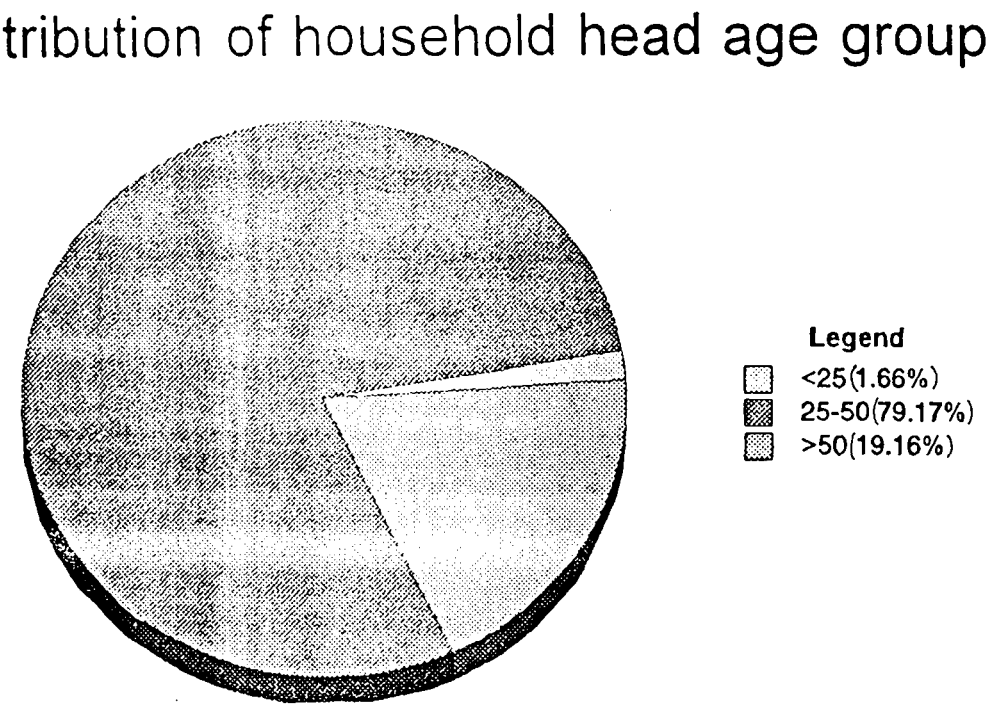
Name of Mouza	Family members range (Nos.)					
	< 5	%	5-9	%	> 10	%
Gila	11	9.17	32	26.67	4	3.33
Ghilachhari	1	0.83	6	5.00	3	2.50
Kaptai	7	5.83	39	32.50	2	1.67
Kukai Chari	8	6.67	7	5.83	-	-
Total	27	22.50	84	70.00	9	7.50



A substantial portion 70% of households comprise 5-9 numbers while 7.50% are more than 10 number and 22.50% less than 5 nos. (These data includes nos. of children below 14 years). It was also found that all the house were their own or hereditarily owned.

Distribution of household head age group

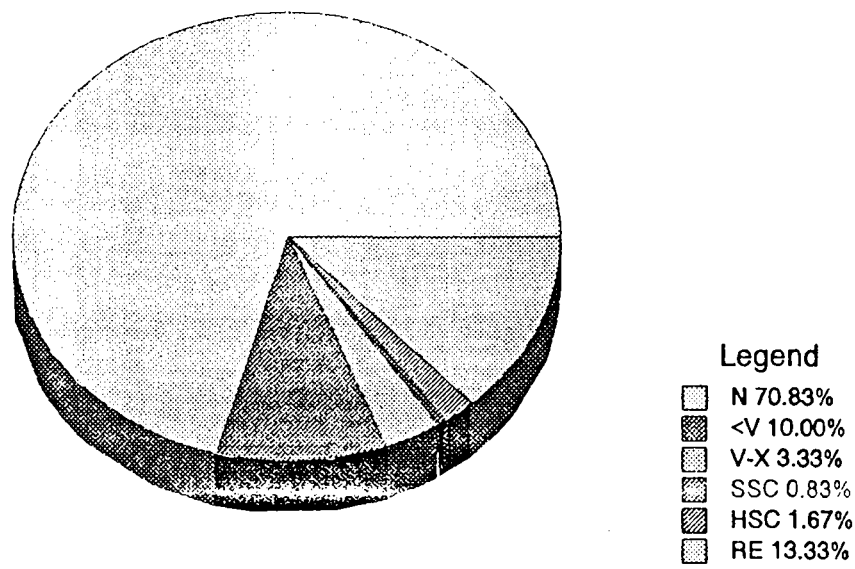
Name of Mouza	Age Group (Years)					
	<25	%	25-50	%	>50	%
Gila	1	0.83	35	29.17	11	9.17
Ghilachhari	-	-	8	6.67	2	1.67
Kaptai	-	-	43	35.83	5	4.17
Kukai Chari	1	0.83	9	7.50	5	4.17
Total	2	1.66	95	79.17	23	19.16



1.66% belong to age group below 25, 79.17% are between the age group of 25-50 and 19.16% are of the age group above 50. All households are tribal. Out of 120 households 12.50% are Hindu, 63.33% are Buddhist and 24.17% are Christian.

Educational qualification of households head

Nam of Mouza	Education													
	N	%	<V	%	V-X	%	SSC	%	HSC	%	GR	%	RE	%
Gila	24	20.00	8	.6.67	4	3.33	-	-	-	-	-	-	11	9.17
Ghilachhari	7	5.83	2	1.67	-	-	-	-	1	0.83	-	-	-	-
Kaptai	41	34.17	2	1.67	-	-	-	-	1	0.83	-	-	4	3.33
Kukai Chari	13	10.83	-	-	-	-	1	0.83	-	-	-	-	1	0.83
Total	85	70.83	12	10.00	4	3.33	1	0.83	2	1.67	-	-	16	13.33

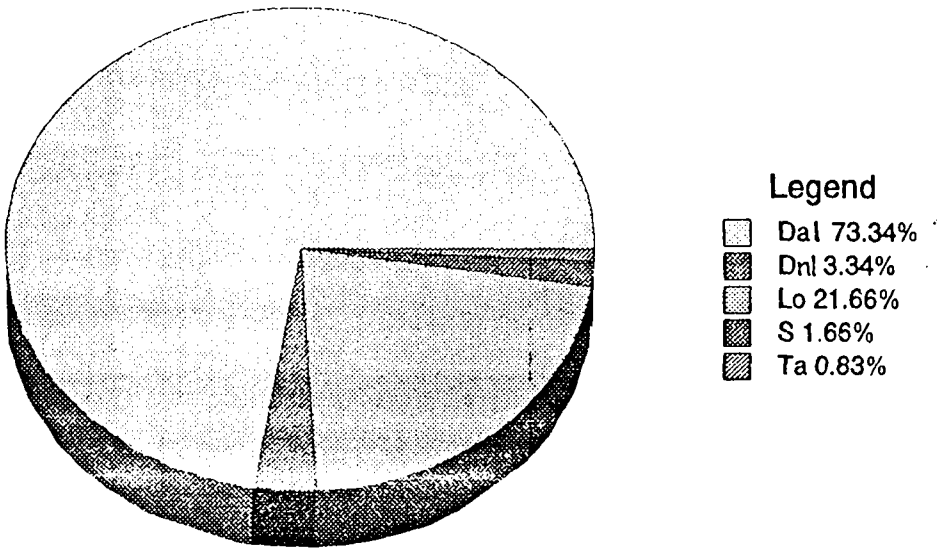


10% of households head have education upto class V, 3.33% are ranges from class V to X and 0.83% are SSC, 1.67% have education upto HSc. and 13.33% have religious education.

Main Occupation of household head

Name of Mouza	DAL	%	DNL	%	LO	%	S	%	TB	%	0	%
Gila	30	25.00	2	1.67	15	12.50	-	-	-	-	-	-
Ghilachhari	2	1.67	2	1.67	6	5.00	-	-	-	-	-	-
Kaptai	42	35.00	-	-	5	4.16	1	0.83	1	0.83	-	-
Kukai Chari	14	11.67	-	-	-	-	1	0.83	-	-	-	-
Total	88	73.34	4	3.34	26	21.66	2	1.66	1	0.83	-	-

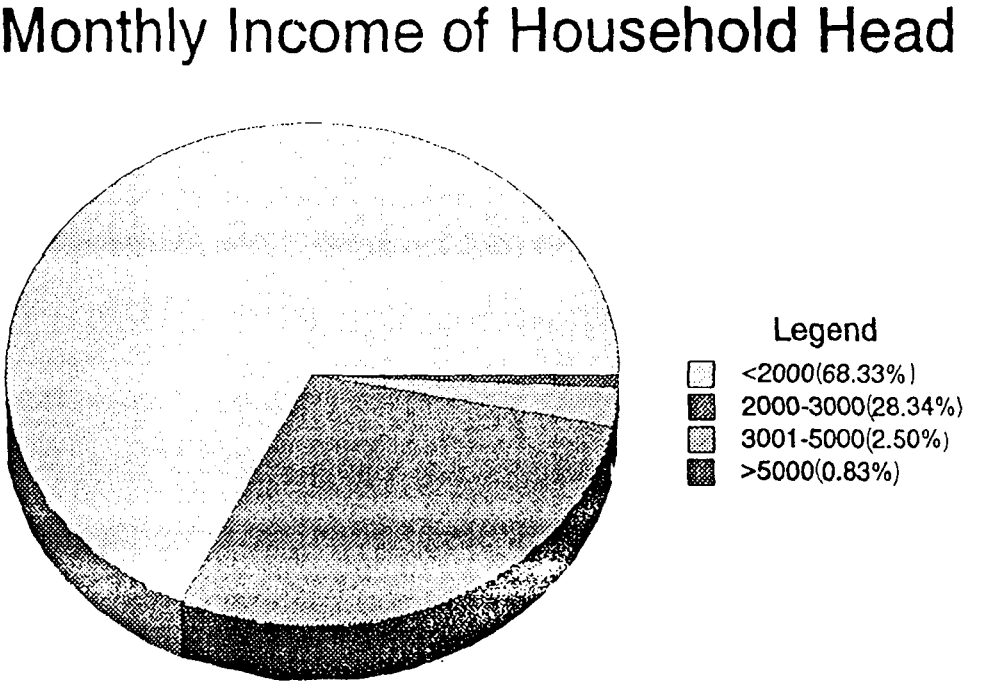
Main Occupation of Household Head



21.66% of the people being Land Owners (LO) and generate income through land cultivation as farmer. Among others 73.34% are daily labourers in the agricultural (DAL) sector, 3.34% are daily non-agricultural labours (DNL), 0.83% are in trading business (TB) and 1.66% are in service.

Monthly Income of household head

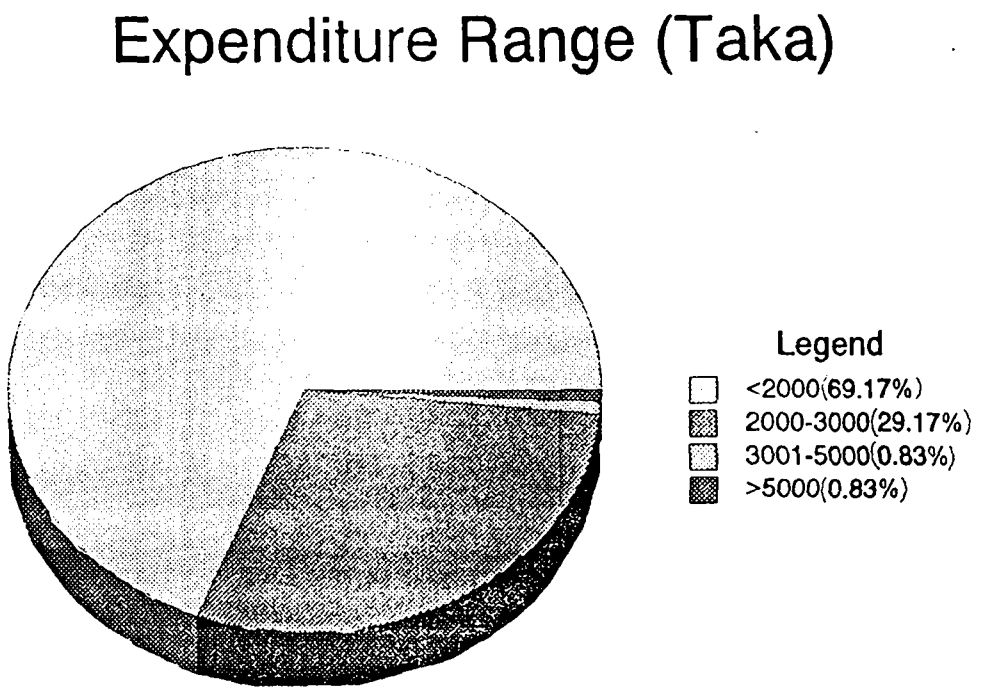
Name of Mouza	Income range (Taka)							
	<2000	%	2000-3000	%	3001-5000	%	>5000	%
Gila	21	17.50	23	19.17	2	1.67	1	0.83
Ghilachhari	5	4.16	5	4.17	-	-	-	-
Kaptai	41	34.17	6	5.00	1	0.83	-	-
Kukai Chari	15	12.50	-	-	-	-	-	-
Total	82	68.33	34	28.34	3	2.50	1	0.83



The income scenario reflects that the percentage of poor people are much higher than the affluent people of the rural society. Pie Chart depicts that about 68.33% people have income less than Tk.2000.00, 28.34% are in the range of 2000.00-3000.00, while only 2.5% and 0.83% income range in between 3000.00-5000.00.

