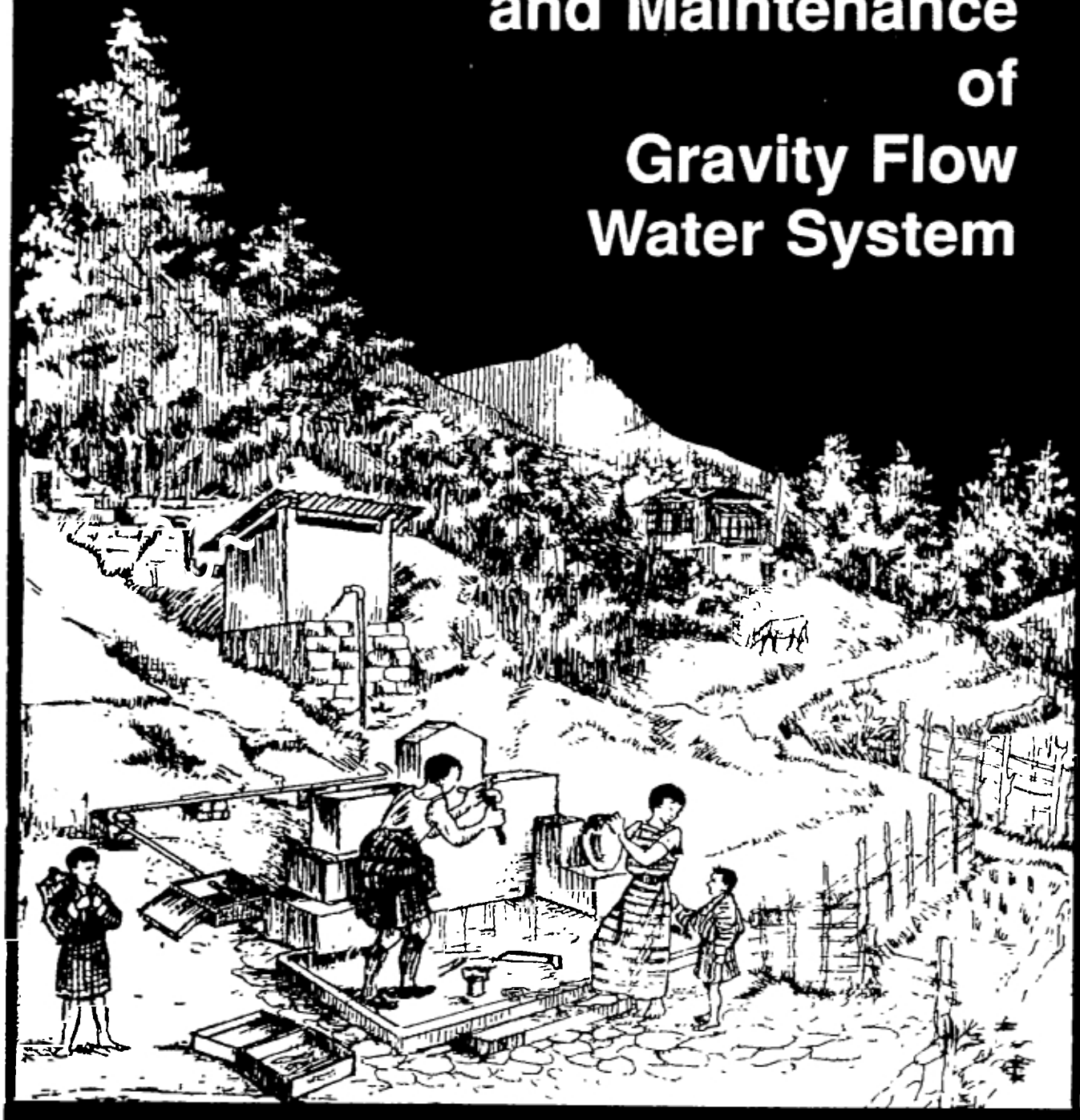
Manual on Operation and Maintenance of Gravity Flow Water System



PUBLIC HEALTH ENGINEERING DIVISION
DEPARTMENT OF WORKS AND HOUSING, THIMPHU : BHUTAN

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Department of Works & Housing, Thimphu
With the assistance from UNICEF, Thimphu

Design and Illustrations: DSOD/S.G. Robin

FORWARD

The Department of Works and Housing since 1974 have constructed 1291 Nos. of Gravity fed Rural Water Supply Schemes throughout the Kingdom. Each Scheme forms a part of a community asset. Unless and untill they are looked after properly the benefits are very marginal. Proper knowledge of operation and maintenance of these schemes by the beneficiaries is an important aspect of the maintenance of Schemes.

Proper operation and regular and timely maintenance is an important factor for a sustainable scheme to benefit the user groups.

Department of Works and Housing with the assistance of UNICEF have brought out this mannual which is intended to make the beneficiaries aware in proper operation and maintenance of the Scheme. Taking care of different components of a Scheme, formation and role of Village Maintenance Committee, responsibilities of Care-taker etc., have been dealt in detail.

I am sure with the introduction of this manual everyone involved in the process of implementation of Rural Supply Scheme and beneficiaries are clear on the role towards such schemes, so that every community looks forward to a better way of life through such schemes.

Director
Department of Works & Housing

CONTENTS

CHAPTER - I

1. DEFINITION AND TYPES OF MAINTENANCE

1.1 DEFINITION

The term "Maintenance" in an engineering sense, may be defined as the art of taking care, looking after and keeping the structures, pipelines and fittings and other related facilities in optimum working order.

"Routine/Regular maintenance" is understood as carrying out activities in regular and routine manner to prevent the deterioration of the water supply scheme e.g. vigilant to prevent pollution of water source, cleaning of tanks, pipelines etc.

"Minor Repair" is understood as the repair works of minor in nature such as rectification of leakages in pipelines, valves, repair of damaged valve boxes, tapstands etc. The expenses incurred in such works should not exceed Nu. 4,000 per annum per **RWS** scheme.

"Rehabilitation" is understood as the total repair of scheme necessitated by major structural failures and total breakdown of the components in it. In this case the "Rehabilitation" should be treated in the same way as the construction of a new scheme without changing scope of the original scheme.

1.2 OPERATION

The operation of a **Rural Water Supply Scheme** will include.

Careful regulation of the flow of water throughout the system to ensure equal and even distribution of water.

Regular cleaning of various components of the **Rural Water Supply** System as a part of the preventive maintenance.

CHAPTER - II

2. VARIOUS COMPONENTS IN GRAVITY FLOW WATER SYSTEM,THEIR FUNCTIONS, MAINTENANCE REQUIREMENTS AND RESPONSIBILITIES

2.1 SOURCE

2.1.1 Definition

"Source" shall mean a Spring or a Stream tapped for drawing the water for gravity flow **Rural Water Supply** scheme.

Spring source

Stream source

2.1.2 Function

Provide required quantity and quality of drinking water throughout the year to a village or a group of villages

2.1.3 Pre-requisites of proper source :

Protection from

Pollution
Flood
Drying

2.1.4 Maintenance Requirements of the source

Pollution

a. To ensure that no defecation is taking place in and around the source.

b. Source is protected from animals

c. Burning of dead bodies of human beings or animals should not be allowed in and around the source.

