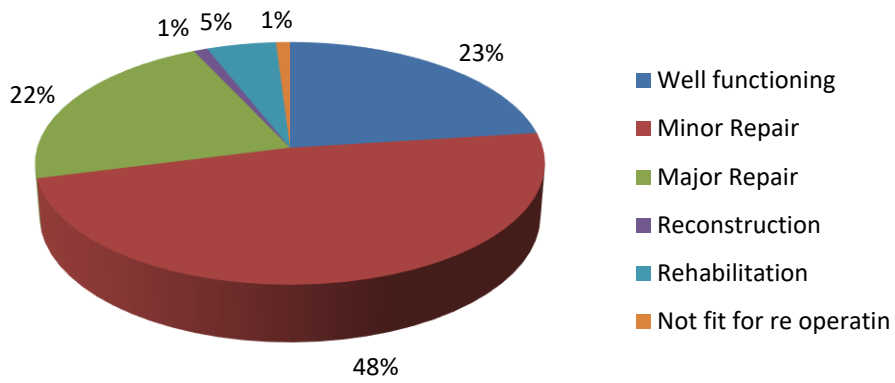
POST COMPLETION STUDY OF DRINKING WATER AND SANITATION SCHEMES: WITH A SPECIAL FOCUS ON OVERALL FUNCTIONALITY



Water Resources Management Program (WARM-P)
Helvetas Intercooperation
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Thakur Prasad Bhatta
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ABBREVIATIONS

BPT	Break Pressure Tank
CC	Collection Chambers
CWSSP	Community Water Supply and Sanitation Program
DC	Distribution Chamber
DDC	District Development Committee
FGD	Focus Group Discussion
HH	Household
IC	Interruption Chamber
LLB	Local Latrine Builder
NA	Not Available
NEWAH	Nepal Water for Health
NGO	Non-governmental Organization
NRs	Nepalese Rupees
RRWSFDB	Rural Water Supply and Sanitation Fund Board
RVT	Reservoir Tank
RWH	Rain Water Harvesting
SI	Source Improvement
SRWSSP	Self Reliant Drinking Water and sanitation Support Program
SSQ	Scheme Survey Questionnaire
VMW	Village Maintenance Worker
VDC	Village Development Committee
WARM-P	Water Resources Management Program
WATSAN	Water and Sanitation
WTCT	Women Tap Stands Care Takers
WUMP	Water Use Master Plan

EXECUTIVE SUMMARY

Since 2001 WARM-P / Helvetas has been supporting water resources management initiatives at community level in Nepal. WARM-P is a community based program that supports local communities for integrated planning and development of water resources providing technical assistance to VDCs to prepare Water Use Master Plan (WUMP). Another principal component of the program is to support implementation of water and sanitation schemes prioritized by the communities themselves through the WUMPs– about 60% of the program resources are spent in this component alone. Life of Drinking water and sanitation (DWS) schemes implemented with the support of WARM-P is assumed to be of 20 years. There is practice of carrying out follow-up studies after completion of construction of the DWS schemes within the period of two years through internal monitoring mechanism of the program.

However, there have been no formal studies after final follow ups on the functioning of DWS scheme within the design period. WARM-P has realized this necessity and decided to conduct a study by external consultants on functional status of DWS schemes completed with its supports especially in the older schemes which have already crossed more than five years after the completion. This report is the outcome of the study which was carried out in November – December 2011.

The objectives of the study were to identify the overall functional status of the schemes considering both the technical and social /institutional parameters to Identify the effectiveness of WARM-P's technology, approach and methods, and to provide inputs for designing the WARM-P's next phase. The study has mainly employed quantitative survey method to collect primary information at the scheme level. Along with this, participatory research methods like focus group discussions, key informant interviews, stakeholders meeting and observation visits were used during the study. Scheme level survey was carried out of 98 schemes using structured comprehensive questionnaire.

Status of water sources overtime, hydraulic flows at different water- points of schemes and condition of individual structures were examined in detail. It was found that 71 % of water sources were as it was in time of scheme completion while 5 % was found dried up. Status of hydraulic flow from intake to reservoir showed that 66 % of schemes were running with water flow from sources to reservoirs same to deign flow and more than that of as it was designed. Water flow in main pipeline was found running regularly with full flow in 80 % of pipeline's segments while it was 74 % in case of distribution pipelines. Similar result was found with taps as 78 % of taps were found running with full water flow.