Monthly Expenditure of household head

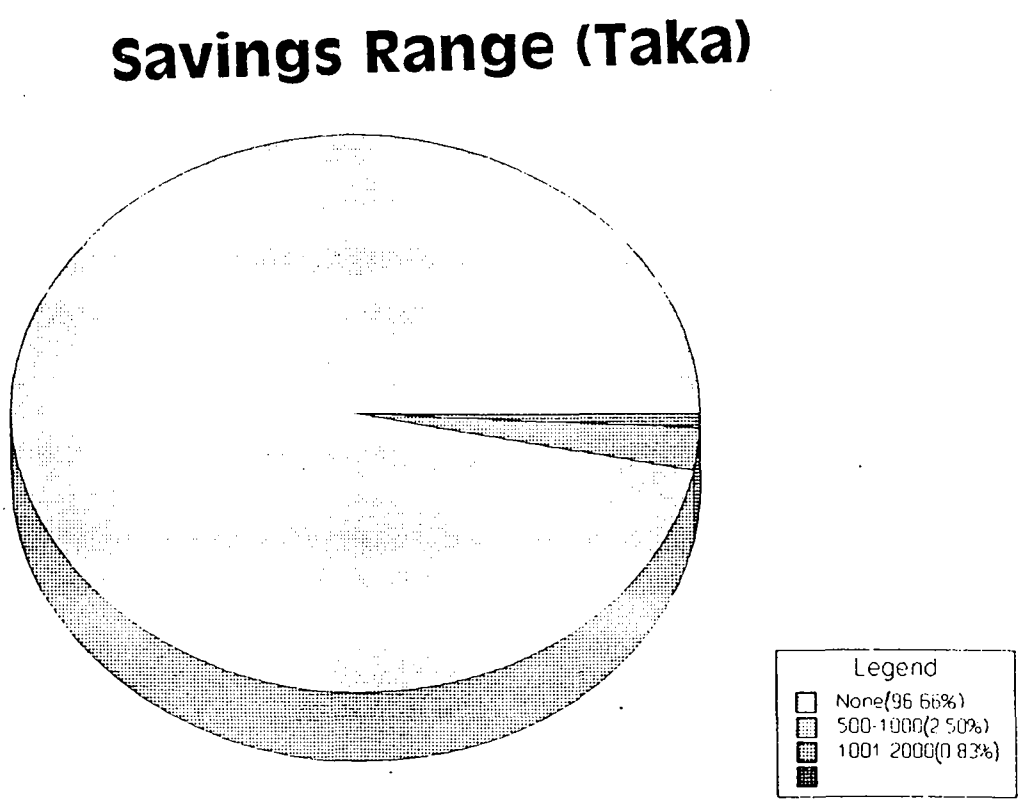
Name of Mouza	Expenditure range (Taka)							
	<2000	%	2000-3000	%	3001-500	%	>5000	%
Gila	2	18.33	24	20.00	-	-	1	0.83
Ghilachhari	5	4.16	5	4.17	-	-	-	-
Kaptai	41	34.17	6	5.00	1	0.83	-	-
Kukai Chari	15	12.50	-	-	-	-	-	-
Total	83	69.17	35	29.17	1	0.83	1	0.83



The expenditure almost conforms with the income of households. The amount they earn the same amount they spent. About 69.17 percent spend less than Tk. 2,000.00. Only 29.17 percent have the expenditure range of Tk. 2,000.00 - 3,000.00.

Monthly savings of household head

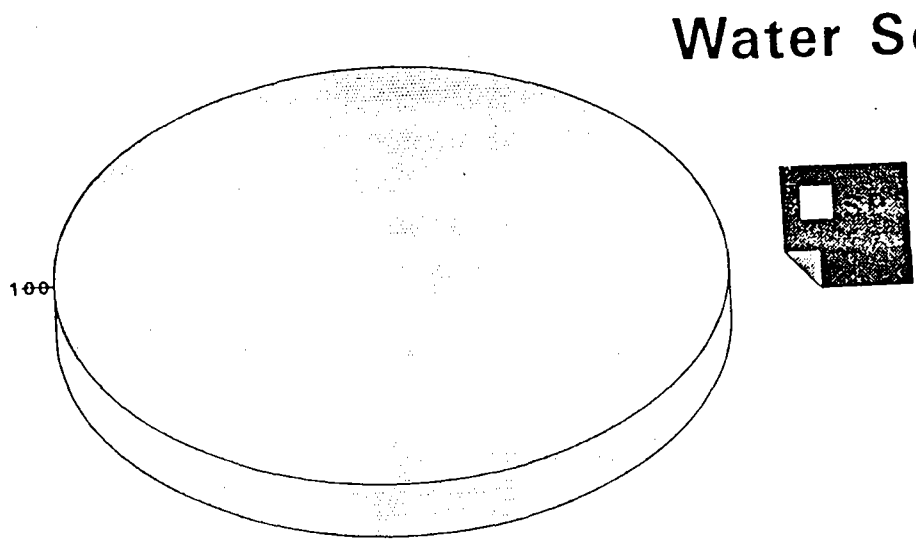
Name of Mouza	Savings range (Taka)									
	None	%	<500	%	500-1000	%	1001-2000	%	>2000	%
Gila	43	35.83	-	-	3	2.50	1	0.83	-	-
Ghilachhari	1	8.33	-	-	-	-	-	-	-	-
Kaptai	48	40.00	-	-	-	-	-	-	-	-
Kukai Chari	15	12.50	-	-	-	-	-	-	-	-
Total	116	96.66	-	-	3	2.50	1	0.83	-	-



The earning and spending is same, about 97 percent households have no savings, only 2.5% have savings in the range of Tk. 500.00 -1,000.00.

Source of drinking water

Name of Mouza	Water source											
	TW	%	RW	%	SP	%	RAW	%	RCP	%	Others	%
Gila	-	-	-	-	47	39.17	-	-	-	-	-	-
Ghilachhari	-	-	-	-	10	8.33	-	-	-	-	-	-
Kaptai	-	-	-	-	48	40.00	-	-	-	-	-	-
Kukai Chari	-	-	-	-	15	12.50	-	-	-	-	-	-
Total	-	-	-	-	120	100.00	-	-	-	-	-	-



Their main source of drinking water are SP (spring) and water falls, 100% household source of drinking water is spring (SP). They use spring (SP) water for other purposes also.

Table 3.12 : Source of water for other purposes

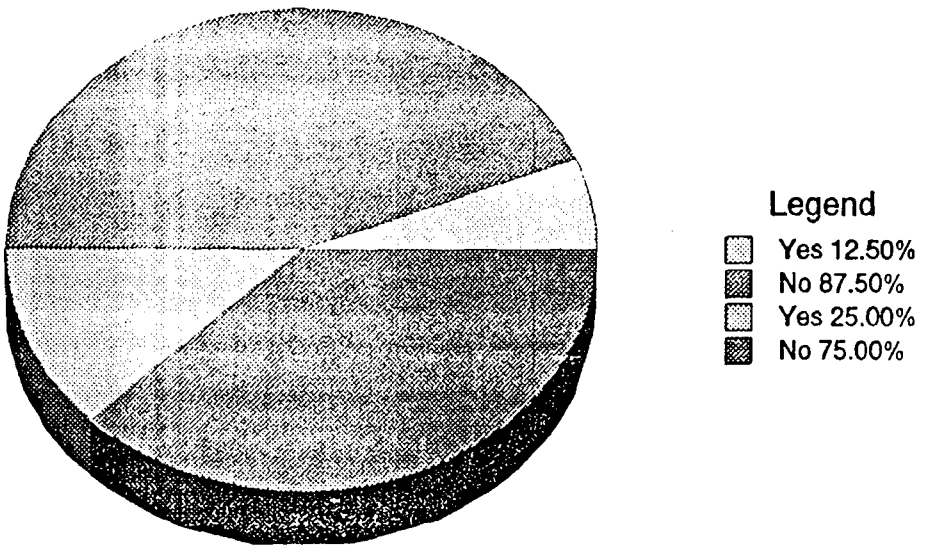
Name of Mouza	Water source											
	TW	%	RW	%	SP	%	RAW	%	RCP	%	Others	%
Gila	-	-	-	-	47	39.17	-	-	-	-	-	-
Ghilachhari	-	-	-	-	10	8.33	-	-	-	-	-	-
Kaptai	-	-	-	-	48	40.00	-	-	-	-	-	-
Kukai Chari	-	-	-	-	15	12.50	-	-	-	-	-	-
Total	-	-	-	-	120	100.00	-	-	-	-	-	-

They use spring (SP) water for other purposes also.

Option for 1000 litre/2000/3200 litre Jar/Tanks and community water storage system and willing to pay.

Name of Mouza	Household				Community			
	Yes	%	No	%	Yes	%	No	%
Gila	-	-	-		10			
Ghilachhari	9				5			
Kaptai	3				5			
Kukai Chari	-	-	-		10			
Mobaichari	1							
Gilamule	2							
Total	15	12.5	105	87.5	30	25	90	75

Household Jars/Tanks & Community Tanks



During socio-economic survey 15 households expressed their option for constructing 1000, 2000, 3200 litre Jars and Tanks out of 15 only 1 expressed for 3200 litre tank. All of them were eager to pay 1000 each for individual jars and tanks.

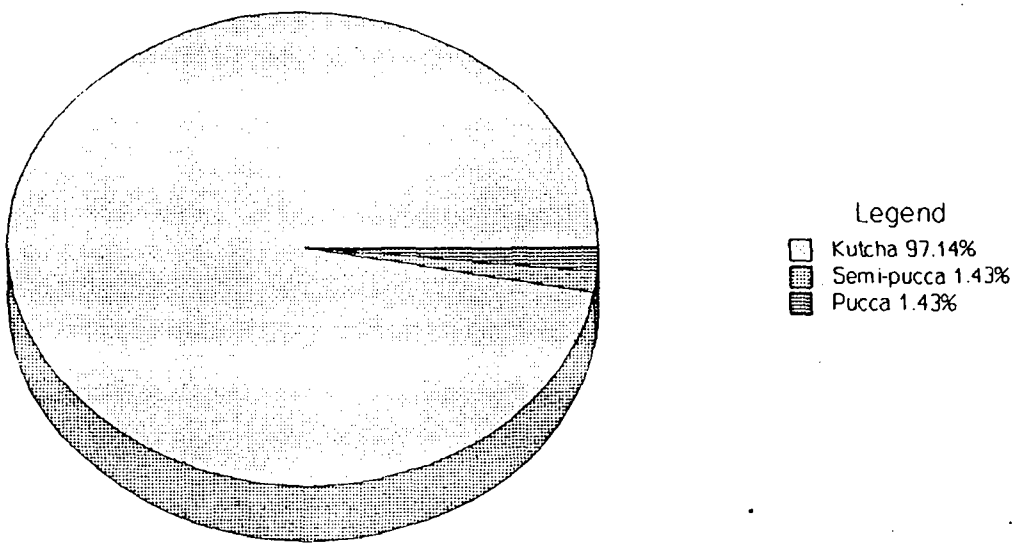
Though during survey about 30 people expressed to have community tank but due to natural problems of drought etc. are now reluctant to have these community tank with contribution money of Taka 3,000.00 each.

SURVEY FINDING OF SUWALAK

Households distribution by category of housing structure

Name of Mouza	Type of House							
	Kutcha	%	Semi-pucca	%	Pucca	%	Nr	%
Suwalak	68	97.14	1	1.43	1	1.43	-	
Total	68	97.14	1	1.43	1	1.43	-	

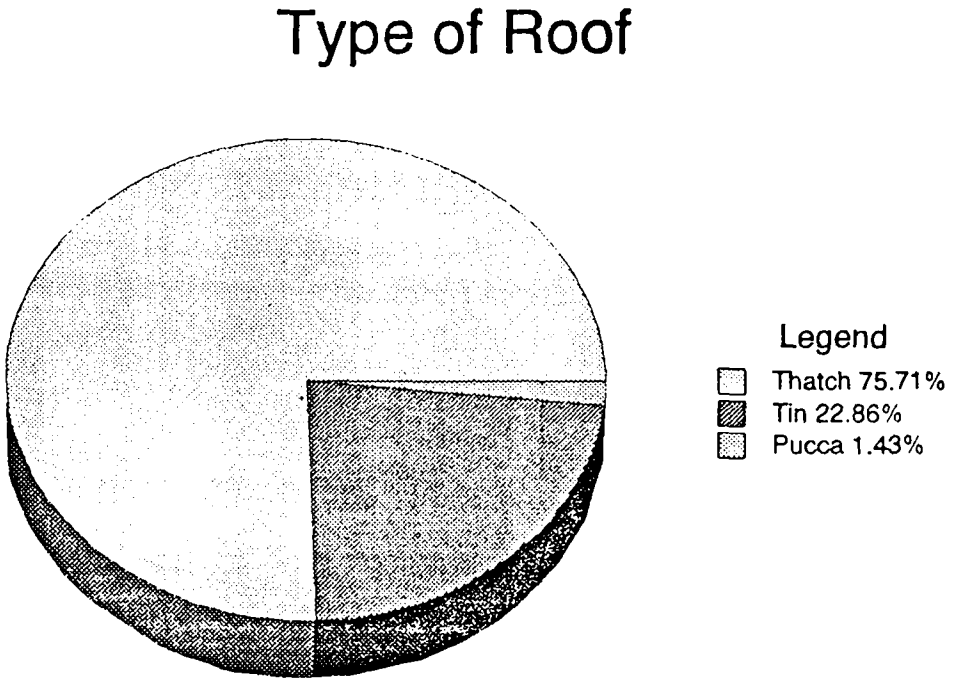
Structure of House



The structure characteristic of a dwelling house is the primary indicator of socio-economic status of the house hold. The house holds were therefore classified into three broad types namely : pucca, semi-pucca and kutcha structure. Pucca is the building where semi-pucca is brick wall and tin and roof. While kutcha is fully tin are thatched structure. Thus surveyed, house holds are 70 out of which 68 (97.14%) kutcha, 1 (1.43) semi-pucca and 1 (1.43) are pucca.

Households distribution by category of housing roof.

Name of Mouza	Type of Roof							
	Thatch	%	Tin	%	Tali	%	Pucca	%
Suwalak	53	75.71	16	22.86	-		1	1.43
Total	53	75.71	16	22.86	-		1	1.43

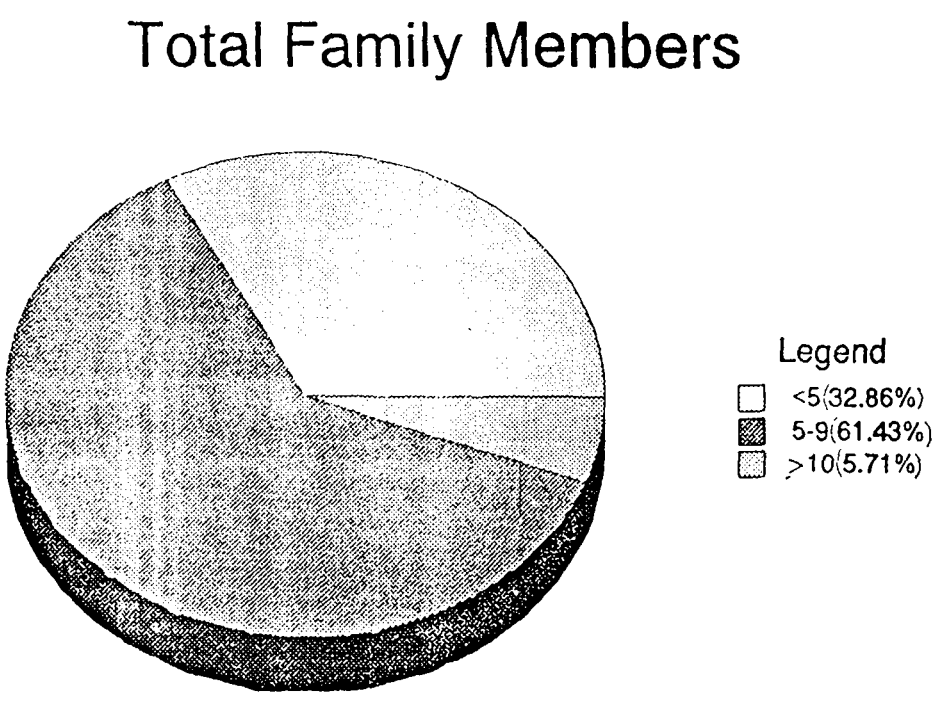


Type of Roof

There are three common types of roof in the area depending on the kind of house the villager lived in (Table-2). These types of roo are corrugated iron sheets, thatch and pucca roof. Among the survey households 75.71% (53 Nos.) are of thatch roofs 22.86% (16 Nos.) tin and 1.43% (1 No.) pucca roofs.