Flood

a. Flood protection wall

b. Spill over and drainage arrangement

Drying

a Prevention of deforestation around the source

b. Plantation of trees around the source

2.1.5 Frequency of check : Once in two weeks

2.1.6 Responsibilities

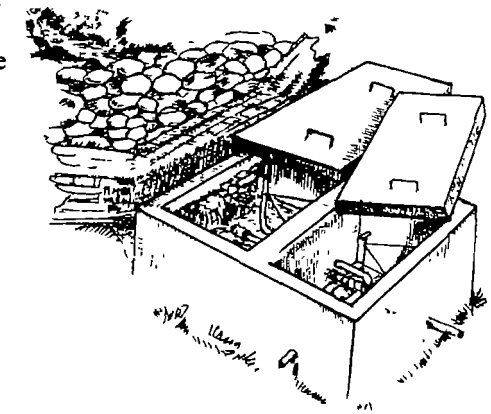
a. Routine/Regular Maintenance : Village Maintenance Committee (VMC) through caretaker (CT)

b. Minor Repair : VMC through CT

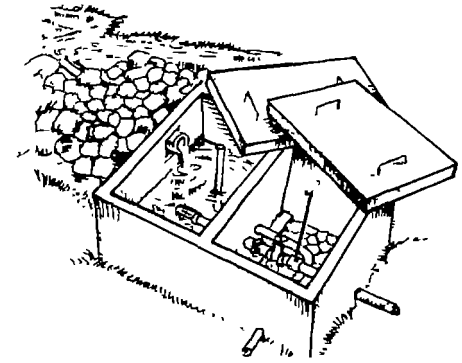
2.2 INTAKE

a. Spring Intake

b. Stream Intake



Spring Intake



Stream Intake

2.2.1 **Definition**

"Intake" shall mean a chamber constructed for the purpose of collecting spring/stream water.

2.2.2 **Function**

Collection of water from source and channel it into the pipeline

2.2.3 **Pre-requisites of proper Spring/Stream Intake**

It should be accessible

It should be fitted with outlet strainer

It must have cover

The valve should be provided at the outlet

It should have protection from erosion and land-sli

It should have fencing

2.2.4 **Maintenance Requirements of Intake**

Accessibility

Approach and intake surroundings should be cleared

Strainer

Check and clean outlet pipe strainer

Cover

Check cover of Intake Chamber for damage, cleanliness,repair and clean if required.

Valve, valve boxes and vent pipe

a. Check all pipes, fittings, valves for leakage and blockage

b. Check whether valve boxes are covered, cleared and drained

c. Check valve box walls for damage and leakage

d. Check all the fittings of vent pipe

Erosion and landslides

a. Check for erosion and landslides and repair with local materials as and when required

b. If damages are major report to the District Engineer

c. Clean intake tank, drainage ditch and surrounding area

2.2.5 **Frequency of check : Twice a month and at least weekly during monsoon.**

2.2.6 **Responsibilities**

a. Routine/Regular Maintenance : Village Maintenance Committee (VMC) through Caretaker (CT).

b. Minor Repair : VMC through CT

2.3 TRANSMISSION PIPELINE

2.3.1 **Definition**

Transmission pipeline shall mean the main pipeline for conveying water from Intake tank (I.T) to clear water reservoir (CWR)

2.3.2 **Function**

Convey water from Intake tank to clear water reservoir

2.3.3 **Pre-requisites of proper transmission pipeline**

The pipe must be properly buried (at least 3'0" below the ground) Proper arrangements for gully and stream crossings

All the valves, valve boxes and fittings should be properly placed

2.3.4 **Maintenance requirements of Transmission pipe.**

Pipeline

a. Ensure that pipeline is not exposed

b. Check breakage, blockage and leakage of pipelines and illegal connections

c. Check all the areas around the pipeline for erosion or landslides

Stream and Gully Crossings

a. Check anchoring structures for damage

b. Check supporting pillars for damage

c. Check binding of pipes

d. Check erosion of banks

e. Check that cable is taut

Valves and Valve boxes

a. Check all valves and valve boxes including walls for leakage and damage.

b. Check whether valve boxes are covered, cleaned and drained

2.3.5 **Frequency of check : At least once in a month**

2.3.6 **Responsibilities**

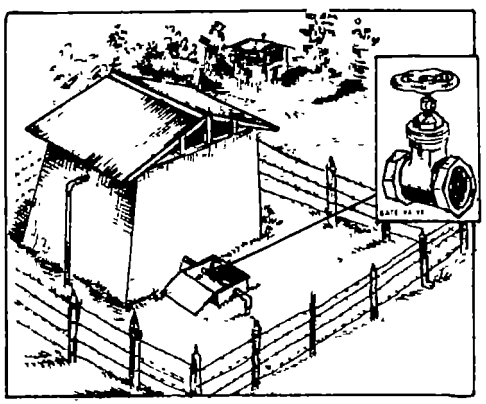
a. Routine/Regular Maintenance : Village Maintenance Committee (VMC) through Caretaker (CT)

b. Minor repair : VMC through CT Maintenance

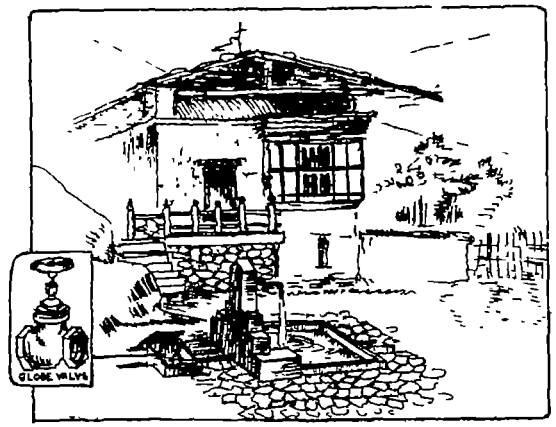
2.4 **VALVES**

2.4.1 **Definitions**

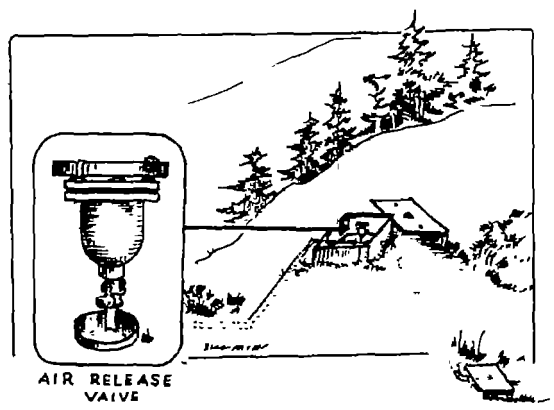
"Gate Valve" shall mean a valve installed at the inlet/outlet of a tank or a pipeline to open or close flow or water completely.



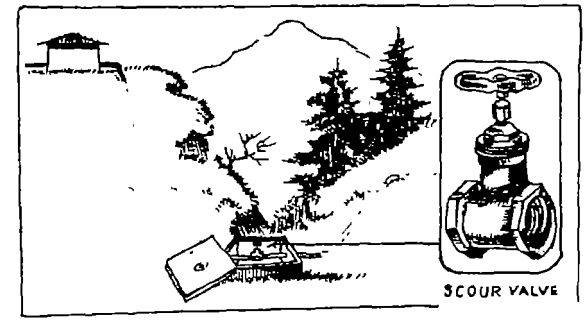
"Glove Valve" shall mean a valve installed for the purpose of regulating the flow of water.



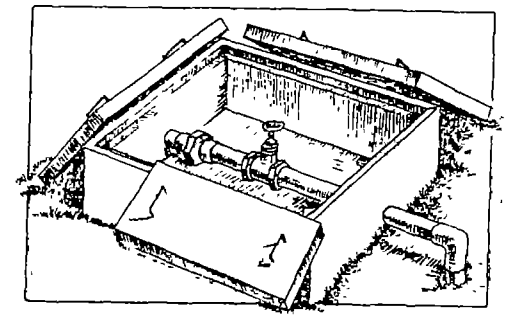
"Air release valve" shall mean a Valve installed at a ridge point in the pipeline to release air that might form in the pipeline.



"Scour Valve" or "Washout Installation" shall mean a valve installed for the purpose of cleaning of a tank or a pipeline by opening the valve completely, and closing it after the tank or pipe section has been cleaned total.



"Valve Box" shall mean a closed box for housing a single valve or a set of valves with suitable covers with locking arrangements.