Water service delivery through the gravity flow DWS schemes was examined in terms of months in a year and number of hours in a day. It was found that water service was available in about 85 % of the schemes for whole years. Of the total schemes, 6.5 % were found providing water for only six months in a year. Similarly 70.7 % were found supplying water above 8 hours a day while 9.8 % of schemes were supplying water for less than 3 hours a day.

Physical conditions shows that majority of structures were in good condition with no need of repair or need of minor repair conditions. In case of maintenance of masonry of structures, reservoir tanks were found in no need repair case in highest number as 77.5 % of RVTs found in this category. In case of intake, 55.2 % was found in no need of repair while about 6 % were in condition of need reconstruction. Conditions of fittings were found in moderate condition which was mainly due to use of plastic fittings instead of usual GI fittings during the conflict period in the country as GI fitting was difficult to transport at that time. Findings on condition of fittings suggest for replacement previous fittings from 11 to 27 % of various structures.

While examining community management aspects, only 24.5 % of UCs was found reformed over the time. UCs registered with District Water Resource Committee was found to be 28.6 % of total UCs. It was found that almost of the schemes had established O&M fund during implementation when there was program's support in process facilitation. But after withdrawal of program support, majority of schemes has not collected O&M fund as only 28% of UCs were found collecting regularly. However, it was found that majority of schemes were taking fund from DDC/VDC or other agencies for the repair and maintenance of the schemes. Of the total schemes, 58 % was found spending money in repair and maintenance from various sources. Considering such issues related to the community management, for the institutional development of UCs there should be certain period support from the program to strengthen the UCs after the completion of schemes too.

65 % of VMWs were found active in their respective schemes. WTCT were found active about 57 % while 70 % of LLB and RWH Mistris were found actively working. Tools for maintenance were available for about 90 % of the schemes. For the full mobilization of VMWs and WTCTs there should be institutional mechanism to provide them refresher training as well as new training if there is absence of previously trained workers.

It was found that 64.5 % of total beneficiary households were using latrines. However, perception of UCs on general impacts of water and sanitation services was found highly encouraging as it was reported that prevalence of diarrhea has decreased by 98 % and use of saved time from fetching water was used in productive and social work by about 90 % of the beneficiaries.

Assessment of overall functionality of DWS schemes found majority of schemes in minor repair condition which was 48 %. Schemes in well functioning condition were 23 % of total schemes. Thus 71 % of the schemes were found operating comparatively in better conditions. For good functioning and sustainable operation of DWS schemes three factors mainly condition of water flow, physical condition of structures, and community management of schemes were found as leading factors. Though the water flow was found in well condition at majority of structures, the overall functional status of the schemes in well functioning condition was found rather low i.e. 23 % because of physical conditions of majority of structures in minor repair condition. However, functionality of schemes is not impeded due to minor repairs though it is essential to consider it to prevent further deterioration of the physical structures of schemes for sustainable operation. As intakes and main pipelines were found in more need of repair

and maintenance, these structures should be considered seriously for their design, implementation and maintenance.

WARM-P approach which has effective stepwise process in planning, implementation and operation of DWS schemes should incorporate water quality and environmental aspects. The concept of community or public tap stand should be reviewed seriously and there should be assessment of the households' willingness for private connection during the feasibility study of the schemes. Hence policy with multiple options on private connection and community tap stands should be developed. This will prevent the misuse of resources being spent on constructing public tap stands. There should be exploration on effective collection and mobilization of O&M fund. As UCs were found getting fund from various sources and not collecting regularly at their own there should be certain mechanism at VDCs and DDC level for the basket O& M fund instead of only with the UCs. Public audit system of the WARM-P is another important aspect that stakeholders appreciate as an effective process for people participation and accountability. This method should be disseminated among other WATSAN agencies for the replication. WARM-P practice of deputing technical and social staff in each scheme has attributed a lot for the quality of the schemes.

The issue is that how to increase ownership of local government bodies in the spirit of Local Self Governance Act. There is no as such any mechanism to monitor and support the completed schemes. It has fully relied on the activeness of the UCs. There should such fund that VDC could support for major repairs. Similarly, there should be WATSAN network at VDC level which can play role in facilitating and mobilizing UCs within the VDC.