Total family members by households.

Name of Mouza	Family members range (Nos.)					
	<5	%	5-9	%	>10	%
Suwalak	23	32.86	43	61.43	4	5.71
Total	23	32.86	43	61.43	4	5.71

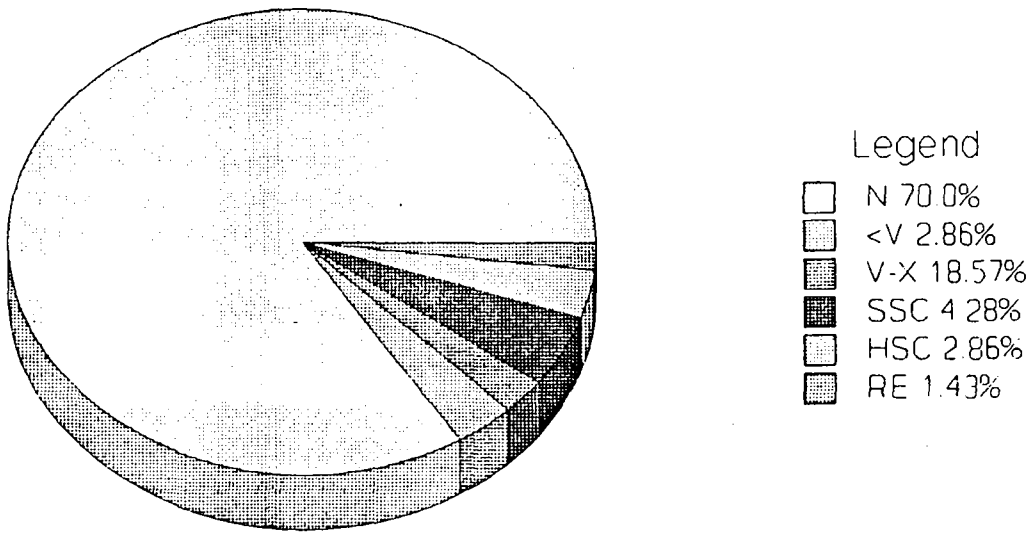


Family numbers range

A sub-stantial portion 61.43% (43 Nos.) of households comprises 5-9 number, while 5.71% (4 Nos.) are more than 10 number and 32.86% (23 Nos.) less than <5 Nos. (their data includes Nos. of children below 14 years). It is also found that all the house were their own or hereditarily owned.

Educatuional qualification of households head

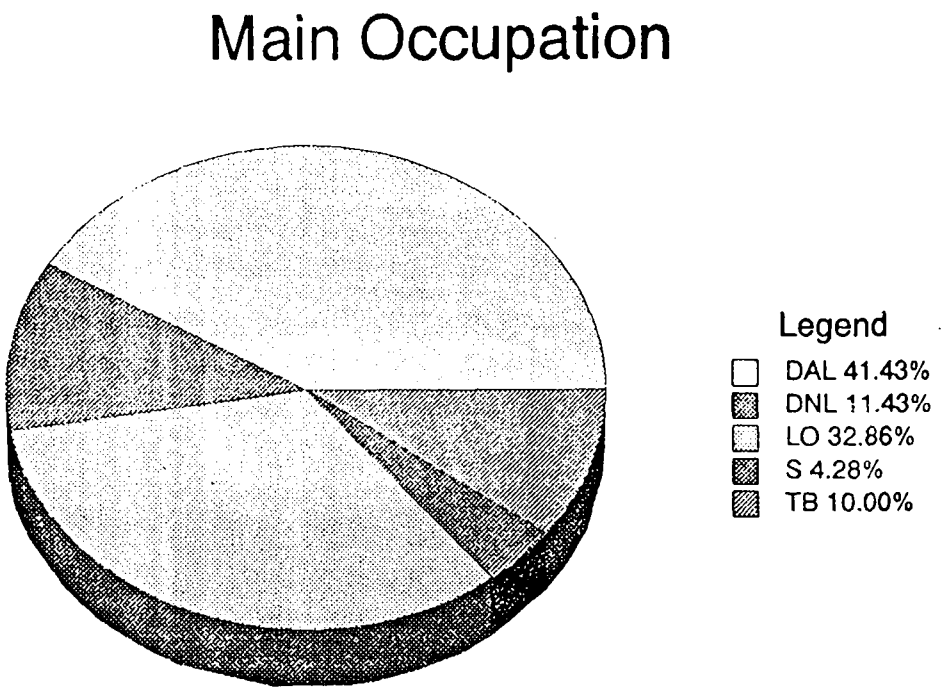
Nam of Mouza	Education													
	N	%	< V	%	V-X	%	SSC	%	HSC	%	GR	%	RE	%
Suwalak	49	70.00	2	2.86	13	18.57	3	4.28	2	2.86	-		1	1.43
Total	49	70.00	2	2.86	13	18.57	3	4.28	2	2.86	-		1	1.43



Educational Qualification of 2.86% (2 Nos.) household heads have education upto class-V, 18.57% (13 No.) education level ranges from class V to X and 4.28% (3 Nos.) are S.S.C., 2.86% (2) have education upto H.Sc. and while 1.43 (1 No.) have religious education.

Main Occupation of household head

Name of Mouza	Occupation											
	DAL	%	DNL	%	LO	%	S	%	TB	%	0	%
Suwalak	29	41.43	8	11.43	23	32.86	3	4.28	7	10.00		
Total	29	41.43	8	11.43	23	32.86	3	4.28	7	10.00		



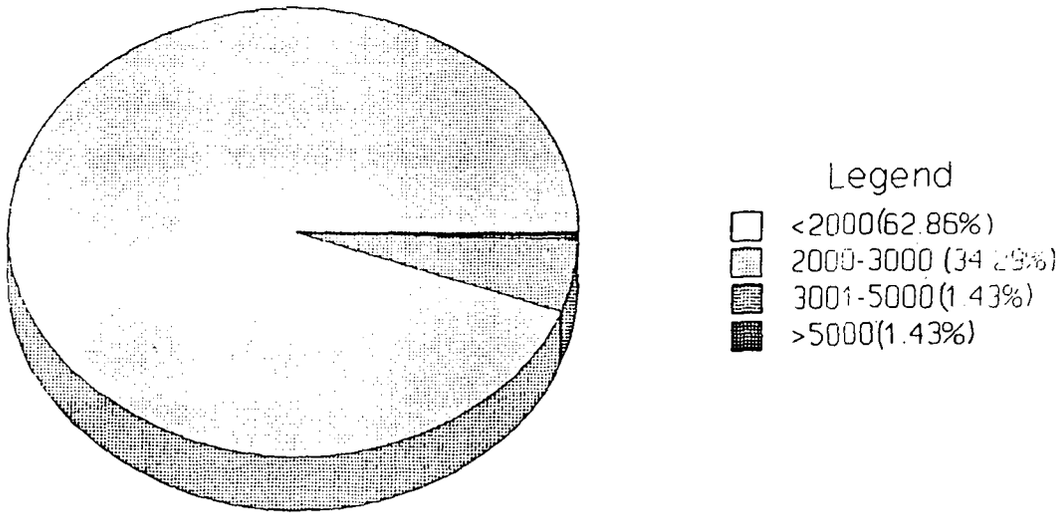
Occupation

About 41.43 are daily agricultural labour while 32.85% (23 Nos.) of the people being land owners and generate income through land cultivation as farmers. Among others 11.43% (8 Nos.) are daily non-agricultural (DNL), 4.28% (3 Nos.) are in service(s) and 10% are in trading business (TB).

Monthly Income of household head

Name of Mouza	Income range (Taka)							
	<2000	%	2000-3000	%	3001-5000	%	>5000	%
Suwalak	44	62.86	24	34.29	1	1.43	1	1.43
Total :	44	62.86	24	34.29	1	1.43	1	1.43

Monthly Income

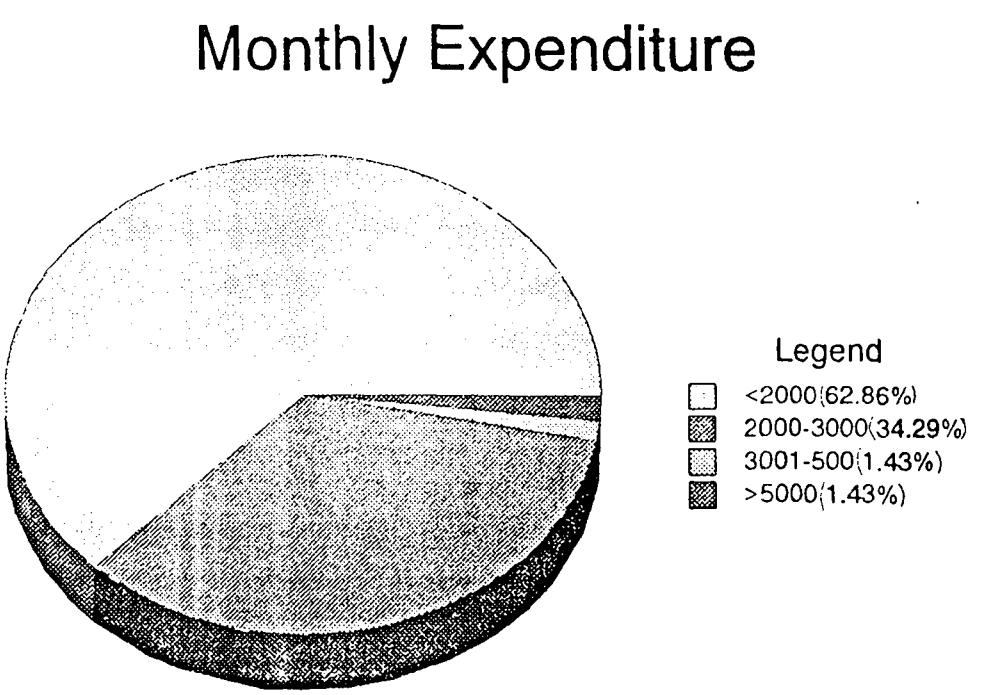


Monthly Income

Monthly income of 62.86% households are below Taka 2000 and 34.29% of the households are within the income range from Taka 2000-3000 and 1.43% households are in the income range from 3001-5000 and only 1.43% have monthly income more than Taka 5000.

Monthly Expenditure of household head

Name of Mouza	Expenditure range (Taka)							
	<2000	%	2000-3000	%	3001-500	%	>5000	%
Suwalak	44	62.86	24	34.29	1	1.432	1	1.43
Total :	44	62.86	24	34.29	1	1.43	1	1.43

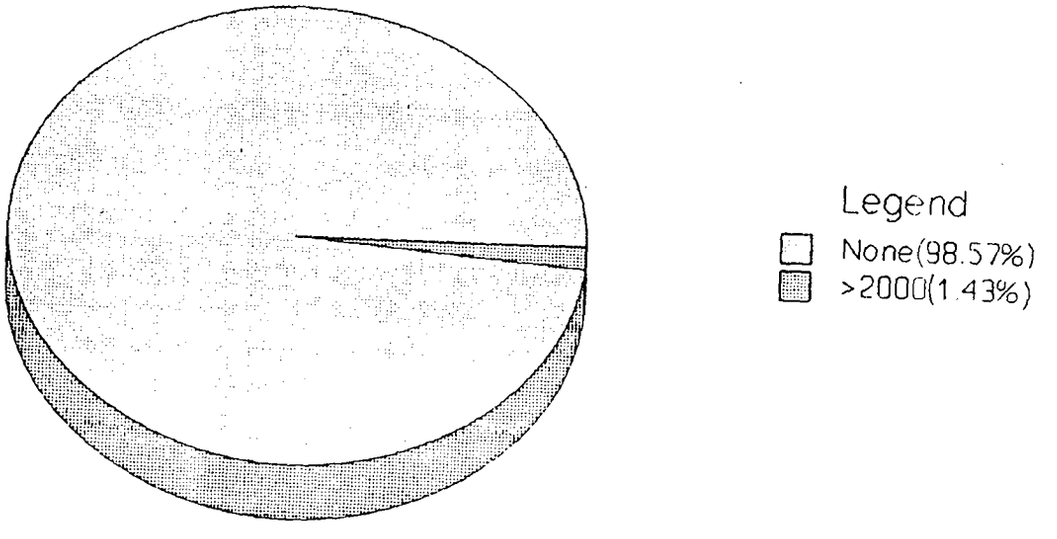


The expenditure conforms with the income. Pie Chart shows that 62.86% spend what they earn i.e. turnover. 34.29% spend between 2000.00-3000.00 while 1.43% spend between 3000.00-5000.00.

Monthly savings of household head

Name of Mouza	Savings range (Taka)									
	None	%	<500	%	500-1000	%	1001-2000	%	>2000	%
Suwalak	69	98.57	-		-				1	1.43
Total :	69	98.57	-		-				1	1.43

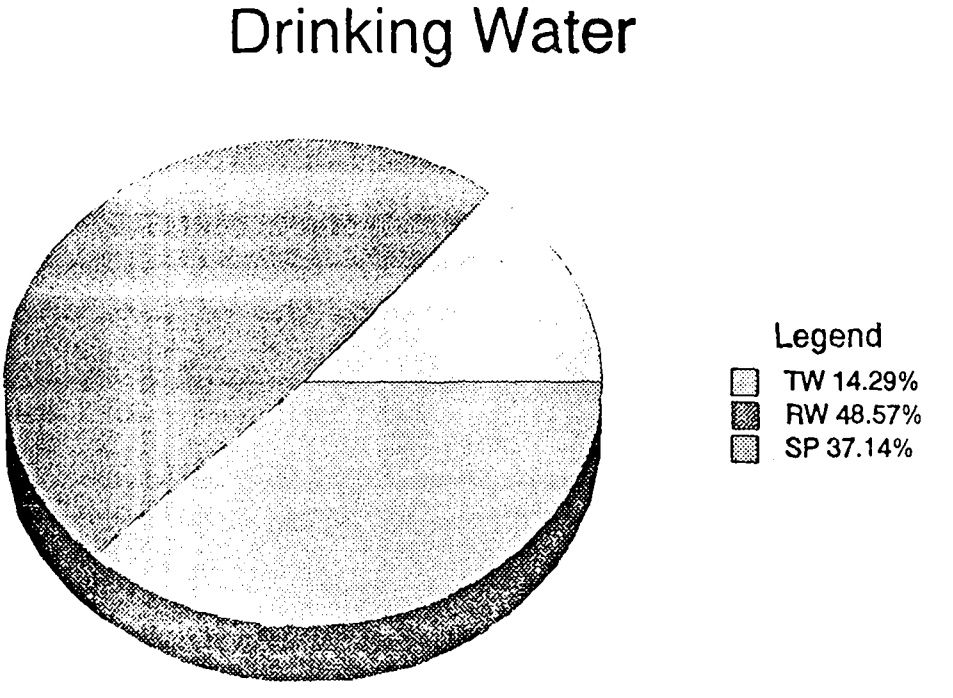
Monthly Savings of household head



The saving scenario show that only 1.43% save more than Taka 2000.00.