2.4.2 Function

Sr. No.	Type of valve	Function
1.	Gate valve	To shut off water flow completely when required and for washout purposes
2.	Globe valve	To regulate the discharge of flow
3.	Air release valve	To release air trapped inside the valve pipeline
4.	Scour valve	To clean tanks and supply line
5.	Valve box	For housing a single or a set of valves

2.4.3 **Pre-requisites of valves**

All valves should have proper fittings

All valves should be placed in proper valve boxes

2.4.4 **Maintenance requirements of valves**

Proper fittings

a. Check all valves have got proper fittings

b. Check for leakages, blockages and proper functioning

c. Check all valves for grease by opening and closing

Valve boxes

a. Check all valves are placed in valve boxes

b. Check valve box covers for damages and locking arrangements

c. Check drainage arrangements of valve boxes

d. Check cleanliness of valve boxes

2.4.5 **Frequency of check: Twice a month for all valves but weekly during monsoon.**

2.4.6 **Responsibilities**

a. Routine/Regular Maintenance : Village Maintenance Committee (VMC) through Caretaker (CT)

b. Minor Repair : VMC through CT

2.5 **BREAK PRESSURE TANK**

2.5.1 **Definition**

"Break pressure Tank" (BPT) shall mean a tank installed in the main/branch pipeline to break the pressure.

2.5.2 **Function**

To prevent bursting of pipes due to high pressure development inside the pipeline.

2.5.3 **Pre-requisites for proper Break Pressure Tank.**

It should have proper fittings

It should have fencings

It should have cover

Cleanliness

2.5.4 Maintenance Requirements of Break Pressure Tank.

Proper Fittings

a. Check float valve present and functioning

b. Check strainer for cleaning

c. Check drainage arrangements

d. Check all the valves including valve boxes, vent pipes for leakages,blockages and proper functioning.

Fencing

a. Check for proper fencing.

Cover

a. Check cover, roof, walls for damage

b. Check for erosion and landslides

Cleanliness

a. Check cleanliness of the tank

2.5.5 Frequency of check : Once in a month

2.5.6 Responsibilities

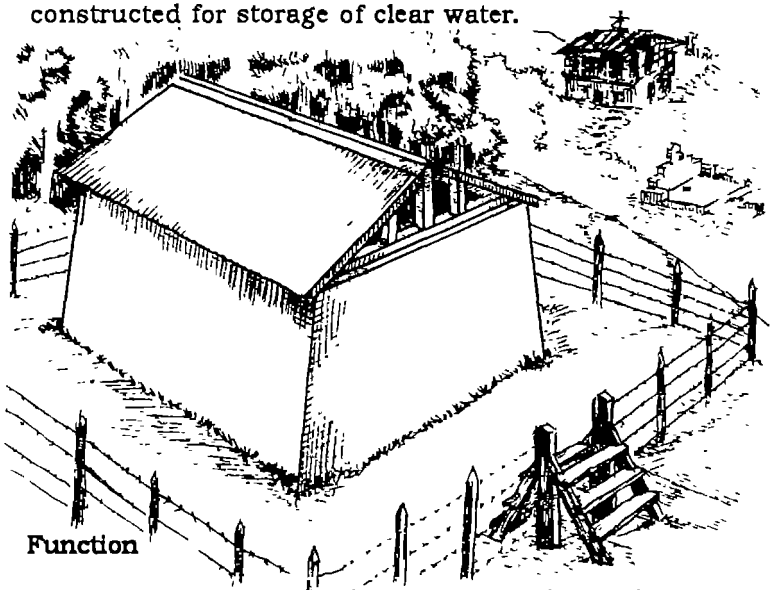
a. Routine/Regular Maintenance : Village Maintenance Committee (VMC) through Caretaker (CT)

b. Minor Repair : VMC through CT

2.6 CLEAR WATER RESERVOIR (CWR)

2.6.1 Definition

"Clear Water Reservoir (CWR)" shall mean a tank constructed for storage of clear water.



2.6.2 Function

To store clear water and to meet the demand at any time.

2.6.3 Pre-requisites for Clear Water Reservoir

A reservoir requires an inlet, outlet with strainer and air vent, overflow, and washout - all in good working conditions.

Manhole cover with locking arrangement

Protection of land slide and erosion area

Cleanliness of surrounding

Provision of fencing

2.6.4 Maintenance Requirements of clear water reservoir

Fittings and accessories

Check for the blockages, leakages, in inlet, outlet, air vent, overflow, and washout.

Cover

Check for cover and locking arrangement for damages

Landslide and erosion

a. Check land slide and erosion area

b. Check drainage of surrounding area Cleanliness

Check cleanliness of the surrounding area such as on defecation takes place, and the area is not exposed to the animals.

Fencing

Check for proper fencing.

2.6.5 Frequency of Maintenance : Once in a month.

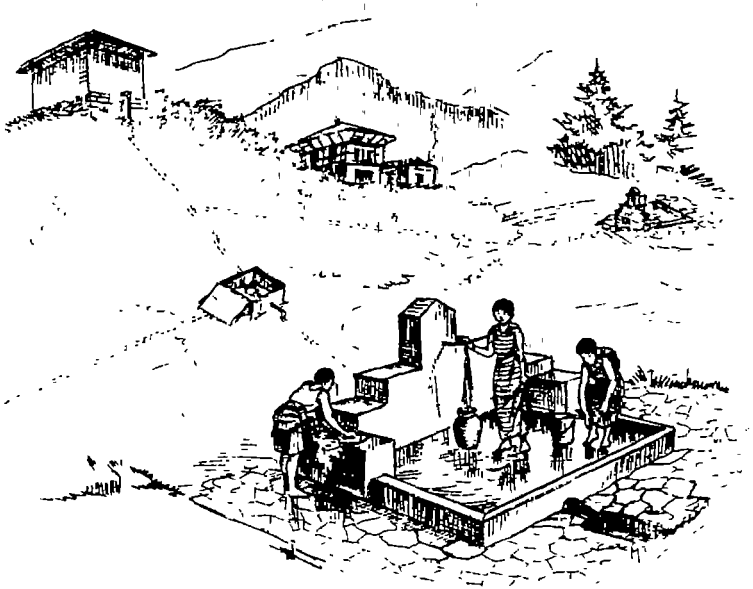
2.6.6 Responsibilities

a.	Routine/Regular Maintenance	:	Village Maintenance Committee (VMC) through Caretaker (CT)
b.	Minor repair	:	VMC through CT

2.7 DISTRIBUTION SYSTEM

2.7.1 Definition

"Distribution pipeline" shall mean the pipeline for conveying water either from clear water reservoir or from intake tank user point (tapstand).



2.7.2 Function

To convey water to the Tapstands

2.7.3 Pre-requisites of proper distribution pipeline

The pipe must be properly buried

Proper arrangements of gully and stream crossings.

All the valves, valve boxes and fittings should be properly placed.

2.7.4 **Maintenance requirements**

Pipeline

a. Ensure that pipeline is not exposed.

b. Check breakage, blockage and leakage of pipelines and illegal connections.

c. Check all area around the pipeline for erosion of landslides.

Stream and Gully Crossing

a. Check anchoring structures for damage

b. Check supporting pillars for damage

c. Check binding of pipes

d. Check erosion of banks

e. Check that cable is taut

Valves and Valve boxes

a. Check all valves and valve boxes including walls for leakage and damage

b. Check whether valve boxes are covered, cleaned and drained.

2.7.5 **Frequency of check : At least once in a month**

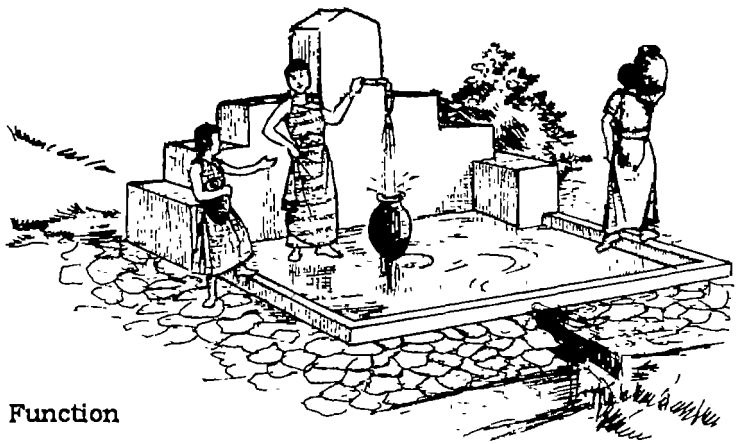
2.7.6 **Responsibilities**

a. Routine/Regular Maintenance : Village Maintenance Committee (VMC) through Caretaker (CT)

b. Minor Repair : VMC through CT

2.8 TAPSTANDS

2.8.1 **"Tapstand" shall mean a platform with a water tap fitted to a pillar for collection of water for consumers.**



2.8.2 **Function**

To deliver water to the consumers.