WARM-P approach of WUMP was well appreciated by the key stakeholders. However, its use is still limited. Thus there is still challenge to bring the WUMP into practice. WARM-P should concentrate its effort to create easy access for all WATSAN agencies working in the district to WUMPs information through DDC, VDC and DWSO division offices for the maximum utilization of WUMP and its institutionalization.

While undertaking studies on functionality of DWS schemes, it is suggested to include cost estimation for the maintenance of structures of the schemes to upgrade them to the level of well functioning schemes. And there should be institutional mechanism for WATSAN agencies to support for repairing, reconstruction and rehabilitation of such schemes as per the requirement based on such study on functionality rather than only looking for the new schemes in coming days for sustainable water service.

1. INTRODUCTION

1.1. Introduction

Helvetas Nepal's engagement in water and sanitation sector (WATSAN) is since 1976 with the initiation of Community Water Supply and Sanitation Program (CWSSP) which remained in implementation up to 1994. This was followed by another WATSAN program- Self Reliant Drinking Water and sanitation Support Program (SRWSSP) which was executed during 1995-2000. Based on the lessons and experiences of the CWSSP and SRWSP Helvetas Nepal made a programmatic shift in 2001 developing Water Resources Management Program (WARM-P). Since 2001 WARM-P / Helvetas has been supporting water resources management initiatives at community level in Nepal.

WARM-P is a community based program that supports local communities for integrated planning and development of water resources and enhancing local capacity for the same. WARM-P has been carrying out mainly four types of activities for supporting development and management of water resources at the community level. The activities comprise supporting VDCs to prepare Water Use Master Plan (WUMP) and advocate for its replication, support construction of water and sanitation schemes prioritized by the communities and develop local capacity.

However, support to construct drinking water and sanitation schemes identified, planned and prioritized by the local communities is the key component and major activity of WARM-P. Almost 60% of the program resources are spent in this component alone. The program provides nonlocal materials, skilled labor, technical support and cash for construction of the drinking water and sanitation schemes while the local communities contribute local materials and unskilled labor for the same. It has been implementing drinking water schemes under the overall sector-leadership and policy guidance of the Department of Water Supply and Sewerage (DWSS) of Government of Nepal.

Scheme life of Drinking water and sanitation (DWS) schemes implemented with the support of WARM-P is assumed to be of 20 years. WARM-P step wise approach has well defined steps of carrying out two follow-up studies of the DWS schemes after completion of construction within the period of two years. The first follow-up is conducted after 6 months of completion of a scheme while the second or the final follow-up is conducted after 18 to 24 months. Though the findings of these follow ups so far conducted report in general that the structures of DWS schemes constructed are found mostly intact and schemes as a whole functional during the two years period immediately after the scheme completion.

However, there has been no formal studies after final follow ups on the functioning of DWS schemes within their designed period of scheme of life. WARM-P has realized this necessity and decided to conduct a study by external consultants on functional status of DWS schemes completed with its supports especially in the older schemes which have already crossed many years after the final follow-up. This report is the outcome of the study which was carried out in November – December 2011.

1.2. Objectives of the Study

The objectives of the study were as following:

- To identify the overall functional status of the schemes considering both the technical and social /institutional parameters
- To Identify the effectiveness of WARM-P's technology, approach and methods, and
- To Provide inputs for designing the WARM-P's next phase (2013-2015) and subsequent plans and policies

Within the premises of the above objectives, the study has tried to answer the following key questions:

- What are the conditions of the different structures constructed? (structural and hydraulic)
- What are the conditions of the water sources? is there any change in water discharge over the years?(based on the experience of the users)
- What is the overall functional status of the schemes?
- What is the functional status of the UCs?
- What is the status of the O&M fund? How far it has been used for the purpose it was collected? What could be an effective means for use of O&M fund for the intended purpose?
- What is the status of the service providers (LLB / VMW / WTCT / RWH Mistris) developed by the program? Are they available around? Are they working as per ToR.
- Are the schemes sustainable? Will they run up to the designed period?