. Source of drinking water

Name of Mouza	Water source											
	TW	%	RW	%	SP	%	RAW	%	RCP	%	Others	%
Suwalak	10	14.29	34	48.57	26	37.14	-		-		-	
Total :	10	14.29	34	48.57	26	37.14	-		-		-	



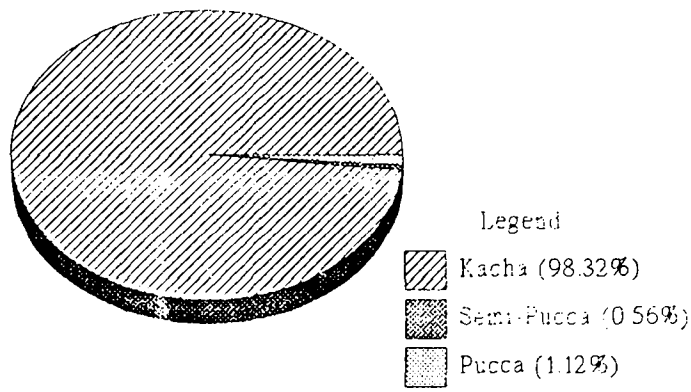
Source of Drinking and other Water

The main source of drinking water are TW, RW and SP (Tubewell, Ringwell and Spring). 14.28% households source of drinking water is TW (Tubewell), 48.57% households source of drinking water is RW (Ringwell) and 37.14 households source of drinking water is SP (Spring). They use RW and SP water for other purposes also.

APPENDICES - C : SURVEY FINDING OF BARGUNA

Households distribution by category of housing structure

Name of Mouza	Type of House					
	Kuccha	%	Semi-pucca	%	Pucca	%
Huglapasha	73	97.33	0	0	2	2.67
Taluk Charduani	103	99.04	1	0.96	0	0
Total	176	98.32	1	0.56	2	1.12

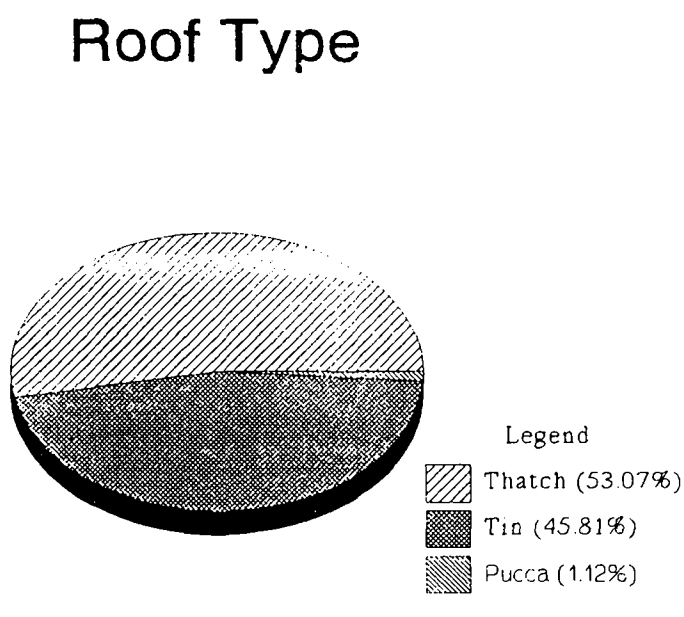


Housing Structure

The households were classified into three broad types namely, Pucca, Semi-Pucca, and Kucha structures. Pucca is the building, where semi-pucca is brick wall and tin roof, while kucha is fully tin or thatched structure. Thus surveyed households are 179, out of which 98.32% (176) ***kuccha***, 056% (1 No.) ***semi-pucca*** and 1.12% (2 Nos.) are ***pucca***.

Households distribution by category of housing roof

Name of Mouza	Type of roof							
	Thatch	%	Tin	%	Tali	%	Pucca	%
Huglapasha	41	54.66	32	42.67	-	-	2	2.67
Taluk Charduani	54	51.92	50	48.08	-	-	-	-
Total	95	53.07	82	45.81	-	-	2	1.12

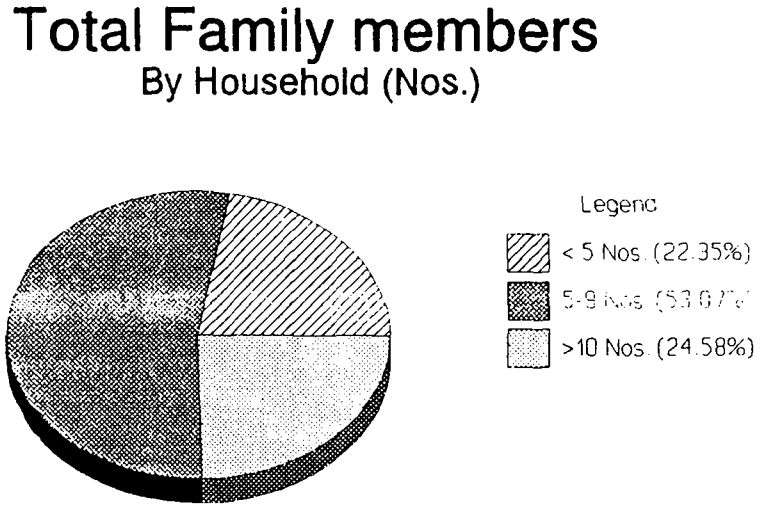


Roof Type

There are three common types of roof in the area depending on the kind of house the villager lived in. These types of houses are corrupted iron sheets, thatch and pucca roof. Among the survey households 45.81% (82 Nos.) are of C.I. sheet roofs 53.07 (95 Nos.) thatched and 1.12% (2 Nos.) pucca roofs.

Total family members by households

Name of Mouza	Family members range(Nos.)					
	<5	%	5-9	%	>10	%
Huglapasha	16	21.33	44	58.67	15	20.00
Taluk Charduani	24	23.08	51	49.04	29	27.88
Total	40	22.35	95	53.07	44	24.58

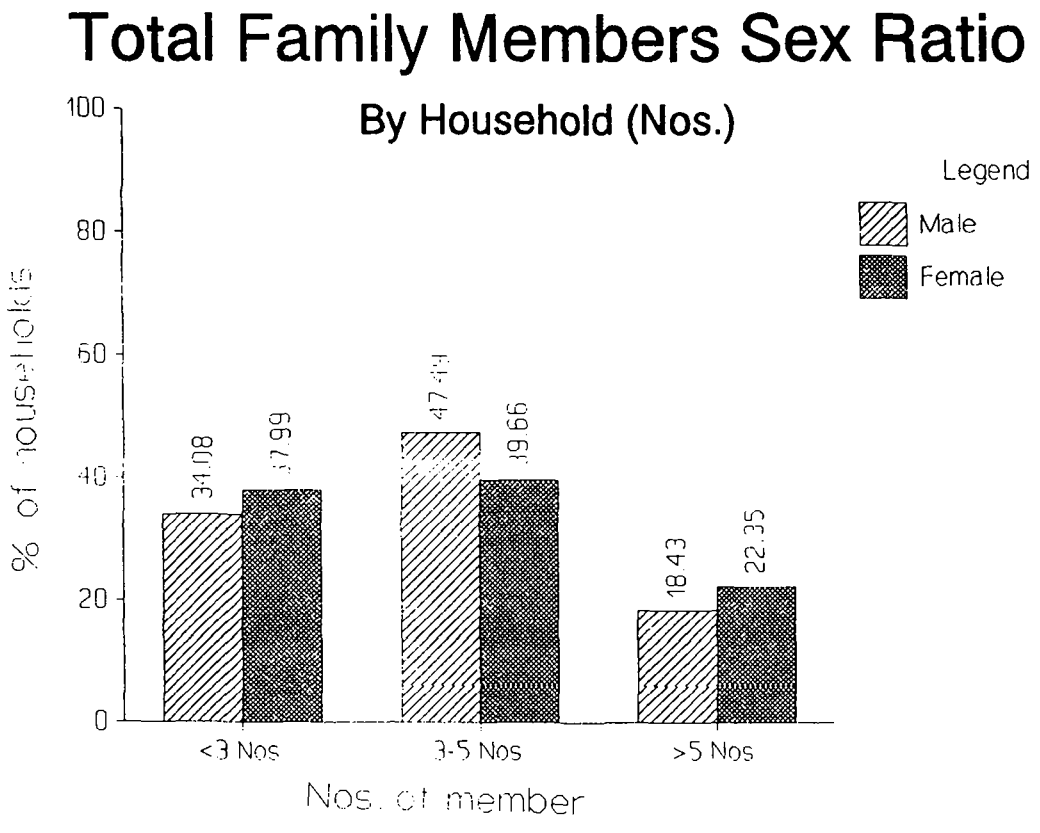


Family Members

A substantial portion (53.07%) of households comprises 5-9 numbers while 24.58% are more than 10 number and 22.35% less than 5 Nos. (There data includes Nos. of children below 14 years). It is also found that all the houses were their own or hereditarily owned.

Total family members sex by households

Name of Mouza	Sex											
	Male range(Nos)						Female range(Nos.)					
	<3	%	3-5	%	>5	%	<3	%	3-5	%	>5	%
Huglapasha	26	34.67	40	53.33	9	12.00	24	32.00	36	48.00	15	20.00
Taluk Charduani	35	33.65	45	43.27	24	23.08	44	42.31	35	33.65	25	24.04
Total	61	34.08	85	47.49	33	18.43	68	37.99	71	39.66	40	22.35

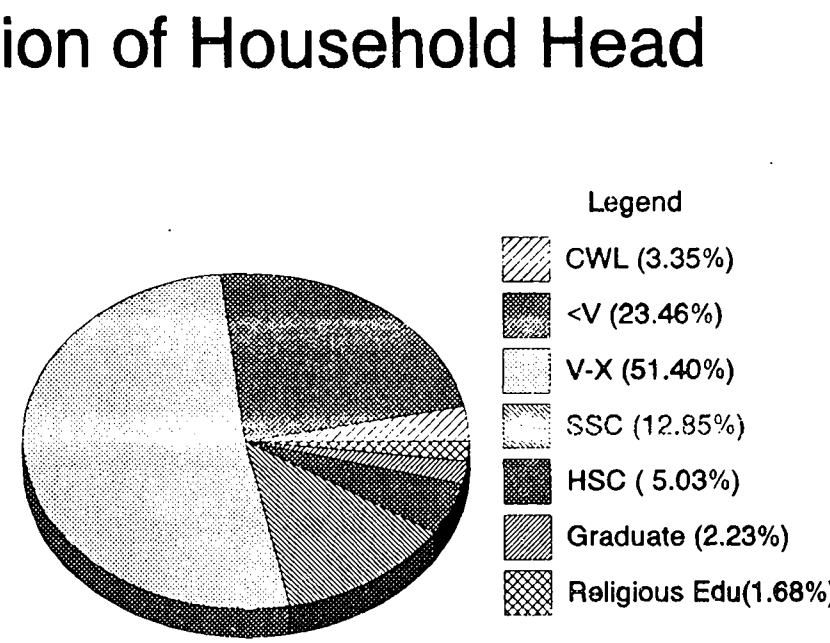


Sex Ratio

Male and female sex ratio within the survey area is described in the above Table and Bargraph.

Educational qualification of households head

Name of Mouza	Education													
	CWL	%	<V	%	V-X	%	SSC	%	HSC	%	GR	%	RE	%
Huglapasha	6	8.00	19	25.33	33	44.00	8	10.67	5	6.67	3	4.00	1	1.33
Taluk Charduani	-	-	23	22.12	59	56.73	15	14.42	4	3.85	1	0.96	2	1.92
Total	6	3.35	42	23.46	92	51.40	23	12.85	9	5.03	4	2.23	3	1.68

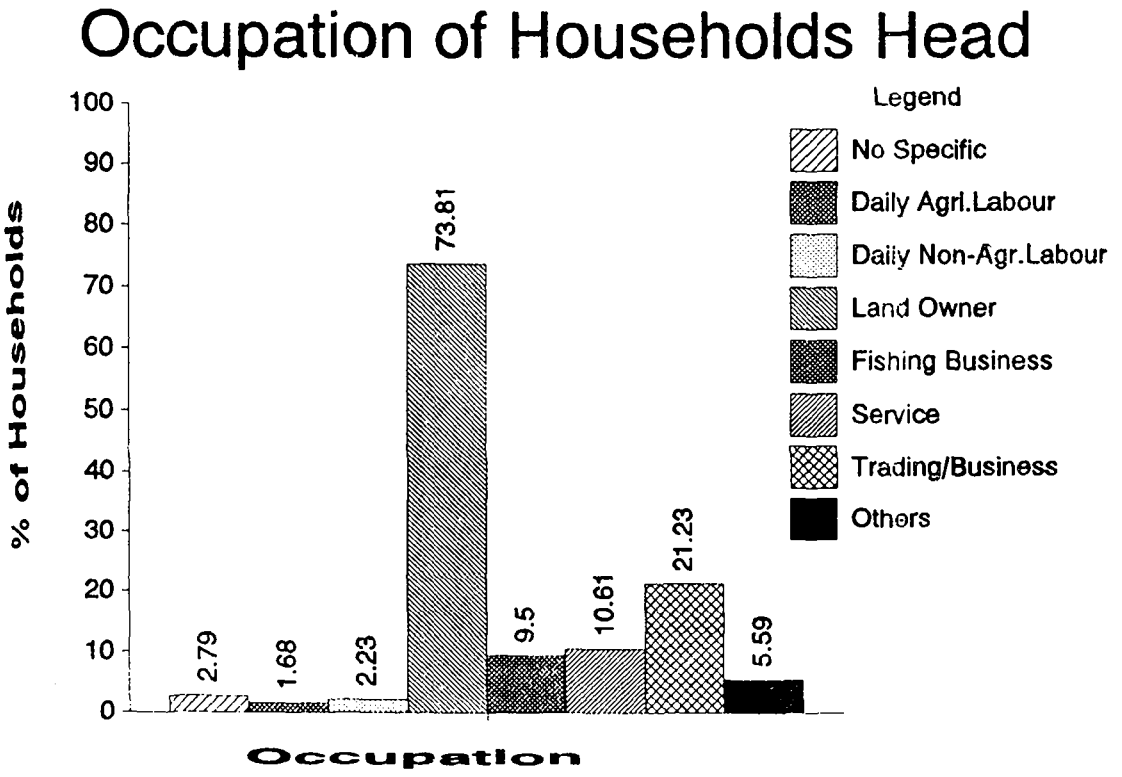


Education

Educational qualifications of 26.81% of 179 households head have education upto class V, 51.40% education level ranges from class V to X and 12.85% are SSC graduates, 5.03% have education upto HSC. Only 2.23% were found to be graduates (B.A.) and 1.68% have religious education.