2.8.3 **Pre-requisites for Tapstands**

Protection from erosion

Drainage arrangements

Cleanliness in the surroundings

Provision of valves including valve boxes and fittings.

Proper functioning to taps

2.8.4 **Maintenance Requirements**

Erosion

Check surrounding area for erosion.

Drainage

a. Check damage and blockage of drainage.

b. Check stagnation of splash water in the surroundings.

Platform

a. Check that the cement platform is not damaged

b. The platform is kept clean and there is not water stagnation.

Cleanliness

a. Check cleanliness of the surroundings

b. Check intervention from animals near tapstands

c. Check cleanliness of the platform.

Valves and fittings

a. Check for blockages, leakages, damages for valves including valve boxes and fittings.

b. Check cleanliness of valve boxes including drainage.

c. Check cover and locking arrangements of valve boxes.

Taps

a. Check breakage, leakage including washers of taps.

b. Check the flow of water from taps.

2.8.5 **Frequency of check : Once in a week**

2.8.6 **Responsibilities**

a. Routine/Regular Maintenance : Village Maintenance Committee (VMC) through Caretaker (CT)

b. Minor Repair : VMC through CT

2.9 SEDIMENTATION TANK

2.9.1 Definition

A tank which is used to separate the settle able suspended solids from water.

2.9.2 Where is it placed ?

Near the source if necessary

2.9.3 Function

To make water clear by removing settle able suspended solids.

2.9.4 Pre-requisites of proper sedimentation tank

Proper fencing
Cleanliness of surroundings
Provision of valves including valve boxes and fittings
Protection from erosion and landslides

2.9.5 Maintenance Requirements

Fencing

Check for proper fencing

Cleanliness

Check cleanliness of surrounding area.

Valves and fittings

a. Check all valves particularly scour valve including valve boxes and fittings for leakage, blockage, damages and proper functioning and cleaning of tanks.

b. Check valve boxes including covers for damages and provision of locking arrangements and drainage.

Land slides and Erosion

2.9.6 **Frequency of check : Once in 15 days but during monsoon once in 7 days.**

2.9.7 **Responsibilities**

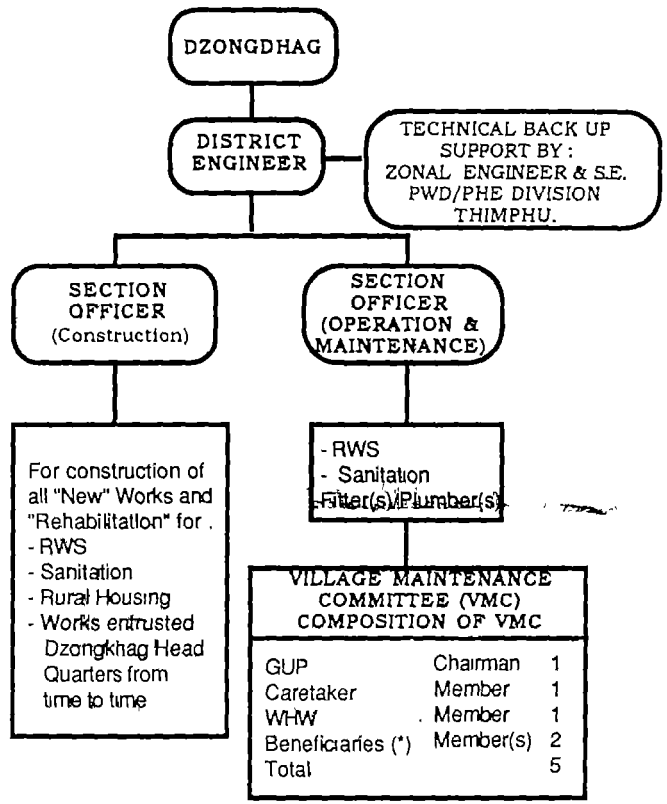
a. Routine/Regular Maintenance : Village Maintenance Committee (VMC) through Caretaker (CT)

b. Minor Repair : VMC through CT.

CHAPTER - III

3. ORGANIZATION,RESPONSIBILITY, PROCEDURE

3.1 ORGANIZATION



Note :- * Out of two beneficiaries as "Members" one should be **"male"** and one **"female"** selected by the beneficiaries (villagers)

Villagers will select one person as a "treasurer" out of the VMC "members" (other than "caretaker").

3.1.1 At the Dzongkhag level, there will be two Section Officers to assist the District Engineer.

For maintenance : 1 No

For New works : 1 No.

Their duties can be interchanged as per discretion of the DWH/Dzongkhag Administration.

3.1.2 Initially to assist the Section Officer for O & M, there should be at least one fitter/plumber in each Dzongkhag.

3.1.3 The representative body of the beneficiaries called VMC will be directly responsible for routine/regular maintenance, minor repair works of the duly completed **RWS** project.

3.1.4 VMC should be established for the **RWS** project [redacted] the project. Concerned District Engineer/S.O. will be fully responsible for appropriate training/motivation of caretaker and all concerned members of the VMC during the construction phase. The District Engineer and the Section Officer will also explain to the villagers and members of the DYT, the responsibilities of the VMC.

VMC shall comprise of Five members :-

[redacted] [redacted]

* Caretaker : Member

[redacted] [redacted]

* Two Beneficiaries (Minimum) : Member(s)

3.1.5 The formation of VMC and selection of caretaker should be the full responsibility of the beneficiaries under the guidance of the Dzongkhag Administration.

3.1.6 While forming a VMC, the following guideline's should be strictly adhered to and be discussed :

1. The formation will take place at an assembly of all concerned villagers in the presence of a Senior Officer from the Dzongkhag. The Officer will observe and confirm that fair procedures are adopted especially regarding decision making and selection. Such decisions and conclusions should be clearly recorded in writing.

2. VMC shall comprise of minimum Five Members :

   * Gup : Chairman
   * Caretaker : Member
   * Voluntary Village Health Worker : Member
   * Two Beneficiaries (Minimum) : Member(s)

   Out of two beneficiaries as member, one should be **"Female"** and one **"Male"**.

3. From the Beneficiary Members, the beneficiaries will select in a fair manner one person as a "Treasurer" of the VMC while selecting the treasurer aptitude of the person and his knowledge of financial matters may be given weight.

4. Likewise one or two persons among beneficiaries will be selected by the villagers as trainee "Caretaker" to be trained during construction phase of the **RWS** project. Caretakers training will be given to both the trainees. The VMC will then select one of the successful trainees as caretaker of the scheme as well as member of the VMC.

5. While selecting "Members" of VMC consideration should be given to "general education levels" and aptitude to social services.

6. The responsibilities of VMC , chairman, treasurer, caretaker and other members and beneficiary"s contributions should be discussed in detail.

3.2 RESPONSIBILITY

3.2.1 Responsibilities of VMC

a. To ensure effective operation, routine/regular maintenance, minor repair of **RWS** systems taken over by VMC.

b. Supervising Caretaker and payment of remuneration to him.

c. Organizing provision of all materials and labour both skilled and unskilled for routine/regular maintenance and minor repair works.

d. VMC can approach to S.O./District Engineer for the technical assistance for the job which are beyond the capacity of the caretaker.

e. Resolving social disputes and preventing vandalism and misuse of the **RWS** system.

f. Ensuring Environmental protection of the **RWS** system.

g. Educating the community of proper use of the facilities.

h. Maintaining project file and keeping records of routine/regular maintenance and minor repair works and minutes of the meetings of the VMC and maintaining appropriate accounts.

i. Requesting support for "Rehabilitation" of the **RWS** system from the Dzongkhag Headquarters when required.

j. To ensure that all beneficiaries have signed the approved "Genja".

k. To ensure that no unauthorized connection is taken/given from the completed **RURAL WATER SUPPLY** Scheme taken over by VMC.