1.3 Organization of the Report

The report is organized into seven sections begins with introductory section which briefly presents overview of the scheme and objectives of the study. Methodology in section two briefs the nature of research and tools used in carrying out the study. Findings of the study are mainly presented in sections three to five. The third section presents findings on water sources and physical structures of the DWS schemes. Findings related to social aspects are presented in chapter four. Chapter five gives the overall functionality of the DWS schemes. Program approach and its effectiveness in terms of its functionality are discussed in section 6. Section seven extracts conclusion and suggests recommendations. Finally, appendices make up the final section of the report.

2. METHODOLOGY

The study has mainly employed quantitative survey method to collect primary information at the scheme level. Along with this, participatory research method was also used to obtain qualitative information. Such mixed research approach was intended to validate information collected using either method. The methods, tools and procedures used in carrying out the study are described here briefly.

2.1 Review of Documents

Relevant studies on WATSAN sector mainly on functionality assessment were reviewed. Salient features of the DWS schemes that were selected for the study were reviewed. Similarly follow up guidelines of WARM-P also reviewed. Mainly studies and documents on functionality and sustainability from DWSS and other national level agencies were explored and consulted.

2.2 Framework for the study

Schemes which have completed five years or more were taken under the framework of the study. All types of schemes – gravity flow, source improvements and rainwater harvesting – which meet this criterion being completed during 2001 to 2004 were covered by the study. Thus the study employed census survey of all DWS schemes older five years or more than that. However, few numbers of schemes which were found highly scattered and inconvenient because of survey administration in view of time constrains were left out without any discrimination. Distribution of the schemes covered by the questionnaire survey is given in the Table 1.

Table 1: Study frame work and distribution of the DWS schemes

Region/Districts	Gravity system	Source Improvement	Rainwater Harvesting	Total
Western Region				
Kaski	5	2	2	9
Syangaja	11	2	2	15
Tanahun	6	1		7
Parbat	3			3
Mid western				
Dailekh	11	1		12
Jajarkot	7			7
Far Western				
Doti	31	4	2	37
Achham	3	1		4
Dadeldhura	3	1		4
Total	**80**	**12**	**6**	**98**

2.3 Preparation of questionnaire and checklist

To collect information on the various aspects of DWS schemes 'Scheme Survey Questionnaire (SSQ)' was prepared based on the terms of reference provide by the WARM-P. The structured PSQ was shared with WARM-P to get comments and feedbacks. Afterward the PSQ was finalized incorporating all feedbacks received from WARM-P including feedbacks received through the Enumerators orientation workshop held before launching the survey (Annex 2). A standard checklist was developed to collect qualitative information using participatory tools for FGD and KI (annex 3).

2.4 Orientation to Enumerators

One day orientation was provided to the field enumerators on PQS to gain clarity and uniformity on understanding the contents of questionnaire. This orientation workshop also prepared field planning for the scheme survey using the scheme questionnaires.

2.5 Scheme Questionnaire Survey

All schemes that fall under the study universe were surveyed using the scheme questionnaires. Respondents of survey were the user committees and trained local persons like LLBs, VMWs and RWH Mistris of respective schemes.

2.6 Focus group discussion and observation visits:

From the total schemes covered by the census survey, some of the schemes, around 10 %, were selected for observation visits and focus group discussion (Annex 4). Members of user committees and trained local persons like LLBs, VMWs and RWH Mistris of respective schemes were the participants of FGD. A standard checklist for the focus group was used (Annex 3). Physical structures and their functionality and operational management of the schemes were observed during the observation visits of the schemes.

2.7 Discussion with the key stakeholders at the district level:

Discussion with district level stakeholders working in WATSAN sector was carried out in the selected three districts taking one district in each region. Such interaction was carried out in Doiti (FWR), Dailekh (MWDR) and Syangja (WDR). Government agencies namely DDC and DWSO Local NGOs, WATASAN agencies working in the district, Federation of Water and Sanitation Users were met and interacted. A standard checklist was used for the interaction with the stakeholders (annex 3).

2.8 Interaction with central level WATSAN Agencies

Central level agencies working in WATSAN sector were met and interacted to get their concept and indicators on the functionality of DWS schemes. Suggestions were also sought ho the functionality can be improved in the future.

2.9 Data Analysis:

Data collected through PQS was entered in the master data entry sheet developing Excel database system. These data were processed developing various data tables to organize and analyze data to interpret in meaningful way as per the requirement of the study. Similarly qualitative information were also processed and analyzed.