Main Occupation of house holds head

Name of Mouza	Occupation															
	NS	%	DAL	%	DNL	%	LO	%	FB	%	S	%	TB	%	O	%
Huglapasha	4	5.33	-	-	3	4.00	48	64.00	2	2.67	13	17.33	13	17.33	5	6.67
Taluk Charduani	1	0.96	3	2.88	1	0.96	83	79.81	15	14.42	6	5.77	25	24.04	5	4.81
Total	5	2.79	3	1.68	1	2.23	131	73.18	17	9.50	19	10.61	38	21.23	10	5.55



Occupation

73.18% of the people being land owners and generate income through land cultivation as farmers. Among others 2.79% are daily labourers in the agricultural (DAL) sector, 1.68% are daily non-agricultural labours (DNL) 2.23% are in fishing business (FB), 9.50% are in service (S) and 10.61 are in trading/business (TB).

Monthly Income of Households head

Name of Mouza	Income range (Taka)							
	<2000	%	2000-3000	%	3001-5000	%	>5000	%
Huglapasha	20	26.67	45	60.00	8	10.67	2	2.67
Taluk Charduani	37	35.58	52	50.00	15	14.42	-	-
Total	57	31.84	97	54.19	23	12.85	2	1.12

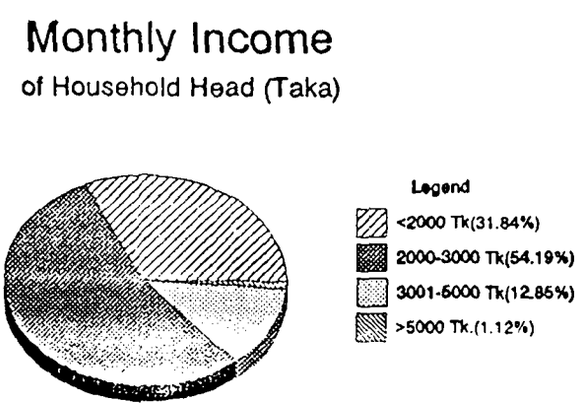
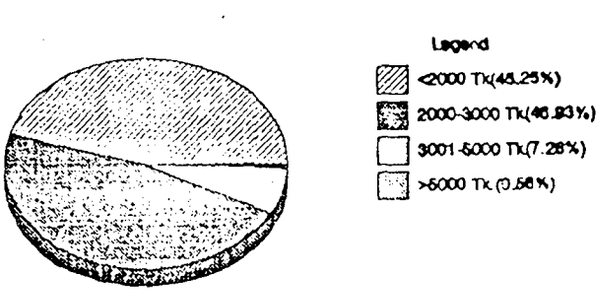


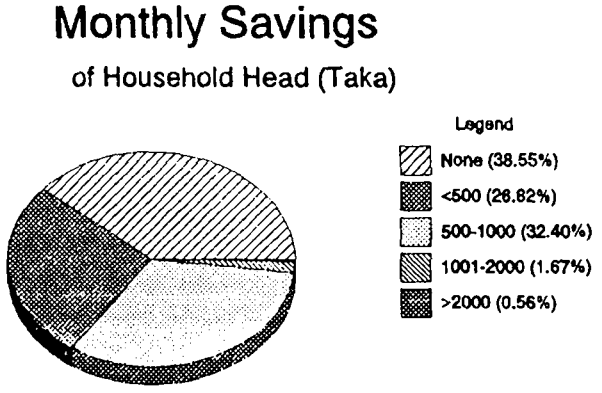
Table 4.13: Monthly Expenditure of Households head

Name of Mouza	Expenditure range (Taka)							
	<2000	%	2000-3000	%	3001-5000	%	>5000	%
Huglapasha	29	38.67	38	50.67	7	9.33	1	1.33
Taluk Charduani	52	50.00	46	44.23	6	5.77	-	-
Total	81	45.25	84	46.93	13	7.26	1	0.56



Monthly Savings of Households head

Name of Mouza	Savings range (Taka)									
	None	%	<500	%	500-1000	%	1001-2000	%	>2000	%
Hughipasha	30	40.00	25	33.33	17	22.67	2	2.67	1	1.33
Taluk Charduani	39	37.50	23	22.12	41	39.42	1	0.96	-	-
Total	69	38.55	48	26.82	58	32.40	3	1.67	1	0.56

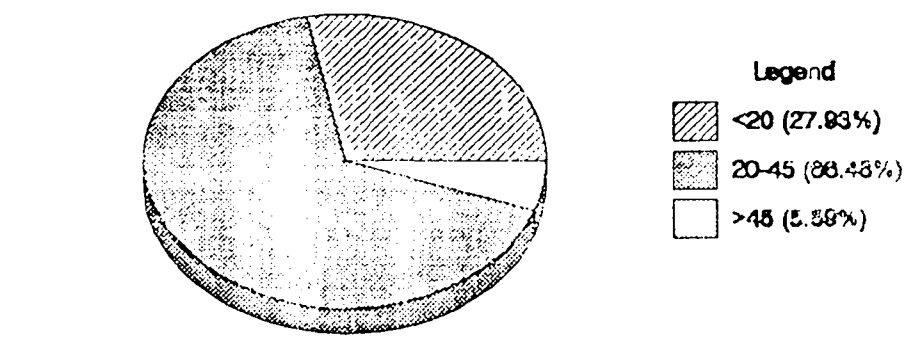


Income, Expenditure and Savings

Monthly income of 31.84% households are below taka 2000, and 54.19% of the household income range from taka 2000-3000 and 12.25% of the households have a monthly income from take 3001-5000, and only 1.12% have monthly income more than taka 5000. Monthly expenditure of households depends on their income, 38.55% households has no savings, 26.82% households save upto 500 taka per month, 32.40% can save from 5000 taka-1000 and 1.67% saves from 1001-2000 taka, and only 0.56% was found to save 2000 taka per month. 93.85% households had a length on stay in the same locality for more than 10 years.

Water consumption for drinking purpose of households

Name of Mouza	Water consumption (Litre)					
	< 20	%	20-45	%	>45	%
Huglapasha	30	40.00	43	57.33	2	2.67
Taluk Charduani	20	19.23	76	73.08	8	7.69
Total	50	27.93	119	66.48	10	5.59



Knowledge about Rain Water use by households.

Name of Mouza	Yes	%	No	%
Huglapasha	69	92.00	6	8.00
Taluk Charduani	104	100.00	-	-
Total	173	96.65	6	3.35

Collection of Rain Water by households.

Name of Mouza	Yes	%	No	%
Huglapasha	57	76.00	18	24.00
Taluk Charduani	104	100.00	-	-
Total	161	89.94	18	10.06

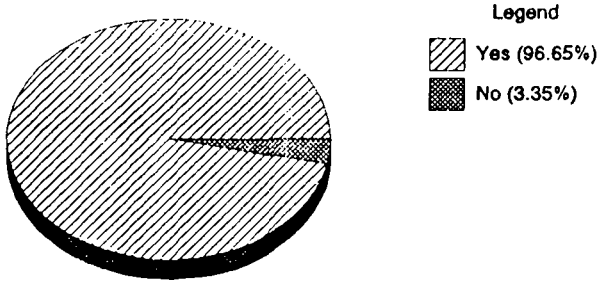
Store Rain Water by households.

Name of Mouza	Yes	%	No	%
Huglapasha	23	40.35	34	59.65
Taluk Charduani	35	33.65	69	66.35
Total	58	36.00	103	63.98

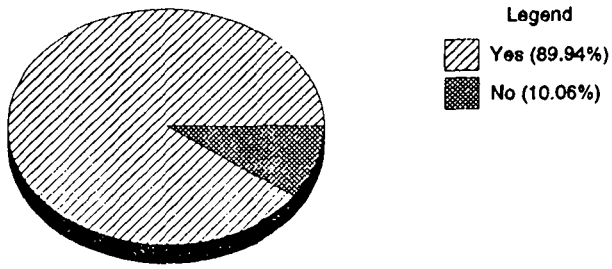
Knowledge, Collection & Storage of Rain Water

96.65% households have knowledge about rain water use. But all do not collect rain water. 89.94% households collect rain water and only 36.02% households store rain water for 1-5 days.

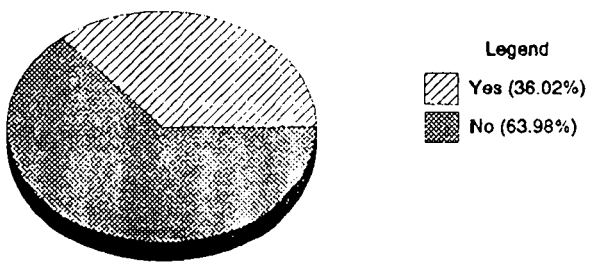
Knowledge about Rain Water use
by Households



Collect Rain Water by Households

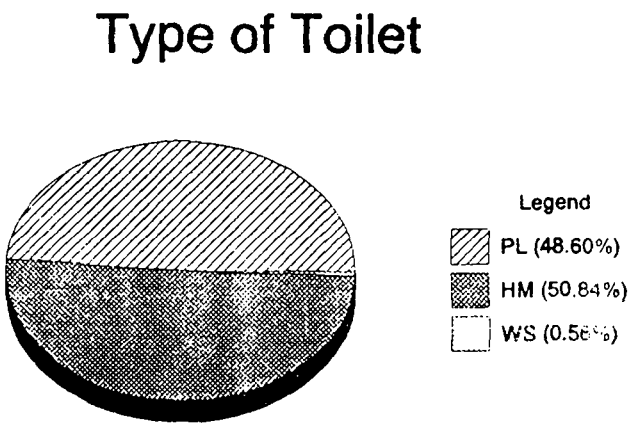


Store Rain Water by Households



Sanitation Facilities

Name of Mouza	Type of toilet							
	PL	%	HM	%	H	%	WS	%
Huglapasha	34	45.33	40	53.33	-	-	1	1.34
Taluk Charduani	53	50.96	51	49.04	-	-	-	-
Total	87	48.60	91	50.84	-	-	1	0.56

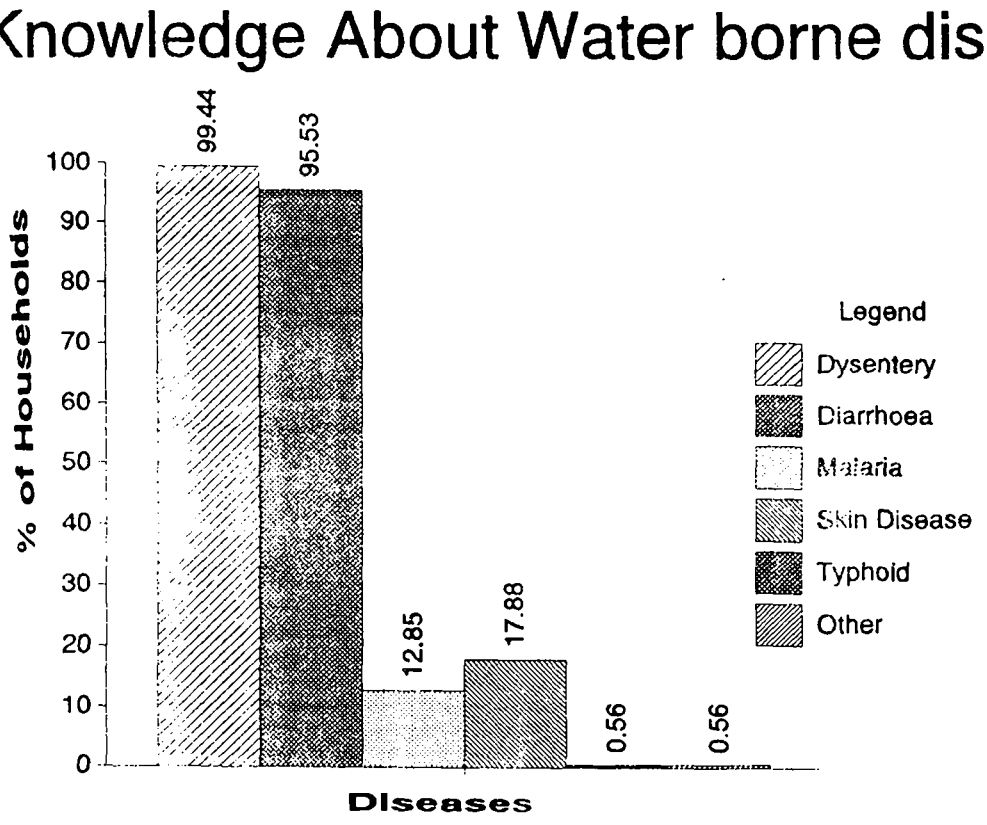


Sanitation (Toilet) Facilities

48.60% households toilet facilities are ring slab (pit latrine) frm DPHE. 50.84% households latrine are home made latrine which were made by a hole in earth and covered.

Knowledge about Water Borne/Water Related Diseases by Households.