3.2.2 Responsibilities of the Chairman

a. To ensure that all responsibilities of the VMC are carried out.

b. To be responsible for maintaining the "Register" reflecting unto date shaptolemi contributions or in lieu of payment made or fines levied and collected from beneficiary.

c. To act as co-ordinator between the Dzongkhag Administration and the beneficiaries.

d. Arranging joint inspection of the completed RWS project, and completion of **RURAL WATER SUPPLY** project completion and Handing over certificate.

e. To ensure that "Operation and Maintenance Fund Account" is kept in order. He as a "Chairman" of the VMC would open a Joint Account along with the "Treasurer" either in the nearest Bank of Bhutan or in post office in the village. In the absence of banking and post office facilities the collected funds should be kept in the custody of the "Treasurer" with the approval of the VMC and the Dzongdag.

3.2.3 Responsibilities of the "Treasurer"

The "Treasurer" of the VMC will be responsible for :-

a. Collection of money from the beneficiaries as approved by the VMC.

b. Deposit collected Money to the joint account.

c. Operation of the Joint Account along with the chairman of the VMC.

d. Keeping "Operation and Maintenance Fund Account" of the VMC in order.

e. Prepare and maintain all relevant records of monetary transactions.

f. Keep collected money of beneficiaries contributions in his safe custody and operate with the approval of the chairman, and the Dzongdag if both Bank of Bhutan or the Post office are not situated within the reasonable distance.

3.2.4 Responsibilities of Caretaker

As defined in **ANNEX-1**

3.2.5 Responsibilities of other Members of VMC

Each individual "Member" (including the caretaker, the Treasurer) of the VMC will be responsible for all the responsibilities of the VMC as defined in para 3.2.1.

3.3 FINANCIAL RESOURCES

1. Operation and Maintenance fund including remuneration to the caretaker for routine/regular maintenance, minor repair works of **RWS** system taken over by VMC is to be generated within the village

2. In case affordable by the beneficiaries do not permit to meet the requirements of funds for minor repair works, VMC has to explore the possibilities of mobilization of required resources from appropriate agencies.

3. Any dispute between the VMC and beneficiaries in financial transaction and or any other matter will be settled by the Dzongkhag. Decision of the Dzongdag will be final and binding to all concerned.

3.4 PROCEDURES

3.4.1 Steps to take over the completed RWS schemes by VMC

1. Scrutiny of the detailed status of the completed **RURAL WATER SUPPLY** System by the S.O./District Engineer should be done within 15 days of completion of the scheme.

2. Joint inspection of the completed scheme by S.O./District Engineer along with VMC members within 15 days of completion of activity as at (1) ABOVE AND completion of formalities relating **"RURAL WATER SUPPLY** Project completion and Handing over certificate".

3. After taking over the same the Chairman of the VMC has to call meeting of the VMC members and the beneficiaries and brief them on the followings :

a. RWS scheme of the village

b. Responsibility of the beneficiaries.

c. Various panels and incentive clauses.

d. Generation of funds and accounting procedure.

e. Tools, Materials and spare parts received by the VMC

CHAPTER - IV

4. RULES AND REGULATIONS

4.1 **SHORT TITLE** : The Rules and Regulations shall be called the "BHUTAN **RURAL WATER SUPPLY** OPERATION AND MAINTENANCE RULES AND REGULATIONS, 1988.

4.2 **OBJECTIVE** : The objective of these Rules and Regulations is to make beneficiaries disciplined in maintaining and upkeeping their **RURAL WATER SUPPLY** Scheme.

4.3 **ENFORCEMENT** : The Rules and Regulations shall come into force at once and shall apply to all "Villages" declared as such by the Royal Government of Bhutan from time to time.

4.4 **DEFINITIONS** : In these Rules and Regulations, unless the context otherwise requires, definitions of the concerned terms will be as defined in **CHAPTER - 1** and **CHAPTER - 2** of this Manual.

4.5 **ORGANIZATION, RESPONSIBILITY & PROCEDURE** : In these Rules and Regulations, unless organization, responsibility and procedure for O & M of any **RURAL WATER SUPPLY** System should be as per **CHAPTER - 3** of this Manual.

4.6 DETAILS OF RULES AND REGULATIONS

4.6.1 Drinking water supply should get the highest priority as in many other countries.

4.6.2 It is the responsibility of the VMC to ensure that the villagers (beneficiaries) sign an approved "Genja"regarding breakage, damage, harm to any component of the **RWS** system, cooperating with VMC and payment of beneficiaries contributions.

If the "Genja" (Agreement) is violated, the villagers have either to replace the broken, damaged, harmed component at their costs and risks or pay "fine" as imposed by the Dzongdag. Decision of Dzongdag in this matter will be binding to the VMC and the villagers.

4.6.3 If the VMC does not fulfil its responsibilities as defined in **CHAPTER - 3** , the Dzongdag of the Dzongkhag, after examining carefully the report of the District Engineer regarding operation and maintenance of the **RWS** system, will have full powers to call explanation from the Chairman and other members of the VMC and take appropriate actions as he deems fit.

4.6.4 If either "Treasurer" or any "Member" of the VMC, fails to discharge his/her responsibilities as defined in **CHAPTER -3** the Chairman in consultation with the other "Members" of the VMC will first pursue to rectify him/her failing which he/she will be removed from the Committee in consultation with the beneficiaries and a new "Member" in his/her place will be selected by the beneficiaries.

4.6.5 If the VMC fails it responsibility regarding "Operation and Maintenance" fund collection and use or any misuse of collected public fund, then Dzongdag of the Dzongkhag after careful verification will take appropriate penal actions against the "Chairman" and the "Treasurer" and any other or all the Members of the VMC.

4.6.6 If the caretaker fails to discharge his/her responsibilities as defined in **CHAPTER - 3**, he/she will be liable to the following disciplinary actions by the appropriate authority :-

Dereliction of Duties	Type of Disciplinary Action
1. First time	Written warning and recovery of TA/DA
2. Second time	Record in C.R
3. Third time	Stop Annual increment

4.6.7 If the routine/regular maintenance work of a handed over **RWS** scheme to a VMC is observed not satisfactory, then till the time the VMC takes interest and discharges its responsibilities for satisfactory O & M of the system, no further development work will be sanctioned or taken up in the village.

4.6.8 Government Functionaries such as fitter/plumber, Section Officer, District Engineer/Assistant Engineer, are expected to discharge their respective responsibilities relating to O & M of **RWS** system. If any one of them fails to do so, he/she will be liable to the following Disciplinary Actions by the Appropriate Authority.

4.6.9 Each beneficiary will be required to give a certain number of days labour (to be decided by the VMC) whenever required for O & M activities of the **RWS** system. An individual beneficiary failing to join work, appropriate "fine" will be imposed on him/her by VMC.

4.6.10 As defined in **CHAPTER - 3**, VMC is responsible for any unauthorized connection from the completed **RURAL WATER SUPPLY** scheme taken over by them. In case of occurrence of any such unauthorized connections, the following fine (s) will be imposed by Dzongdag of the Dzongkhag as per delegation of Administrative power to Dzongdag for providing disciplinary action as the case may be :-

Case	Person(s) responsible for unauthorized connection	Agency to collect	Fine(s)
Case "A" If "beneficiary/ beneficianes" take/give unauthorized connection(s) without knowledge of "Caretaker and/or "Village Maintenance Committee	Beneficiary/ beneficiaries who has/have taken/given unauthorized connection(s)	Dzongkhag Administration towarde operation & maintenance of the **RURAL WATER SUPPLY** scheme	Nu. 1000 for the first offence and for the subsequent offences the amount fine will be double of the previous offence
Case "B" If "Care Taker gives unauthorized connection(s)	Caretaker	Dzongkhag Administration towards operation & maintenance of the **RURAL WATER SUPPLY** scheme	Nu. 1000 for the first offence and for the subsequent offences the amount fine will be double of the previous
Case "C" Unauthorized connection(s) with the knowledge and/or approval of Village Maintenance Committee	Chairman/Treasurer/ Care Taker and all members of the Village Maintenance Committee	Dzongkhag Administration towards operation & maintenance of the **RURAL WATER SUPPLY** scheme	Nu. 1000 for the first offence and for the subsequent offences the amount fine will be double of the previous

4.6.11 The amount collected as "fine" will be utilized for "Minor Repair" works of the RWS scheme(s) as per direction of the VMC or Dzongkhag Administration as appropriate.