3. WATER SOURCES, HYDRAULIC FLOW AND STRUCTURES OF SCHEMES

Before going to the overall functional status of the DWS schemes the study has presented the findings on the status of water sources, water flow and condition of various physical structures of the DWS schemes in this section.

3.1 Status of Water sources

Perennial water sources as of the scheme design time is determining factor for the functioning and sustainability of water schemes for the gravity flow systems. The study has collected information on the status of water sources whether the sources undergone with any changes in the yield overtime since the scheme was completed. The information was based on the observation and local knowledge of the user committee and VMWs who were involved regularly in the operation of the scheme. It should be noted that there were 221 water sources taped for 92 gravity flow schemes. It was found that 24 % of water sources has decreased yield than it was in time of scheme completion. The survey revealed that 5 % of water sources were dried up over time after the scheme completion. However, yield level of majority sources -71 %, was found in constant level as it was in time of project completion.

Table 2: Status of water source yield

Status of source	No. of sources	Sources in %
As it was in time of scheme completion	158	71
Decreased than the year of scheme completion	52	24
Dried up	11	5
Total	221	100

Source: Scheme level survey, 2011

3.2 Hydraulic Flow

Water flow as per the design and changes occurred overtime in the scheme system was examined. It is important to examine the hydraulic flow as a scheme with good physical structure may have been experiencing hydraulic problem in water flow. Condition of hydraulic flow was examined in various ways- source to RVT, water service in terms of months and hours, water flow in pipelines and water flow in tap stands.

3.2.1 Water Flow from Source to RVT:

It was found that that 66.3 % of schemes were running with water flow from source to reservoirs same to deign flow and more than that of design flow. While about 34 % were reported experiencing water flow less than that of deign flow.

Table 3: Status of water flow from source to RVT

Status of Water Flow	No. of Schemes	Schemes in %
Same to design flow	1	1.1
More than design flow	60	65.2
Less than design flow	31	33.7
Total	92	100

Source: Scheme level survey, 2011

3.2.2 Water flow in pipelines:

Water flow in Pipelines was examined of main and distribution lines taking into account of all segments individually. It was found that regular and full water flow was in 80.2 % and 73.6 % of main pipeline and distribution pipeline segments respectively. No water flow was found higher in the segments of distribution pipeline than in the segments of main pipeline which was 13.2 % in the former and only 4.5 % in case of latter.

Table 4: Status of Water flow in pipeline

Status of water flow	Main pipeline		Distribution pipeline	
	Nos. of segments	In %	Nos. of segments	In %
Regular and full water flow	195	80.2	637	73.6
Full water flow but with sometimes interruption	25	10.3	72	8.3
Less water flow but with sometimes interruption	12	4.9	43	5.0
No water flow	11	4.5	114	13.2
Total	243	100.0	866	100.0

Source: Scheme level survey, 2011

3.2.3 Water flow in taps:

Water flow in taps was examined on the basis of users' experiences and observations. It was found that 78.03 % of taps were discharging full water flow. There were 15.7 % of taps with no water flow at all.

Table 5: Status of Water flow in taps

Tap stands with full water flow	No. of tap stands	In %
Taps with full water flow	735	78.03
Taps with less water flow	61	6.48
Taps with no water flow	146	15.50
Total	942	100.00

Source: Scheme level survey, 2011

3.2.4 Availability of water service:

Water service delivery through the gravity flow DWS schemes was examined in terms of months in a year and number of hours in a day. It was found that water service was available in about 85 % of the schemes for whole years. 6.5 % of schemes were found providing water for only six months in a year.

Table 6: Water supply in months

Water supply in months	No of schemes	Schemes in %
whole year (12 months)	78	84.8
7-11 months	7	7.6
1 to 6 months	6	6.5
0 month	1	1.1
Total	92	100

Source: Scheme level survey, 2011

Of the total gravity schemes 70.7 % were found supplying water above 8 hours a day while 9.8 % of schemes were supplying water for less than 3 hours a day.

Table 7: Water service in terms of hours in a day

Water service in a day (in No. of hours)	No. of Schemes	Schemes in %
Up to 3 Hours a day	9	9.8
4 - 8 Hours a day	18	19.6
Above 8 Hours a day	65	70.7
Total	92	100.0

Source: Scheme level survey, 2011

3.3 Condition of Physical structures

Findings of Conditions of physical structures of gravity flow system are presented in this section. RWH schemes' findings are presented separately after this section. Detail analysis of physical structures is essential to get information on the hindrances that are occurring on functionality. Fencing, fittings and maintenance status of structures namely intakes, reservoirs, break pressure tanks, interruption chambers, collection chambers and distribution chambers were taken as the parameters to explain the condition of these structures which are explained first. Then maintenance condition of pipeline and tap stands has been presented separately.