Name of Mouza	Diseases											
	DY	%	DI	%	MAL	%	SK	%	TY	%	O	%
Huglapasha	74	98.67	67	89.33	8	10.67	11	14.67	-	-	1	1.33
Taluk Charduani	104	100.00	104	100.00	15	14.42	21	20.19	1	0.96	-	-
Total	178	99.44	171	95.53	23	12.85	32	17.88	1	0.56	1	0.56

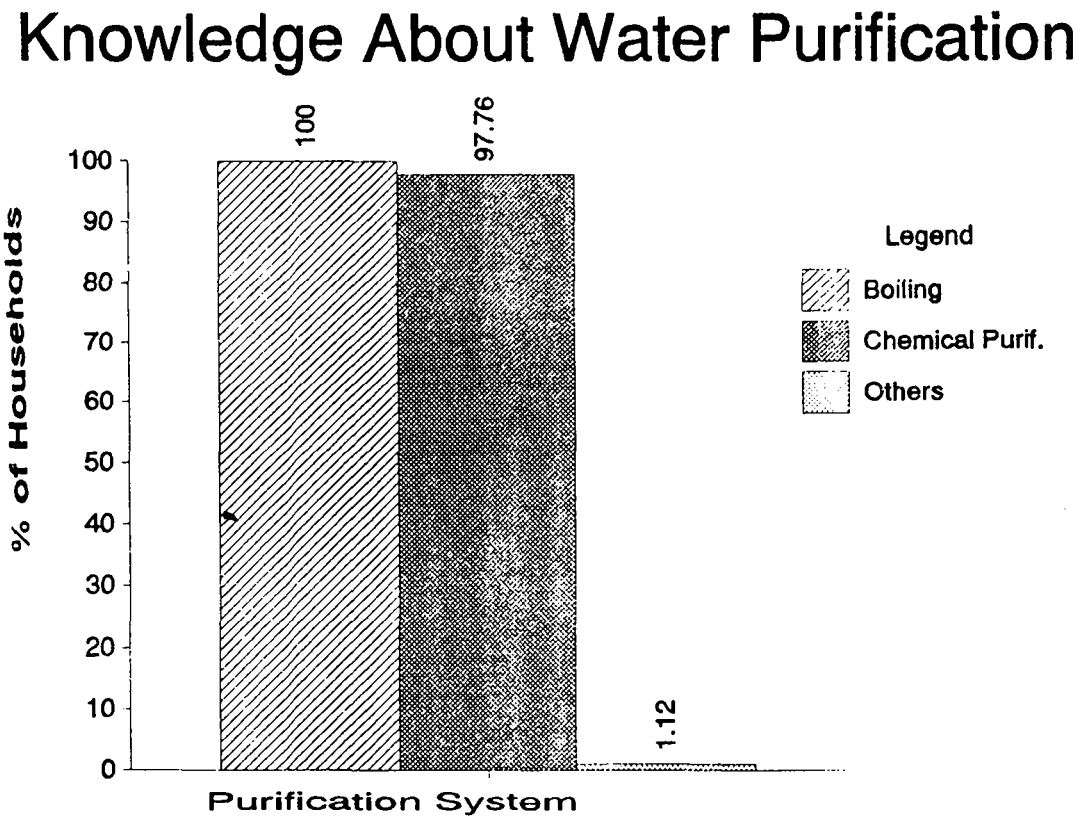


Knowledge about Water Borne/Water Related Diseases

99.44% have knowledge about dysentery (DY), 95.53% know about diarrhoea (DI) and 12.85% know about Malaria (MAL). 17.88% were found to be aware of skin disease (SK) and others diseases.

Knowledge Regarding Water Purification by Households

Name of Mouza	Purification System							
	B	%	CP	%	HP	%	O	%
Huglapasha	75	100.00	71	94.67	-	-	-	-
Taluk Charduani	104	100.00	104	100.00	-	-	2	1.92
Total	179	100.00	175	97.76	-	-	2	1.12

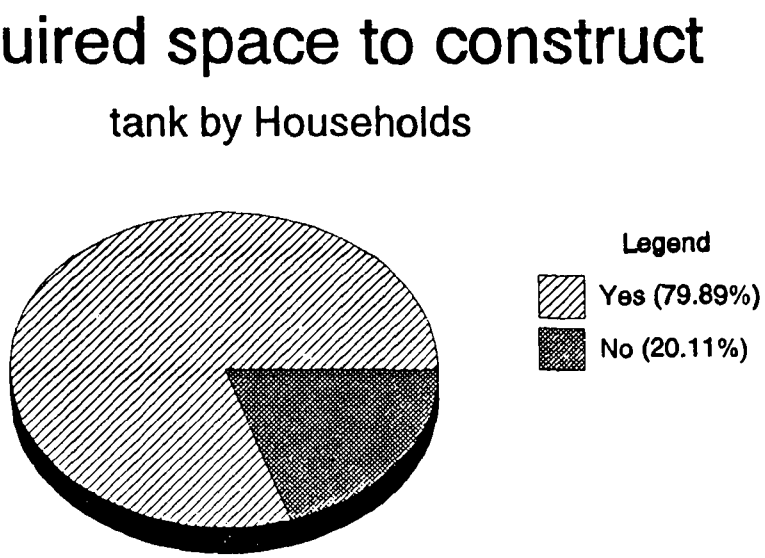


Knowledge Regarding Water Purification

100% of them appeared to have knowledge about water purification by boiling (B) and 97.76% of the households have the knowledge about chemical purification (CP) with alum.

Required Space to Construct the Tank by Households.

Name of Mouza	Yes	%	No	%
Huglapasha	64	85.33	11	14.67
Taluk Charduani	79	75.96	25	24.04
Total	143	79.89	36	20.11



Required Space for Tank Construction

About 143 (79.89%) of households confirmed the availability of enough required space for the construction of the storage tanks while 36 Nos. (20.11%) said they don't have the required space.

APPENDICES - D : QUESTIONNAIRE OF SOCIO-ECONOMIC SURVEY

HOUSEHOLD AND SOCIO-ECONOMIC SURVEY QUESTIONNAIRE

Administrative Division :----------

District :----------

Thana :----------

Union :----------

Mouza :----------

Village :----------

Para :----------

Date of Interview :----------

Time of Interview : ----------

Interviewer:----------

DISTRICT THANA

UNION MOUZA VILLAGE

HH NO.	Name of the HH Head	Father's/ Husband's Name of the HH Head	Location of HH

PART A HOUSEHOLD INFORMATION

Q. HH No.						TOTAL
1. Housing Structure (main bedroom)	K 1 SP 2 P 3	K 1 SP 2 P 3	K 1 SP 2 P 3	K 1 SP 2 P 3	K 1 SP 2 P 3	K SP P
2. Type of Roof	TH 1 TA 2 TI 3 P 4	TH 1 TA 2 TI 3 P 4	TH 1 TA 2 TI 3 P 4	TH 1 TA 2 TI 3 P 4	TH 1 TA 2 TI 3 P 4	TH TA TI P
3. Own house	Y 1 N 2	Y 1 N 2	Y 1 N 2	Y 1 N 2	Y 1 N 2	Y N
4. Total Family Members	<5 1 5-9 2 >10 3	<5 1 5-9 2 >10 3	<5 1 5-9 2 >10 3	<5 1 5-9 2 >10 3	<5 1 5-9 2 >10 3	<5 5-9 >10
5. Total Male Members	<3 1 3-5 2 >5 3	<3 1 3-5 2 >5 3	<3 1 3-5 2 >5 3	<3 1 3-5 2 >5 3	<3 1 3-5 2 >5 3	<3 3-5 >5
6. Total Female Members	<3 1 3-5 2 >5 3	<3 1 3-5 2 >5 3	<3 1 3-5 2 >5 3	<3 1 3-5 2 >5 3	<3 1 3-5 2 >5 3	<3 3-5 >5
7. Total Male Children (13 years & below)	<3 1 3-5 2 >5 3 N 4	<3 1 3-5 2 >5 3 N 4	<3 1 3-5 2 >5 3 N 4	<3 1 3-5 2 >5 3 N 4	<3 1 3-5 2 >5 3 N 4	<3 3-5 >5 N
8. Total Female Children (13 years & below)	<3 1 3-5 2 >5 3 N 4	<3 1 3-5 2 >5 3 N 4	<3 1 3-5 2 >5 3 N 4	<3 1 3-5 2 >5 3 N 4	<3 1 3-5 2 >5 3 N 4	<3 3-5 >5 N

1. K = Kacha
   SP = Semi Pucca
   P = Pucca

2. TH = Thatch
   TA = Tali
   TI = Tin
   P = Pucca

3. Y = Yes
   N = No

4. <5 = Less than Five
   5-9 = Five to Nine
   >10 = Ten and above

5,6,7&8. <3 = Less than Three
   3-5= Three to Five
   >5 = Five and above
   N = None

PART A HOUSEHOLD INFORMATION

Q. HH No.						TOTAL
9. Sources of ~~Drinking~~ Drinking Water	TW 1	TW 1	TW 1	TW 1	TW 1	TW
	TAP 2	TAP 2	TAP 2	TAP 2	TAP 2	TAP
	RW 3	RW 3	RW 3	RW 3	RW 3	RW
	SP 4	SP 4	SP 4	SP 4	SP 4	SP
	RAW 5	RAW 5	RAW 5	RAW 5	RAW 5	RAW
	RCP 6	RCP 6	RCP 6	RCP 6	RCP 6	RCP
	O 7	O 7	O 7	O 7	O 7	O
10. Sources of Water For Other Purposes	TW 1	TW 1	TW 1	TW 1	TW 1	TW
	TAP 2	TAP 2	TAP 2	TAP 2	TAP 2	TAP
	RW 3	RW 3	RW 3	RW 3	RW 3	RW
	SP 4	SP 4	SP 4	SP 4	SP 4	SP
	RAW 5	RAW 5	RAW 5	RAW 5	RAW 5	RAW
	RCP 6	RCP 6	RCP 6	RCP 6	RCP 6	RCP
	O 7	O 7	O 7	O 7	O 7	O
11. Toilet Facilities	WS 1	WS 1	WS 1	WS 1	WS 1	WS
	PL 2	PL 2	PL 2	PL 2	PL 2	PL
	H 3	H 3	H 3	H 3	H 3	H
	HM 4	HM 4	HM 4	HM 4	HM 4	HM
	O 5	O 5	O 5	O 5	O 5	O

9&10. TW =Tube well
TAP=Supply
RW =Ring well
SP =Spring
RAW=Rain water
RCP=River/Canal/ Pond
O =Other

11. WS = Water Seal H = Hanging
PL = Pit Latrine HM = HOME MADE
O = Other

PART B QUESTIONS FOR HOUSEHOLD HEAD

Q. HH NO.											TOTAL
1. Sex	M	1	M	1	M	1	M	1	M	1	M
	F	2	F	2	F	2	F	2	F	2	F
2. Age	<25	1	<25	1	<25	1	<25	1	<25	1	<25
	25-50	2	25-50	2	25-50	2	25-50	2	25-50	2	25-50
	>50	3	>50	3	>50	3	>50	3	>50	3	>50
3.Ethnic Background	Tr	1	Tr	1	Tr	1	Tr	1	Tr	1	Tr
	NTr	2	NTr	2	NTr	2	NTr	2	NTr	2	NTr
4.Religion	I	1	I	1	I	1	I	1	I	1	I
	H	2	H	2	H	2	H	2	H	2	H
	C	3	C	3	C	3	C	3	C	3	C
	B	4	B	4	B	4	B	4	B	4	B
	O	5	O	5	O	5	O	5	O	5	O
5. Education	CWL	1	CWL	1	CWL	1	CWL	1	CWL	1	CWL
	<V	2	<V	2	<V	2	<V	2	<V	2	<V
	V-X	3	V-X	3	V-X	3	V-X	3	V-X	3	V-X
	SSC	4	SSC	4	SSC	4	SSC	4	SSC	4	SSC
	HSC	5	HSC	5	HSC	5	HSC	5	HSC	5	HSC
	GR	6	GR	6	GR	6	GR	6	GR	6	GR
	RE	7	RE	7	RE	7	RE	7	RE	7	RE
	NF	8	NF	8	NF	8	NF	8	NF	8	NF
	N	9	N	9	N	9	N	9	N	9	N
6. Main Occupation	NS	1	NS	1	NS	1	NS	1	NS	1	NS
	DAL	2	DAL	2	DAL	2	DAL	2	DAL	2	DAL
	DNL	3	DNL	3	DNL	3	DNL	3	DNL	3	DNL
	LO	4	LO	4	LO	4	LO	4	LO	4	LO
	FB	5	FB	5	FB	5	FB	5	FB	5	FB
	S	6	S	6	S	6	S	6	S	6	S
	TB	7	TB	7	TB	7	TB	7	TB	7	TB
	O	8	O	8	O	8	O	8	O	8	O

1. M=Male
   F=Female

2. <25 = Less than 25 years
   25-50 = 25 years to 50 years
   >50 = 50 years and above

3. Tr = Tribal
   N-Tr = Non-Tribal

4. I = Islam
   H = Hindu
   C = Christian
   B = Buddhist

5. CWL= Can ONLY Write Letter
   <V = Less than Class V
   V-X= Class V to X
   SSC= Secondary Sc. Cert.
   HSC= Higher Sc. Cert.
   GR = Graduate
   RE = Religious Education
   NF = Non-Formal Education
   N = None

6. NS = No Specific
   DAL= Daily Agri. Labour
   DNL= Daily Non-Agri.Labour
   LO = Land Owner
   FB = Fishing Business
   S = Service
   TB= Trading/ Business
   O = Other

PART B QUESTIONS FOR HOUSEHOLD HEAD

Q.	HH NO.										TOTAL
7.	Average Monthly Household Income	<2000	1	<2000	1	<2000	1	<2000	1	<2000 1	<2000
		2000-3000	2	2000-3000	2	2000-3000	2	2000-3000	2	2000-3000 2	2000-3000
		3001-5000	3	3001-5000	3	3001-5000	3	3001-5000	3	3001-5000 3	3001-5000
		>5000	4	>5000	4	>5000	4	>5000	4	>5000 4	>5000
8.	Average Monthly Household Expenditure	<2000	1	<2000	1	<2000	1	<2000	1	<2000 1	<2000
		2000-3000	2	2000-3000	2	2000-3000	2	2000-3000	2	2000-3000 2	2000-3000
		3001-5000	3	3001-5000	3	3001-5000	3	3001-5000	3	3001-5000 3	3001-5000
		>5000	4	>5000	4	>5000	4	>5000	4	>5000 4	>5000
9.	Average Monthly Household Savings	None	1	None	1	None	1	None	1	None 1	None
		<500	2	<500	2	<500	2	<500	2	<500 2	<500
		500 - 1000	3	500 - 1000	3	500 - 1000	3	500 - 1000	3	500 - 1000 3	500 - 1000
		1001-2000	4	1001-2000	4	1001-2000	4	1001-2000	4	1001-2000 4	1001 - 2000
		>2000	5	>2000	5	>2000	5	>2000	5	>2000 5	>2000
10.	Length of Stay in the HH	<1 yr	1	<1 yr	1	<1 yr	1	<1 yr	1	<1 yr 1	<1 yr
		1-3yr	2	1-3yr	2	1-3yr	2	1-3yr	2	1-3yr 2	1-3yr
		>3yrs	3	>3yrs	3	>3yrs	3	>3yrs	3	>3yrs 3	>3yrs
11.	Cooking Fuel	FW	1	FW	1	FW	1	FW	1	FW 1	FW
		K	2	K	2	K	2	K	2	K 2	K
		G	3	G	3	G	3	G	3	G 3	G
		O	4	O	4	O	4	O	4	O 4	O

7&8. <2000 = Taka less than 2000
2000-3000 = Taka 2000 to 3000
3001-5000 = Taka 3001 to 5000
>5000 = Taka 5000 and above

9. None = No savings
<500 = Taka less than 500
500-1000 = Taka 500 to 1000
1001-2000 = Taka 1001 to 2000
>2000 = Taka 2000 and above.