4.6.12 To encourage competitiveness amongst villagers (beneficiaries), individual members of VMCs in

Sl. No.	Category	Type of Incentive	Competent Authority to Recommend Sanction	
1.	Villagers (Beneficiaries)	1. Membership of VMC 2. Training on Social Services	VMC	Dzongkhag Administration (Dzongdag)/RCSC
2.	Individual Member of VMCs	1. Consideration for post of: - Treasurer - Training on Social Services	VMC	Dzongkhag Administration (Dzongdag)/RCSC
3.	"Treasurer"	1. Consideration for : - Training on financial matters	VMC	Dzongkhag Administration (Dzongdag)/RCSC
4.	Chairman	1. Consideration for : Study tour to Neighbouring areas	Dzongkhag Administration (Dzongdag)	Royal Civil Service Commission (RCSC)
5.	Caretaker	1. Consideration for : - Exemption from "Shaptolemi" - Exemption from Dzongdag Woola - Exemption from "Gungda Woola" - Orientation Training course (O.T.C.)	VMC	Dzongkhag Administration (Dzongdag)/RCSC
6.	VMC	1. Declaring as "Best VMC" in the Dzongkhag in the year & an award of a certificate 1. Membership of VMC 2.Preference in Saction of any New Development project.	Dzongkhag Administration (Dzongdag)	Dzongkhag Administration (Dzongdag)/ Planning Commission

Dzongkhag for their active and efficient involvement in

O & M activities of **RWS** system in the respective area(s), the following incentives will be given by the competent Authority.

Note :- The exemption from Gungda Woola is subject to condition that beneficiaries contribute Nu. 25 per day for 15 days in a year i.e. Nu. 375 per year so that the caretaker can devote full time in a year for operation and maintenance of **RWS** system.Villagers will select one person as a "treasurer" out of the VMC "members" (other than "caretaker").

4.6.13 To encourage competitiveness and increase efficiencies of Government functionaries such as Fitter/Plumber, Section Officer, District Engineer/Assistant Engineer in discharging their duties relating to O & M activities of RWS system, the following incentives will be duly considered by the appointing authorities for efficient staff members/officers :

a. Letter of Appreciation

b. Record in C.R

c. Accelerated promotion on Merit ground

d. Preference for Inservice training and Higher study

e. Preference for Foreign study tour/Fellowship/ Seminar/Workshop etc.

ANNEXURE - 1

CARETAKER JOB DESCRIPTION AND CONTRACT

This agreement defines the terms of contract between the

_____ Village Maintenance Committee (VMC) of

_____ Dzongkhag and

Mr. _____, caretaker, resident of village in

_____ Dzongkhag,

beginning_____.

1. **GENERAL CONDITIONS**

The [redacted]will work with honesty and diligence for efficient and effective execution of a RURAL WATER SUPPLY Operation and maintenance programme in village of Dzongkhag.

2. **RESPONSIBILITIES OF CARETAKER**

a. Perform Routine/Regular checking, inspection, maintenance and operation of the RURAL WATER SUPPLY System according to the check list approved.

b. Keep the village maintenance committee (VMC) informedof the condition of the RURAL WATER SUPPLY System.

c. Make minor repairs to the RURAL WATER SUPPLY System to the extent that he is capable.

d. Assist the tapstand user groups to perform their duties.

e. If Voluntary labour is required, request the VMC to organize a Voluntary labour is required, request the VMC to organize a Voluntary labour force to work under direction of caretaker.

f. If materials, spare parts, tools are required to perform repairs or maintenance within caretaker"s capability inform the VMC to arrange the same.

g. If the required repair work is beyond the capability of the caretaker, inform the VMC for necessary actions.

h. Ensure the good condition and safe storage of all tools, spare parts and materials.

i. Maintain the records of all repair works, spare parts and materials used.

j. Take active part in educating the beneficiaries regarding the importance and for proper use of the system.

3. **REMUNERATION**

The VMC on behalf the RURAL WATER SUPPLY System, agrees to remunerate the Caretaker as follows:

_____

_____

_____

_____

_____

4. **TERMINATION**

This agreement can be terminated by either side by giving two weeks notice.

Signed : _____. _____

Chairman
Village Maintenance committee

Caretaker

Date : _____. Date: _____.

Members
Signature : _____.

_____

ANNEXURE - 2

LIST OF TOOLS, SPARE PARTS AND MISCELLANEOUS ITEMS TO BE ISSUED TO CARETAKER

1. TOOLS AND SPARE PARTS

SL NO#	Description	Quantity	Unit
1.	Tool box	1	Pc
2.	Padlock	1	Pc
3.	Heating pzlate	1	Pc
4.	Teflon cover	1	Pc
5.	Blow lamp	1	Pc
6.	Thermochrome	2	Pc
7.	Pipe compound	1	Can
8.	Hem or jute	1	Bundle
9.	Hacksaw frame	1	Pc
10.	Hack blade	10	Pc
11.	Flat file	1	Pc
12.	Round file	1	Pc
13.	Knife	2	Pc
14.	Pliers	1	Pc
15.	Adjustable wrench 10"	2	Pc
16.	Pipe wrench 14"	1	Pc
17.	Pipe wrench 18"	1	Pc
18.	Tap 3 meter	1	Pc
19.	Hammer 1 kg	1	Pc
20.	Trowel	2	Pc
21.	Shovel	2	Pc
22.	Pick axe	2	Pc
23.	Crowbar	2	Pc
24.	Bucket	2	Pc
25.	HDPE & G.I.pipes of various diameters used in the system	50	Mtrs.
26.	Pipe fittings		To be decided by DWH/ PHE Div.and should not exceed10% of quantity installed.

2. MISCELLANEOUS ITEMS

SL NO#	Description	Quantity	Unit
1.	Maintenance Log-book	1	Pc
2.	Routine inspectioncheck list	1	Pc

3. RECEIPT & ISSUE CERTIFICATE

The above spare parts and miscellaneous items have been received by

Mr. _____, Caretaker of village: _____,

Gewog: _____, Dzongkhag: _____,

Signed: _____, Date: _____,

Issued by
Mr. _____, Dist. Engineer/Section Officer

Signed: _____, Date: _____.

Witnessed by
Mr. _____, Chairman,Village Maintenance Committee

Village: _____,

ANNEXURE - 3

RURAL WATER SUPPLY MAINTENANCE LOG BOOK

AT VILLAGE LEVEL

Project Fact Sheet

1. **GENERAL INFORMATION**

Name of caretaker: _____ Resident: _____

Name of **RWS** project: _____ Village: _____

Project Number: _____ Gewog : _____

Start date of the project: _____

Date of Joint Inspection of the project: _____

Date of taking over the project VMC: _____

of the village: _____

for the **RWS**: _____

Present population of the village: _____

Design population: _____

2. **TECHNICAL INFORMATION**

2.1 **TYPE OF SYSTEM:** Open/closed

2.2 **TYPE OF SOURCE:** Spring/Stream

2.3 **YIELD OF THE SOURCE** (liters per second)

As per project survey and design: _____

On the day of Joint Inspection: _____

2.4 **TOTAL PIPE LENGTH OF THE PROJECT:** _____

2.5 **IS THE CATCHMENT AREA PROTECTED:** _____

2.6 **NUMBER OF COMPONENTS**

Spring Intake _____

Stream Intake _____

Sedimentation tank _____

Transmission pipeline YES/NO

If "Yes" Type of pipe HDPE/GI/Both HDPE & GI

Sl.No	Type	Diameter	Class	Length
1.	HDPE			
2.	GI			

Total length of Transmission pipe line: (shown in pipeline schematic drawing) _____

Valves and Washout arrangements provided: Yes/No

If "Yes" location of each valve and washout arrangement are shown in the enclosed drawings of "General arrangements"and "pipe line schematic".