3.3.1 Status of fencing in structures

Fencing indicates the protection measures and its maintenance condition reveals the responsiveness of users towards the schemes. Fencing was found in well condition in highest number in RVTs among the structures as 87.6 % of RVTs had well fencing. But in intakes, the fencing in well condition was only 51.6 %.

Table 8: Status of fencing in structures

Description of Structure	Status of fencing (in nos. of schemes and %)						
	well condition	in %	not working well	in %	No fencing	in %	Total
Intake	111	51.6	47	21.9	57	26.5	215
RVT	155	87.6	16	9.0	6	3.4	177
Collection Chamber	85	79.4	17	15.9	5	4.7	107
BPT	56	66.7	21	25.0	7	8.3	84
DC	29	78.4	5	13.5	3	8.1	37
IC	18	81.8	2	9.1	2	9.1	22

Source: Scheme level survey, 2011

3.3.2 Physical Condition of structures

The study examined physical conditions of structures of 92 gravity schemes. There were about two intakes and two reservoirs in a scheme in an average. Among the structures RVT was found in no need repair case in highest number as 77.5 % of RVTs found in this category. In case of intake, 55.2 % was found in no need of repair while about 6 % were in condition of need reconstruction. Table 9 gives details of each structure maintenance condition.

Table 9: Physical condition of structures

Structure	Status of structures								Total
	No need of repair	in %	Need minor repair	in %	Need major repair	in %	Need reconstruction	in %	
Intake	122	55.2	59	26.7	27	12.2	13	5.9	221
RVT	141	77.5	29	15.9	5	2.7	7	3.8	182
CC	79	73.8	20	18.7	4	3.7	4	3.7	107
BPT	56	66.7	13	15.5	10	11.9	5	6.0	84
DC	28	75.7	7	18.9		0.0	2	5.4	37
IC	18	81.8	3	13.6	1	4.5	0	0.0	22

Source: Scheme level survey, 2011

3.3.3 Condition of Fittings

Condition of fittings in various structures shows somewhat different picture in compare to fencing and physical conditions. Fittings in BPT were found in poor condition compare to other structures. Like in fencing and physical conditions, fittings were also found in comparatively in good condition of RVT as 68.9 % of its fittings were in no repair condition.

Table 10: Condition of Fittings

Structure	**Status of fittings**						
	No need of repair	**in %**	**need of minor repair**	**in %**	**need to replace**	**in %**	**Total**
Intake	126	58.9	45	21.0	43	20.1	214
RVT	124	68.9	35	19.4	21	11.7	180
CC	62	57.9	32	29.9	13	12.1	107
BPT	37	44.0	24	28.6	23	27.4	84
DC	23	62.2	6	16.2	8	21.6	37
IC	15	68.2	4	18.2	3	13.6	22

Source: Scheme level survey, 2011

For such moderate condition of fittings was mainly due to use of plastic fittings instead of usual GI fittings during the conflict period in the country as GI fitting was difficult to transport at that time. Thus the findings on condition of fittings suggest for replacement previous fittings from 11 to 27 % of various structures.

3.3.4 Condition of Pipelines

Condition of both pipelines main and distribution were examined taking into account of all segments. There were 244 segments in main pipeline of 92 schemes while it was 868 in distribution pipeline of the same.

Table 11: Condition of pipelines

Condition	Main pipeline		Distribution pipeline	
	No of segments	Segments in %	Segments in %	in %
No need of repair	143	58.6	616	71.0
Need minor repair	68	27.9	163	18.8
Need major repair	28	11.5	59	6.8
Need reconstruction	5	2.0	30	3.5
Total	244	100.0	868	100.0

Source: Scheme level survey, 2011

Condition of distribution pipeline was found in more good condition than main pipeline as 71 % of its segments was in no need of repair condition while it was only 58.6 % in case of main pipeline. But segments in condition of need reconstruction of main pipeline was only 2 % which is less than of distribution line as it was 3.5 % that was in condition of reconstruction.