10. <1yr= Less than 1 year
1-3yr= 1 to 3 years
>3yr= 3 years and above

11. FW = Fire Wood
K = Kerosine
G = Gas
O = Other

PART B QUESTIONS FOR HOUSEHOLD HEAD

Q.	HH NO.										TOTAL
12. Water	<5 g	1	<5 g	1	<5 g	1	<5 g	1	<5 g	1	<5 g
Consump-	5-10g	2	5-10g	2	5-10g	2	5-10g	2	5-10g	2	5-10g
tion for	11-20g	3	10-20g	3	10-20g	3	10-20g	3	10-20g	3	10-20g
all	21-30g	4	21-30g	4	21-30g	4	21-30g	4	21-30g	4	21-30g
purpose	31-50g	5	31-50g	5	31-50g	5	31-50g	5	31-50g	5	31-50g
(Average	>50g	6	>50g	6	>50g	6	>50g	6	>50g	6	>50g
Per Day)											
13. Drinking	<5g	1	<5g	1	<5g	1	<5g	1	<5g	1	<5g
Water	5-10g	2	5-10g	2	5-10g	1	5-10g	2	5-10g	2	5-10g
Consump-	>10g	3	>10g	3	>10g	3	>10g	3	>10g	3	>10g
tion											
(Average											
Per Day)											
14. Walking	<10m	1	<10m	1	<10m	1	<10m	1	<10m	1	<10m
Time	10-20m	2	10-20m	2	10-20m	2	10-20m	2	10-20m	2	10-20m
Distance	21-30m	3	21-30m	3	21-30m	3	21-30m	3	21-30m	3	21-30m
For	31-60m	4	31-60m	4	31-60m	4	31-60m	4	31-60m	4	31-60m
Drinking	>60m	5	>60m	5	>60m	5	>60m	5	>60m	5	>60m
Water											
Collection											
15a. Container	K	1	K	1	K	1	K	1	K	1	K
For	M	2	M	2	M	2	M	2	M	2	M
Collection	MB	3	MB	3	MB	3	MB	3	MB	3	MB
	PB	4	PB	4	PB	4	PB	4	PB	4	PB
	O	5	O	5	O	5	O	5	O	5	O
15b. Collec-	<5g	1	<5g	1	<5g	1	<5g	1	<5g	1	<5g
tion	5-10g	2	5-10g	2	5-10g	2	5-10g	2	5-10g	2	5-10g
container	11-20g	3	11-20g	3	11-20g	3	11-20g	3	11-20g	3	11-20g
capacity	21-30g	4	21-30g	4	21-30g	4	21-30g	4	21-30g	4	21-30g
	>30g	5	>30g	5	>30g	5	>30g	5	>30g	5	>30g

12. <5 = Less than 5 gallons
5-10g = 5 to 10 gallons
10-20g = 10 to 20 gallons
21-30g = 21 to 30 gallons
31-50g = 31 to 50 gallons
>50g = 50 gallons and above

13. <5 = Less than 5 gallons
5-10g = 5 to 10 gallons
>10g = 10 gallons and above

14. <10m = Less than 10 minutes
10-20m = 10 to 20 minutes
21-30m = 21 to 30 minutes
31-60m = 31 to 60 minutes
>60m = 60 minutes and above

15a. K = Kalshi
M = Matka
MB = Metallic Bucket
PB = Plastic Bucket
O = Other

15b. <5 = Less than 5 gallons
5-10g = 5 to 10 gallons
11-20g = 11 to 20 gallons
21-30g = 21 to 30 gallons
>31 = 30 gallons and above

PART B QUESTIONS FOR HOUSEHOLD HEAD

Q. HH NO.											TOTAL
16a. Container For Storage	K	1	K	1	K	1	K	1	K	1	K
	M	2	M	2	M	2	M	2	M	2	M
	MB	3	MB	3	MB	3	MB	3	MB	3	MB
	PB	4	PB	4	PB	4	PB	4	PB	4	PB
	ERT	5	ERT	5	ERT	5	ERT	5	ERT	5	ERT
	MRT	6	MRT	6	MRT	6	MRT	6	MRT	6	MRT
	O	7	O	7	O	7	O	7	O	7	O
16b. Storage capacity	<5g	1	<5g	1	<5g	1	<5g	1	<5g	1	<5g
	5-20g	2	5-20g	2	5-20g	2	5-20g	2	5-20g	2	5-20g
	21-40g	3	21-40g	3	21-40g	3	21-40g	3	21-40g	3	21-40g
	41-60g	4	41-60g	4	41-60g	4	41-60g	4	41-60g	4	41-60g
	>60g	5	>60g	5	>60g	5	>60g	5	>60g	5	>60g
16c. Shape of storage	C	1	C	1	C	1	C	1	C	1	C
	R	2	R	2	R	2	R	2	R	2	R
	S	3	S	3	S	3	S	3	S	3	S
17. Who Collects	AMFM	1	AMFM	1	AMFM	1	AMFM	1	AMFM	1	AMFM
	AFFM	2	AFFM	2	AFFM	2	AFFM	2	AFFM	2	AFFM
	MC	3	MC	3	MC	3	MC	3	MC	3	MC
	FC	4	FC	4	FC	4	FC	4	FC	4	FC
	PP	5	PP	5	PP	5	PP	5	PP	5	PP
18. Amount Sufficient	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N
19. Quality of Drinking Water	G	1	G	1	G	1	G	1	G	1	G
	F	2	F	2	F	2	F	2	F	2	F
	P	3	P	3	P	3	P	3	P	3	P
	VP	4	VP	4	VP	4	VP	4	VP	4	VP

16a. K = Kalshi
M = Matka
MB = Metallic Bucket
PB = Plastic Bucket
ERT= Earthen Reserved Tank
MRT= Metallic Reserved Tank
O = Other

17. AMFM = Adult Male Family Member
AFFM = Adult Female Family Member
MC = Male Children
FC = Female Children
PP = Paid Person

16b. <5 = Less than 5 gallons
5-20g = 5 to 20 gallons
21-40g= 21 to 40 gallons
41-60g= 41 to 60 gallons
>60 = 60 gallons and above

18. Y=Yes
N=No

16c. C = Circular
R = Rectungular (LxBxH)
S = Square (L^2xH)

19. G=Good F= Fair P = Poor VP = Very Poor

PART B QUESTIONS FOR HOUSEHOLD HEAD

p.5/10

Q. HH NO.											TOTAL
20. Knowledge About Water borne/water related diseases	NK	1	NK	1	NK	1	NK	1	NK	1	NK
	DY	2	DY	2	DY	2	DY	2	DY	2	DY
	DI	3	DI	3	DI	3	DI	3	DI	3	DI
	TY	4	TY	4	TY	4	TY	4	TY	4	TY
	MAL	5	MAL	5	MAL	5	MAL	5	MAL	5	MAL
	SK	6	SK	6	SK	6	SK	6	SK	6	SK
	HEP	7	HEP	7	HEP	7	HEP	7	HEP	7	HEP
	O	8	O	8	O	8	O	8	O	8	O
21. Knowledge Regarding Water Purification	NK	1	NK	1	NK	1	NK	1	NK	1	NK
	HP	2	HP	2	HP	2	HP	2	HP	2	HP
	B	3	B	3	B	3	B	3	B	3	B
	CP	4	CP	4	CP	4	CP	4	CP	4	CP
	O	5	O	5	O	5	O	5	O	5	O
22. Knowledge About Rain Water Use	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N
23. For What Purpose	D	1	D	1	D	1	D	1	D	1	D
	C	2	C	2	C	2	C	2	C	2	C
	B	3	B	3	B	3	B	3	B	3	B
	O	4	O	4	O	4	O	4	O	4	O
24. Frequency of Rain	D	1	D	1	D	1	D	1	D	1	D
	TW	2	TW	2	TW	2	TW	2	TW	2	TW
	OW	3	OW	3	OW	3	OW	3	OW	3	OW
	TM	4	TM	4	TM	4	TM	4	TM	4	TM
	OM	5	OM	5	OM	5	OM	5	OM	5	OM
25. Does Rain Occur	EM	1	EM	1	EM	1	EM	1	EM	1	EM
	2M	2	2M	2	2M	2	2M	2	2M	2	2M
	3M	3	3M	3	3M	3	3M	3	3M	3	3M
	>6M	4	>6M	4	>6M	4	>6M	4	>6M	4	>6M

20. NK=No Knowledge
DY=Dysentery
DI=Diarrhoea
TY=Typhoid
MAL=Malaria
SK=Skin Disease
HEP=Jaundice
O =Other

21. NK=No Knowledge
HP=Herbal Purification
B =Boiling
CP=Chemical Purification
O =Other

22. Y=Yes
N=No

23. D=Drinking
C=Cooking
B=Bathing
O=Other

24. D=Daily
TW=Twice a Week
OW=Once a Week
TM=Twice a Month
OM=Once a Month

25. EM=Every Month
2M=2 months a yr
3M=3 months a yr
>6M=6 months and more

PART B QUESTIONS FOR HOUSEHOLD HEAD

Q. HH NO.												TOTAL
26. Do You Collect Rain Water (If `N' skip to 30)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	
27. Do You Store (If `N' skip to 30)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	
28. For What Purpose	D C O	1 2 3	D C O	1 2 3	D C O	1 2 3	D C O	1 2 3	D C O	1 2 3	D C O	
29. Amount of Rain Water	S NS	1 2	S NS	1 2	S NS	1 2	S NS	1 2	S NS	1 2	S NS	
30. Would Like To Have Better Collection & Storage (EXPLAIN)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	
31. Would Like To Have Private System (EXPLAIN PRIVATE SYSTEM) (If `N' skip to 34)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	N N	

26 & 27. Y=Yes N=No

28. D=Drinking C=Cooking O=Other

29. S=Sufficient NS=Not Sufficient

30 & 31. Y=Yes N=No

PART B QUESTIONS FOR HOUSEHOLD HEAD
p.7/10

Q. HH NO.												TOTAL
32. Would Be Willing to Pay (INFORM THE RATE) (If `N' skip to 41)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	
33. Do You Have Enough Space to Construct the Tank (EXPLAIN AMOUNT OF SPACE REQUIRED)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	
34. Would Like To Have Community Sytem (EXPLAIN COMMUNITY SYSTEM) (If `N' skip to 42)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	
35. Would Be Willing to Pay For Group System (INFORM THE RATE) (If `N' skip to 42)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	

32 to 35. Y = Yes
N = No

PART B QUESTIONS FOR HOUSEHOLD HEAD

Q. HH NO.											TOTAL
36. Would you spare required space for construction of the tank (explain amount of space required) (If `N' skip to 43)	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N
37. Would Take Care of Maintenance (EXPLAIN Manitenance) (If `N' skip to 44)	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N
38. Would Be Willing To Take Training on collection & storage (If `N' skip to 45)	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N
39. Would Allow Female Members Receive collection & storage Training (If `N' skip to 46)	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N

36 - 39. Y = Yes
N = No

PART B QUESTIONS FOR HOUSEHOLD HEAD
p.9/10

Q. HH NO.											TOTAL
40.Why Not	DK	1	DK	1	DK	1	DK	1	DK	1	DK
	NCF	2	NSF	2	NSF	2	NSF	2	NSF	2	NSF
	NSF	3	NSS	3	NSS	3	NSR	3	NSS	3	NSS
	NSR	4	NSR	4	NSR	4	NSR	4	NSR	4	NSR
41.Why Not	CAP	1	CAP	1	CAP	1	CAP	1	CAP	1	CAP
	OIP	2	OIP	2	OIP	2	OIP	2	OIP	2	OIP
	O	3	O	3	O	3	O	3	O	3	O
42.Why Not	CAP	1	CAP	1	CAP	1	CAP	1	CAP	1	CAP
	OIP	2	OIP	2	OIP	2	OIP	2	OIP	2	OIP
	CNC	3	CNC	3	CNC	3	CNC	3	CNC	3	CNC
43.Why Not	SNA	1	SNA	1	SNA	1	SNA	1	SNA	1	SNA
	NAC	2	NAC	2	NAC	2	NAC	2	NAC	2	NAC
	PD	3	PD	3	PD	3	PD	3	PD	3	PD
	O	4	O	4	O	4	O	4	O	4	O
44.Why Not	DK	1	DK	1	DK	1	DK	1	DK	1	DK
	NT	2	NT	2	NT	2	NT	2	NT	2	NT
	NI	3	NI	3	NI	3	NI	3	NI	3	NI
45.Why Not	NT	1	NT	1	NT	1	NT	1	NT	1	NT
	OFT	2	OFT	2	OFT	2	OFT	2	OFT	2	OFT
	NI	3	NI	3	NI	3	NI	3	NI	3	NI
46.Why Not	NT	1	NT	1	NT	1	NT	1	NT	1	NT
	V	2	V	2	V	2	V	2	V	2	V
	NFM	3	NFM	3	NFM	3	NFM	3	NFM	3	NFM

40. DK=Do not know how to collect
NCF=No collection facility
NSF=No storage facility
NSR=Not sufficient rain

41. CAP=Cannot Afford to Pay
OIP=Other Investment Priority
O=Other

42. CAP=Cannot Afford to Pay
OIP=Other Investment Priorities
CNC=Community Not Cooperative

43. SNA= Space Noot Available
NAC= No Absolute Control
PD = Public Disturbances
O = Other

44. DK=Do not know
NT=No Time
NI=Not Interested

45. NT=No Time
OFT=Old For Training
NI=Not Interested

46. NT=No Time
V=Veiling/Purdah
NFM=No Female Member

PART B QUESTIONS FOR HOUSEHOLD HEAD

Q. HH NO.												TOTAL
47. Would you allow us to talk with any female member of your family (DO NOT INSIST) (if allowed, go to Part C)	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	1 2	Y N	