No. of globe valve along with valve box: _____

No. of Gate valve along with valve box: _____

No. of Air valve along with valve box: _____

No. of Washout arrangement (Scour valve along with valve box): _____

Break Pressure Tank (BPT) provided: _____

If "Yes"Number: _____

Capacity of each BPT (In m^3): _____

Clear Water Reservoir Provided (CWR): YES/NO

DIRECTIVES TO FILL UP MAINTENANCE LOG BOOK

1. Before filling the Log book the caretaker should ensure that Routine/Regular checking of each component of the **RWS** project is checked thoroughly as per the requirements of the checklist.

2. The Log book must be checked by the Chairman or any member of VMC atleast once in two weeks and he/she should record his/her "Remarks" about overall performance of the maintenance of the **RWS** Project as well as performance of the caretaker.

3. The Log book must be checked by the concerned Section Officer of the Dzongkhag at least once in four months and take corrective measures if necessary and record his "Remarks" for better interactions.

4. The Log book must be checked by the concerned District Zonal Engineer/Superintending Engineer whenever they visit and record their "Remarks" for better interactions.

5. Any specific important issues relating to Operation and Maintenance as recorded in the log book are to be brought to the notice of the Zonal Engineer and Superintending Engineer, PHE Division of DWHby the concerned Section Officer/District Engineer of the Dzongkhag immediately for appropriate action at their ends. 6. The Log book is to be filled in by the caretaker in two part "A" for Routine/Regular Maintenance and part "B" for Repair for the **RWS** project by the caretaker.

PART "A"

ROUTINE/REGULAR OPERATION AND MAINTENANCE ACTIVITY OF THE CARETAKER

Operation AND Maintenance Activity of RWS Project
(To be filled by the Caretaker)

DATE : _____

WEATHER: _____

NAME OF CARETAKER: _____

PERFORMANCE AND IDENTIFICATION OF REPAIR ACTIVITY FOR VARIOUS COMPONENTS

1. SOURCE			2. INTAKE		
PERFORMANCE			PERFORMANCE		
Quality	Quantity	Maintenance & cleaning work undertaken any other problem Encountered	Working well	Not working	Maintenance & clean work done /Repair work under taken/any problem Encountered

1. TURBID
2. SEMI TURBID
3. CLEAR
4. ANY OTHER IMPORTANT COMMENT

1. ADEQUATE
2. NOT SUFFICIENT

3. BREAK PRESSURE TANK		4. CLEAR WATER RESERVOIR		5. DISTRIBUTION SYSTEM	
PERFORMANCE MAINTENANCE/ REPAIR WORK UNDERTAKEN		PERFORMANCE MAINTENANCE/ REPAIR WORK UNDERTAKEN		PERFORMANCE MAINTENANCE REPAIR WORK UNDERTAKEN	
Working well	Not working	Working well	Not working	Working well	Not working

6. TAP STANDS		7. REMARKS
PERFORMANCE	MAINTENANCE AND CLEANING WORK DONE/REPAIR WORK UNDERTAKEN/ANY OTHER PROBLEM ENCOUNTER	
1.	FLOW IS ADEQUATE	
2.	FLOW NOT ADEQUATE IN THE TAP STAND POINT	
3.	DRAINAGE : CLEARED/NOT CLEARED	
4.	PLATFORM : DAMAGED/NOT DAMAGED	
5.	TAP : WORKING/NOT WORKING	
6.	SURROUNDING : CLEARED AREA/NOT CLEARED	
7.	VALVE BOX WITH COVER : DAMAGED/NOT DAMAGED	

Signature :_____

Date :_____

PART "B"

SPECIFIC REPAIR ACTIVITY FOR THE RWS PROJECT BY THE CARETAKER

Specific Minor Repair Activity for the RWS Project

(To be filled by the Caretaker)

Sl No.	Date of birth	Brief Description of repair work to be done	Repair/ Assistance officially requested from Chairman of VMC	Details of materials/ labour for minor repair works			
				Material		Labour	
			Yes/No	Locally available	Not locally available	Skilled ND	unskilled ND

Any other specify	REPAIR WORK UNDERTAKEN DATE STARTING COMPLETION	EXECUTED BY	CHECKED BY	REMARKS

Forwarded to the chairman of VMC :_____on_____ for necessary action.

Signature :_____

Date :_____

ANNEXURE - 4

GENJA
(Agreement with Beneficiaries)

We, the undersigned villagers of village _____

Gewog _____, Dzongkhag _____ and Future

Beneficiaries of _____, **Rural Water Supply** project,

Project Number _____, agree to assume the

following responsibilities failing which we also agree to pay fine :

1. We will not break, damage, harm, directly or indirectly to any con ponent of the **Rural Water Supply** System.

2. We will also ensure that none of the members of our families including Children also do not break, damage, harm directly or indirectly any component of the **Rural Water Supply** System.

3. If we or any member of our families including children violate/violates undertaking as at 1 and 2 above, we will replace the broken/damaged component of the **Rural Water Supply** System at our costs and risks or pay fine as imposed by the Dzongdag. Decision of Dzongdag in the matter will be binding to us.

4. We will fully co-operate with the village Maintenance Committee (VMC) in discharging its responsibilities.

5. We will pay the 'Beneficiaries contributions' as decided by the VMC.

6. We will pay fine as decided by the Dzongdag for violation of undertaking as at 4 and 5 above or for any negligence of responsibility in accordance with Home Ministry circular No. CHA/19/257-89/927 dated March 7, 1989.

Sl No.	Name of the Head of the Household	Son or Daughter of	House Hold No.	Signature	Date

ANNEXURE - 5

RURAL WATER SUPPLY PROJECT COMPLETION & HANDING OVER CERTIFICATE

1. **GENERAL INFORMATION**

Name of **RWS** project: _____,

Village: _____,

Project Number : _____,

Gewog: _____,

Dzongkhag: _____,

Start date of the **RWS** Project: _____,

Date of Completion of the **RWS** Project: _____,

Present population of the **RWS** Project: _____,

Design population of the **RWS** Project: _____,

Date of joint inspection of the **RWS** Project by the District Engineer or his representative (S.O) and the Chairman and members of VMC (CT must be present during joint inspection): _____,

2. TECHNICAL INFORMATION

2.1 TYPE OF SYSTEM: Open/closed

2.2 TYPE OF SOURCE: Spring/stream

2.3 YIELD OF THE SOURCE (liters per second)

As per survey/Design: _____.

As observed on the day of joint inspection. _____.

2.4 TOTAL PIPE LENGTH OF THE PROJECT: _____.

2.5 IS THE SOURCE PROTECTED: Yes/No.

2.6 COMPONENTS

(Completed satisfactorily as per approved project)

Spring Intake: _____.

Stream Intake: _____.

Sedimentation Tank (m^3): _____.

Transmission pipeline (Main line): _____.

Type of pipe provided: HDPE/GI/ Both HDPE & GI

Sl.No	Type	Diameter	Class	Length
1.	HDPE			
2.	GI			

No. of Globe valve along with valve box: _____.

No. of Gate valve along with Valve box: _____.

No. of Air valve along with valve box: _____.

No. of washout arrangements along with cover: _____.

Break pressure Tank (BPT): _____.

Number: _____.

Open BPT/closed BPT: _____.

Clear Water Reservoir (CWR): _____.

Number/Type /Capacity (m^3): _____.

Number of Tapstands provided: _____.

No.of Stream and Gully crossings: _____.

Any other special structures: _____.