3.3.5 Condition of Tap stands

There were 897 taps in time of scheme completion which were counted 942 in time of scheme survey which comes to be 5 % increment in total over the years. The average number of taps per scheme which was 9 in time of scheme completion was found to be 10 at the time of scheme survey.

Table 12: Number of taps

Description	Figures
No. of schemes	92
No. of taps in scheme completion year	897
Average no. of tap stands in scheme completion year	9.8
No. of taps at present	942
Average no. of taps in present	10.2

Source: Scheme level survey, 2011

The study found that 78.4 % of tap stands was in condition of no need of repairs while 5.1 % of them was in need of major repair.

Table 13: Condition of tap stands

Description	No. of tap stands	Tap stands in %
Tap stands with no need of repair	732	78.4
Tap stands with minor repair	154	16.5
Tap stands with major repair	48	5.1
Total	934	100.0

Source: Scheme level survey, 2011

3.4 Rain Water Harvesting System

There were six RWH systems included in the study. Households benefitting from the RWH schemes were 321 in time of scheme completion and there was no any change over time.

Table 14: Details of RWH Jars

Description	Capacity of jars and their respective numbers			Total
	6.5 m3	2 m3	6 m3	
Jars in time of scheme completion	257	33	23	313
Jars constructed by Users themselves	o	0	0	0
Total	257	33	23	313

Source: Scheme level survey, 2011

3.4.1 Condition of Water collection jars

Condition of water collection jars is the determining factors of functionality of RWH system. It was found that 76 % of jars were in condition of no need of repair.

Table 15: Conditions of water collection Jars

Status of jars' structure	Capacity of Jars and respective number			Jars in %
	6.5 m3	2 m3	Total	
Need no repair	222	16	238	76.0
Need minor repair	42	7	49	15.7
Need major repair	16	10	26	8.3
Need reconstruction	0	0	0	0
Total	**280**	**33**	**313**	**100**

Source: Scheme level survey, 2011

Table 16: Operational condition of Jars

Descriptions	Capacity of Jars and their respective number			
	6.5 m3	2 m3	Total	In %
Jars in operation/functioning	267	29	296	94.6
Jars not in operation/functioning	13	4	17	5.4
Total	**280**	**33**	**313**	100.0

Source: Scheme level survey, 2011

Among the households having rainwater jars 70.3 % had not face problem of repairing the jars since they installed. Only 3.8 % of households had repaired jars so far. But 25.9 % of households had not repaired jars though it was needed.

Table 17: Maintenance condition of jars

Maintenance condition of Jars	Figures	in %
HHs repaired Jars	12	3.8
HHs need of repair but not repaired yet	81	25.9
HHs do not need repair of Jars till now	220	70.3
Total	**313**	**100**

Source: Scheme level survey, 2011

3.4.2 Gutter system

Similarly 72.5 % of households had good condition of gutter with no need of repair. While 9.6 % of households gutter was found not working.

Table 18: Condition of gutter

Description	Figures	in %
Condition of Gutter		
HHs with well gutter	227	72.5
HHs with minor repair need of gutter	56	17.9
HHs with not functioning gutter	30	9.6
Total HHs	**313**	**100**

Source: Scheme level survey, 2011

3.4.3 Water sufficiency

Water through rainwater harvesting was found sufficient from 6 to 12 months in a year. 33.3 % of schemes in each had water sufficiency for up to six months, up to nine months and up to 12 months respectively.

Table 19: Water sufficiency of RWH schemes

Average nos. of months of water sufficiency	Schemes	Schemes in %
Up to 3 months	0	0
Up to 6 months	2	33.3
Up to 9 months	2	33.3
Up to 12 months	2	33.3
Total	6	100

Source: Scheme level survey, 2011

3.4.4 Use of water

Of the total households 41.4 % were using rain water harvesting water only for drinking purpose while 28 % were found not using for drinking and remaining households were found using for common purpose.

Table 20: Purpose of use of rainwater harvesting

Use of rainwater	Nos. of HHs	HHs in %
HHs only use as drinking water	133	41.4
HHs using both for drinking and other purpose	98	30.5
HHs not use for drinking but only for other purpose	90	28.0
Total	**321**	**100**

Source: Scheme level survey, 2011

4. SOCIAL ASPECT AND GENERAL IMPACT OF DWS SCHEMES

This section presents the findings on social aspects of the scheme which comprises users' committee, operation and maintenance fund, locally trained skill persons, toilet coverage and impacts of the schemes in beneficiary communities.