47. Y=Yes N=No.

PART C QUESTIONS FOR FEMALE RESPONDENTS

Q. HH NO.											TOTAL
1.Relation w/HH Head	S	1	S	1	S	1	S	1	S	1	S
	M	2	M	2	M	2	M	2	M	2	M
	D	3	D	3	D	3	D	3	D	3	D
	DL	4	DL	4	DL	4	DL	4	DL	4	DL
	OR	5	OR	5	OR	5	OR	5	OR	5	OR
2.Age	<18	1	<18	1	<18	1	<18	1	<18	1	<18
	18-25	2	18-25	2	18-25	2	18-25	2	18-25	2	18-25
	26-50	3	26-50	3	26-50	3	26-50	3	26-50	3	26-50
	>50	4	>50	4	>50	4	>50	4	>50	4	>50
3.Marital Status	UM	1	UM	1	UM	1	UM	1	UM	1	UM
	M	2	M	2	M	2	M	2	M	2	M
	W	3	W	3	W	3	W	3	W	3	W
	S/D	4	S/D	4	S/D	4	S/D	4	S/D	4	S/D
4.No. of Children Male/Female	<3	1	<3	1	<3	1	<3	1	<3	1	<3
	3-4	2	3-4	2	3-4	2	3-4	2	3-4	2	3-4
	>5	3	>5	3	>5	3	>5	3	>5	3	>5
	N	4	N	4	N	4	N	4	N	4	N
5.Education	CWL	1	CWL	1	CWL	1	CWL	1	CWL	1	CWL
	<V	2	<V	2	<V	2	<V	2	<V	2	<V
	V-X	3	V-X	3	V-X	3	V-X	3	V-X	3	V-X
	SSC	4	SSC	4	SSC	4	SSC	4	SSC	4	SSC
	HSC	5	HSC	5	HSC	5	HSC	5	HSC	5	HSC
	GR	6	GR	6	GR	6	GR	6	GR	6	GR
	RE	7	RE	7	RE	7	RE	7	RE	7	RE
	NF	8	NF	8	NF	8	NF	8	NF	8	NF
	N	9	N	9	N	9	N	9	N	9	N

1.S=Spouse
M=Mother
D=Daughter
DL=Daughter-in-law
OR=Other relation

2. <18 = Less than 18 years
18-25= 18 to 25 years
26-50= 25 to 50 years
>50 = 50 years and above

3.UM= Unmarried
M = Married
W = Widow
S/D=Separated/Divorced

4. <3 = Less than 3 children
3-4= 3 to 4 children
>5 = 5 and more children

5.CWL=Can write letter <V=Less than Class V. V-X=Class V to X
SSC= Secondary Sc.Cert. HSC= Higher Sc.Cert. GR = Graduate
RE = Religious Education NF = Non-Formal Education
N = None

PART C QUESTIONS FOR FEMALE RESPONDENTS

Q.	HH NO.										TOTAL
6.Main Occupation	HW	1	HW	1	HW	1	HW	1	HW	1	HW
	DAL	2	DAL	2	DAL	2	DAL	2	DAL	2	DAL
	DNL	3	DNL	3	DNL	3	DNL	3	DNL	3	DNL
	B	4	B	4	B	4	B	4	B	4	B
	S	5	S	5	S	5	S	5	S	5	S
	ST	6	ST	6	ST	6	ST	6	ST	6	ST
7.Sources Drinking	TW	1	TW	1	TW	1	TW	1	TW	1	TW
	TAP	2	TAP	2	TAP	2	TAP	2	TAP	2	TAP
	RW	3	RW	3	RW	3	RW	3	RW	3	RW
	SP	4	SP	4	SP	4	SP	4	SP	4	SP
	RAW	5	RAW	5	RAW	5	RAW	5	RAW	5	RAW
	RCP	6	RCP	6	RCP	6	RCP	6	RCP	6	RCP
	O	7	O	7	O	7	O	7	O	7	O
8.Sources of water ~~for~~ for other purpose	TW	1	TW	1	TW	1	TW	1	TW	1	TW
	TAP	2	TAP	2	TAP	2	TAP	2	TAP	2	TAP
	RW	3	RW	3	RW	3	RW	3	RW	3	RW
	SP	4	SP	4	SP	4	SP	4	SP	4	SP
	RAW	5	RAW	5	RAW	5	RAW	5	RAW	5	RAW
	RCP	6	RCP	6	RCP	6	RCP	6	RCP	6	RCP
	O	7	O	7	O	7	O	7	O	7	O
9.Who collects	S	1	S	1	S	1	S	1	S	1	S
	AMFM	2	AMFM	2	AMFM	2	AMFM	2	AMFM	2	AMFM
	AFFM	3	AFFM	3	AFFM	3	AFFM	3	AFFM	3	AFFM
	MC	4	MC	4	MC	4	MC	4	MC	4	MC
	FC	5	FC	5	FC	5	FC	5	FC	5	FC
	PP	6	PP	6	PP	6	PP	6	PP	6	PP
10.Satisfied with present water supply	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N

6.HW=House wife
DAL=Daily Agri.Lab.
DNL=Daily Non-Agri.Lab.
B=Business
S=Service
ST=Student

7 & 8.TW =Tube well
TAP=Supply
RW= Ring well
SP= Spring
RAW=Rain Water
RCP=River/Canal/Pond
O =Other

9. S=Self
AMFM=Adult Male Family Member
AFFM=Adult Female Family Member
MC= Male Children
FC=Female Children
PP=Paid Person

10. Y=Yes
N=No

PART C QUESTIONS FOR FEMALE RESPONDENTS

Q.	HH NO.										TOTAL
11. If 'N', why not	IS	1	IS	1	IS	1	IS	1	IS	1	IS
	LRF	2	LRF	2	LRF	2	LRF	2	LRF	2	LRF
	PWQ	3	PWQ	3	PWQ	3	PWQ	3	PWQ	3	PWQ
	LMP	4	LMP	4	LMP	4	LMP	4	LMP	4	LMP
	O	5	O	5	O	5	O	5	O	5	O
12. Would you like improved way of collection & storage of rain water	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N
13. Who would decide in this regard	S	1	S	1	S	1	S	1	S	1	S
	HHH	2	HHH	2	HHH	2	HHH	2	HHH	2	HHH
	JFD	3	JFD	3	JFD	3	JFD	3	JFD	3	JFD
	CL	4	CL	4	CL	4	CL	4	CL	4	CL
	O	5	O	5	O	5	O	5	O	5	O
14. Would you be willing to receive training on O & M	Y	1	Y	1	Y	1	Y	1	Y	1	Y
	N	2	N	2	N	2	N	2	N	2	N
	DK	3	DK	3	DK	3	DK	3	DK	3	DK
	IABH	4	IABH	4	IABH	4	IABH	4	IABH	4	IABH

11. IS=In Sufficient
LRF=Long Time Required For Fetching
PWQ=Poor Water Quality
LMP=Lack of Man Power
O= Other

12. Y= Yes
N= No

13. S= Self
HHH= Head of House Hold
JFD= Joint Family Decision
CL = Community Leaders
O = Other

14. Y= Yes
N= No
DK=Do not know/ Uncertain
IABH=If allowed by Household Head

APPENDICES - E : MONITORING FORMATS

RAIN WATER HARVESTING SYSTEM
PERFORMANCE MONITORING FORMAT
FOR
1000 LITRE/2000 LITRE JARS/3200 LITRE TANK

I. GENERAL

1. District ---------- Thana ----------

   Mouza ---------- Para ----------

2. Serial Nos. of Jar/Tanks ----------

3. Name of Head of H.H.

4. Number of Family members ----------

5. Age ---------- Occupation ----------

6. Average number of days the guests staying per month ----------

7. Roof Type-Tin/Thatched/Pucca - (2 sided roof/4 sided roof)

8. Area of the roof (catchment) ---------- m^2/ft^2

9. Rainfall intensity during last week/15 days/month ---------- mm

10. What is the capacity of ferrocement Jar/Tank used to collect rain water ------ litre

II. HANDLING

1. Was the Jar/Tank water in use at the time of arrival Yes/No

2. If yes was the tank filled with water - full/half/partly

3. If no, whether it was empty ----------

4. Was the Jar/Tank covered with the lid ? yes/no.

5. If no - Why ----------

6. How the water from Jar/Tank is taken for use - by tap or through bucket/rope from top, or by hand.

7. What action the user's take when the tank/jar is over flowing ----------

---

8. Was there any wastage of water - yes/no.

9. How the collected water is wasted ----------

III. COLLECTION

1. Who collects water - male/female/children.

2. Relationship with household ----------.

3. How many times in a day they collect water ---------- times.

4. Quantity of collected water each time and in a day - a pitcher/a bucket/approx. ---------- litre

5. Other than household members - how many other users collect water from this Jar ----------

6. In collecting Rain Water from roof catchment and gutter system into Jar directly do they face any problem. What are those ----------

---

7. Do they collect water from other sources for domestic consumption yes/no

8. If yes, What are the sources - TW/DW/SPW/Pond/River/Canal.

10. While collecting water, do they notice any of the Jar/Tank Have leakage - yes/no

IV. STORAGE

1. On an average water is stored at an interval of a 1 week/15 days/1 month.

2. After storage, do they chlorinate/disinfect by tablets or any form.

---

3. Collected rain water from the ferrocement Jar is stored in

		Capacity
a)	Earthen Jar	----------
b)	Mettalic Jar	----------
c)	Bucket	----------
d)	Motka	----------

4. Quality of stored rain water in the Jar/Tank :

		Remain same	Colour Changes	Taste changes
a)	Three days	----------	----------	----------
b)	Four days	----------	----------	----------
c)	7 days	----------	----------	----------
d)	15 days	----------	----------	----------
e)	One month	----------	----------	----------

5. What preventive measures they follow to preserve the safety of water ------

V. USE

1. Collected Rain Water is usually used for drinking/cooking/washing-utensils/ clothes/animal feeding/ablution/others (specify)

2. Before drinking do the users boil the water - yes/no.

3. Do they observe any difference in water quality/acceptable/odour/colour or any other (specify).

VI. MAINTENANCE

1. How often they clean the Jar/Tank - weekly/fortnightly/monthly/bimonthly

2. What is frequency of checking the cleanliness of gutters - weekly/fortnightly/ monthly.

3. Do the users clean the catchment surface just after first flush rain - yes/no

4. How often they change the Tap ? ----------

5. If any leaks/cracks are noticed in Jars/Tank, do they repair it immediately by cement mortar plastering or wait for field monitor's suggestion ----------

---

VII. WATER QUALITY ANALYSIS

1. Duration of the water sample (i.e. for how many days the water is stored in the Jar) ---------- days/collected from Jars & Tanks.

2. Date of collection of sample ----------

3. Time of collection of sample ----------

4. Quantity of sample collected (in milli litre bottle) - 500 ml/1000 ml

STORED RAIN WATER QUALITY PARAMETERS TO BE TESTED AT PATHERGHATA AND CHITTAGONG HILL TRACTS

A MICRO-BIOLOGICAL TESTS

i) Pathogenic Bacteria Organisms

a) Vibrio Cholerae and its variance
b) Total Coliform count
c) Faecal Coliform Test

B PHYSICAL TEST

i) Temperature
ii) Colour
iii) Taste
iv) Odour
v) Turbidity
vi) P^
vii) EC (Electric Conductivity)

C CHEMICAL TEST

i)	Hardness	-	$Caco_3$
ii)	Chloride	-	Cl
iii)	Fluoride	-	FL_3
iv)	Nitrate	-	NO_3
v)	Hydrogen Sulphide	-	H_2S
vi)	Iron	-	Fe
vii)	Sodium	-	Na
viii)	Magnesium	-	Mg
ix)	Sulphate	-	SO4
x)	Lead	-	Pb

APPENDICES - F : DPHE LAB WATER QUALITY RESULT SHEET

Government of Bangladesh.
D.P.H.E. Zonal Laboratory. Comilla.

Soalak Union, Bandarban.

Mode of Transport:- Private.

Sample Code	Source Code.	Sample Location.	Source.	Date of Collection.	Date received in Laboratory	Date of Completion of anal sis	Results of Examinations							
							pH	Temp. °C	E.C. µs/cm	F. Alka. mg/L as CaCO3	T. Alka. mg/L as CaCO3	Ca-Hardness mg/L as CaCO3	T. Hardness. mg/L as CaCO3	Total Iron mg/L
250		Head man para. Boddist Bihar Soalakh. Majherpara. Bandarban.	Rain Water	12/9/95	13/9/95	17/9/95	8·2		450	—	7	58	80	0·088
2251	//	Headman house. Majherpara Soalakh. Bandarban.	11	11	11	11	8·5		130	—	8	26	40	0·077
2252		Kaoching member's house Majherpara. Bandarban	11	11	11	11	8·5		760	—	10	62	100	0·11
2253		Clow Chairman's house (Formal) Majherpara. Soalakh.	11	11	11	11	8·3		210	—	10	60	80	0·099
2254		Commissioner. Ebrahim. Hafezgona. Municipal Area Bandarban.	Infiltration gallery	11	11	11	6·5		700	—	15	146	250	3·608

APPENDICES - G : TOR OF UNICEF

UNITED NATIONS CHILDREN'S FUND (UNICEF)

Terms of Reference for Consultants and Contractors

1. Purpose of assignment: (Attach background documents, if necessary)
The task will be to survey the rain water collection, storage and use in selected areas of Chittagong Hill Tracts and Baruguna district, design and construct rain water collection tanks and monitor the performance.

2. Duty Station: DHAKA, BANGLADESH

3. Supervisor: T. KANAGARAJAN, PROJECT OFFICER, WESS, UNICEF-DHAKA

4. Major tasks to be accomplished: (Estimate the time required to complete each task. Attach additional sheets, if necessary to describe assignment.)

1) To investigate the potentiality of rain water collection, storage and use to meet the drinking and cooking water needs of the people, where tubewell, spring, chara are absent or not dependable.

Few paras from 2/3 thanas in 2 districts covering 100-125 Households CHT area and Baruguna district can be selected for the study, from earlier study of water source investigation done in CHT.

3) To carry out 100% sampling of the households of the selected paras to collect the socio-economic and water sources and use data.

4) To investigate and record the type, shape, size and capacity of rain water storage tanks used presently.

5) To design and construct * tanks of different appropriate types for collection of rain water, for household (30 Nos) as well as community system (3 Nos).

6) To work out the technical and financial viability of rain water collection, storage facility for round the year use for various types. Families will be organized and motivated to participate in the scheme: (Payment of upto TK.1,000/- for household and TK.3,000/- for community).

7) To monitor performance of units both technical/acceptability.

* Note: The cost will be per actuals.

5. End Product: (e.g. final report article, document, etc.)
Preliminary and med-term and final reports.
Deadline: 12 months from date of commencement.

6. Qualifications or specialized knowledge/experience required: Civil Engineering firm with experience in rural water supply system and community involvement.

7. Prepared by:
T. Kanagarajan, Project Officer, WESS
(Name and Title) Date: 27.12.93

8. Approved by:

Section Chief/Sr. Programme Coordinator Date: 28/12/93