2.7 NUMBER OF PERSONS INVOLVED IN CONSTRUCTION :

	Number of Days	Labour rate (NU.per person per day)	Total Labour charge (NU)
Skilled labour :			
Unskilled labour:			
Total Labour :			

2.8 PROJECT COMPLETION COST (IN 'NU')

Survey	:	
Materials	:	
Transportation	:	
Labour	:	
Skilled	:	
Unskilled	:	
Grand Total	:	

2.9 COST SHARING (NU)

Contribution by	In Ngultrums	In percentage
RGOB/DWH/PHE DIVISION	Nu.	%
BENEFICIARY	Nu	%
UNICEF	Nu.	%
TOTAL	Nu	%

3. NAME OF THE DISTRICT ENGINEER: _____,

3.1 NAME OF THE S.O: _____,

3.2 NAME OF THE FITTER/PLUMBER: _____,

3.3 NAME OF THE MASON: _____,

3.4 NAME(S) OF THE CARETAKER(S) ASSOCIATED WITH PROJECT DURING CONSTRUCTION: _____,

1. THE ROUTINE/REGULAR MAINTENANCE, MINOR REPAIR PROGRAMME OF THIS RWS PROJECT HAS BEEN DISCUSSED IN DETAIL.

5. THE CHAIRMAN, CARETAKER, THE TREASURER AND ALL OTHER MEMBERS OF THE VMC ARE AWARE OF THE RESPONSIBILITIES OF THE VMC AND THE CARETAKER.

6. IT IS ALSO CERTIFIED THAT A VMC HAS BEEN CONSTITUTED AND A CARETAKER HAS BEEN APPOINTED AND TOOK ACTIVE PART DURING CONSTRUCTION PHASE OF THIS PROJECT.

7. IT IS CERTIFIED THAT THE UNDERSIGNED HAVE THOROUGHLY INSPECTED THE WHOLE SYSTEM OF THIS RWS PROJECT AND ARE SATISFIED WITH THE COMPLETION OF THE PROJECT.

8. IT IS CERTIFIED THAT THE ABOVE PROJECT HAS BEEN TAKEN OVER BY VMC FOR OPERATION AND MAINTENANCE OF THE SYSTEM AS PER RESPONSIBILITIES DEFINED IN CHAPTER 3.

9. DRAWING SHOWING GENERAL ARRANGEMENTS OF THE RWS PROJECT IS ENCLOSED.

Name of District Engineer: _____,

Signature: _____,

Date: _____,

Name of S.O incharge of the Project during of the construction of the RWS Scheme: _____,

Signature: _____,

Date: _____,

Name of Chairmanof VMC: _____,

Signature: _____,

Date: _____,

Name of Caretaker: _____,

Signature: _____

Date: _____

Name of treasurer: _____

Signature: _____

Date: _____

Members :

Sl No	Name	Designation	Signature
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

Name of Dzongdag: _____

Dzongkhag: _____

Signature: _____

Date: _____

ANNEXURE - 6

CHECKLIST FOR ROUTINE/REGULAR MAINTENANCE OF GRAVITY FLOW WATER SYSTEM

SL No#	Component	Checklist	Frequency of check
1.	Source		
		Pollution	Once in two weeks
		a. To ensure that no defecation is taking place in and around the source b. Source is protected from animals c. Burning of dead bodies of human beings or animals should not be allowed in and around the source.	
		Flood	- do -
		a. Flood protected wall b. Spill over and drainage arrangement	
		Drying	- do -
		a. Prevention of deforestation around the source b. Plantation of trees around the source	

SL No#	Component	Checklist	Frequency of check
2.	Intake Spring/Stream		
		Accessibility	a: Spring . Once a month b: Stream . Twice a month During monsoon this frequency has to be increased to weekly inspections.
		Approach and Intake Stream surroundings should be cleared	
		Strainer	-do-
		Check and clean outlet pipe strainer	
		Cover	-do-
		Check cover of Intake Chamber for damage, cleanliness, repair and clean if required.	
		Valves,valve boxes and vent pipe	-do-
		a Check all pipes, fittings, valves for leakage and blockage b Check whether valve boxes are covered, cleared and drained c. Check valve box walls for damage and leakage d. Check all the fittings of vent pipe	
		Erosion and landslides	-do-
		a Check for erosion and landslides and repair with local materials as when required b If damages are major report to the concerned authority c Clean intake tank, drainage ditch and surrounding area	

SL No#	Component	Checklist	Frequency of check
3.	Transmission pipeline (Main pipeline)		
		Pipeline	At least once in a month
		a. Ensure that pipeline is not exposed . b. Check breakage, blockage and leakage of pipelines and illegal connections c. Check all the areas around the pipeline for erosion or land-slides.	
		Stream and Gully crossings	-do-
		a. Check anchoring structures for damage b. Check supporting pillars for damage c. Check binding of pipes d. Check erosion of banks e. Check that cable is taut	
		Valves and Valve boxes	At least once in a month
		a. Check all valves and valveboxes including walls for leakage and damage b. Check whether valve-boxes are covered, cleaned and drained	

SL No#	Component	Checklist	Frequency of check
4.	Valves		
		Proper fittings	Twice a month for all valves, but weekly during monsoon
		a. Check all valves have got proper fitting. b. Check for leakages, blockages and proper functioning. c. Check all valves for grease by opening and closing	
		Valve boxes	-do-
		a. Check all valves are placed in valve boxes b. Check valve box covers for damages and locking arrangements c. Check drainage arrangements of valve boxes d. Check cleanliness of valve boxes	

SL No#	Component	Checklist	Frequency of check
5.	Break Pressure Tank		
		Proper fittings	Once in a month
		a. Check float valve present and functioning b. Check strainer for cleaning c. Check drainage arrangements d. Check all the valves including valve boxes, vent pipes for leakages, blockages and proper functioning.	
		Fencings	
		a. Check for proper fencing	
		Cover	-do-
		a. Check cover, roof, walls for damage b. Check for erosion and landslides	
		Cleanliness	-do-
		Check cleanliness of the tank	

SL No#	Component	Checklist	Frequency of check
6.	Clear Water Reservoir (CWR)		
		Fittings and accessories	Once in a month
		Check for the blockages, leakages and proper functioning of inlet, outlet, with strainer, air vent,overflow, and washout.	
		Cover	-do-
		Check for cover and locking arrangement for damages	
		Landslide and erosion	-do-
		a. Check land slide and erosion area b. Check drainage of surrounding area	
		Cleanliness	-do-
		Check cleanliness of the surrounding area such as no delecation takes place, and the area is not exposed to the animals	
		Fencing	-do-
		Check for proper fencing	

SL No#	Component	Checklist	Frequency of check
7.	Distribution system		
		Pipeline	At least once in a month
		a. Ensure that pipelineis not exposed. b. Check breakage, blockage & leakage of pipelines & illegal connections c. Check all area around the pipelines for erosion of landslides	
		Stream and Gully Crossings	-do-
		a. Check anchoring structures for damage b. Check supporting pillars for damage c. Check binding of pipes. d. Check erosion of banks. e. Check that cable is taut.	
		Valves and Valves boxes	-do-
		a. Check all valves and valve boxes including walls for leakage and damage b. Check whether valve boxes are covered, cleaned and drained.	

SL No#	Component	Checklist	Frequency of check
8	Tapstands		
		Erosion	Once in a week
		Check surrounding area for erosion	
		Drainage	-do-
		a. Check damage and blockage of drainage b. Check stagnation of splash water in the surroundings.	
		Cleanliness	-do-
		a. Check cleanliness of the surroundings b. Check intervention from animals near tapstands c. Check cleanliness of the platform	
		Valves and fittings	-do-
		a. Check for blockages, leakages, damages for valves including valve boxes and fittings b. Check cleanliness of valve - boxes including drainage c. Check cover and locking arrangements of valve boxes	
		Taps	-do-
		a Check breakages, leakage including washers of taps b. Check the flow of water from taps	

SL No#	Component	Checklist	Frequency of check
9.	Sedimentation Tank		
		Fencing	Once in 15 days but during monsoon once in 7 days
		Check for proper fencing	
		Cleanliness	-do-
		Check cleanliness ofsurrounding area	
		Valves and fittings	-do-
		a. Check all valves particularly scour valve including valve boxes and fittings for leakage, blockage,damage and proper functioning and cleaning of tanks. b. Check valve boxes including covers for damages and provision of locking arrangements and drainage.	
		Landslides and Erosion	-do-
		Check protection from landslides and erosion.	