4.1. Scheme VDCs and Beneficiary Households

There were 98 schemes included in the survey which were located in 35 VDCs of nine districts. These schemes have served 116 wards. It was revealed from the study that the program has been selective in undertaking the VDCs as the DWS schemes were found concentrated in selected wards of the selected VDCs in the program districts.

Table 21: Geographical distribution of DWS schemes

District	No. of Schemes	No. of VDC	No. of Ward
Achham	4	1	5
Dadeldhura	4	2	4
Dailekh	12	5	18
Doti	37	12	45
Jajarkot	7	4	7
Kaski	9	2	13
Parbat	3	2	3
Syangja	15	4	15
Tanahu	7	3	6
Total	**98**	**35**	**116**

Source: Scheme level survey, 2011

Beneficiary households were found increased in most of the schemes. Number of average households per scheme in time of scheme completion was 58, which was found about 68 in time of survey.

Table 22: Beneficiary households of DWS schemes

Year of Scheme completion	No. of Schemes	Beneficiary HHs		Increment in HHs in %
		In Scheme Completion Year	Present Year	
2000	1	12	28	133.3
2001	5	243	275	13.2
2002	12	573	660	15.2
2003	33	2071	2411	16.4
2004	28	1471	1712	16.4
2005	13	996	1169	17.4
2006	5	238	280	17.6
2007	1	99	109	10.1
Total	98	5703	6644	16.5

Source: Scheme level survey, 2011

Increment of beneficiary households over years after scheme completion was found to be increased in an average by 16.5 %.

4.2. Users Committee

There were users committee formed in all 98 schemes. Of them only 24.5 % of UCs were reformed over the time. UCs registered with District Water Resource Committee was found to be 28.6 % of total UCs.

Table 23: Details of Users' Committees

Description	Number	in %
Schemes in total	98	
UCs formed	98	
UCs reformed	24	24.5
UCS registered	28	28.6
Meeting held in last years	264	
No. of UCs holding meetings last year	58	59.2

Source: Scheme level survey, 2011

There was 59.2 % of UCs that had held their meetings which shows active performance of these UCs.

4.3 Operation & Maintenance Fund and its utilization

Almost of the UCs of gravity flow schemes had collected O&M fund in time of project completion. However, only 28.3 % of UCs was found collecting O&M fund regularly. The amount of O&M fund was found varying from NRs.5000 to 200000. Amount of O&M fund collected was found to be up to NRs. 50,000 with majority of UCs.

Table 24: Details of O&M Fund with UCS

Description	No. of schemes	In %
Amount of O&M fund collected (NRs.)		
0 to 5000	33	36.3
5001 to 10000	23	25.3
10001- 20000	15	16.5
20001 - 50000	14	15.4
50001-100000	4	4.4
Above 200000	2	2.2
Total	91	100

Description	No. of schemes	In %
Place of deposit		
Bank/financial institutions	42	48.3
With Users committee	15	17.2
In loans distribution	8	9.2
Any two or all of above	22	25.3
Total	87	100
Reasons behind not collection of fund regularly		
No concern of Users	7	10.1
Passive UCs	15	21.7
Scheme defunct	1	1.4
Mixed reason	38	55.1
Others	8	11.6
Total (n=69)	69	100

Source: Scheme level survey, 2011

About 48 % of UCs had deposited the collected O&M fund in bank while 25.3 % of UCs was found practicing of keeping money with the both the bank and UCs and even putting into loans. For the reasons not collecting the fund regularly, no concern of users and passiveness of UCs were found causing factors. Of the total schemes 25 UCs of schemes were found collecting O&M fund regularly and the rate of regular collection was found to be from NRs.5 to 20 per household per month.

Table 25: Rate of O&M Fund

Rate of O & M collection per month per HHs	All scheme that once collected (in nos. of schemes)	in %	Schemes that are regularly collecting	in %
5 and < 5 Rs.	53	58.2	9	36.0
6 - 20 Rs.	26	28.6	8	32.0
21 - 50 Rs.	6	6.6	3	12.0
51 - 100 Rs.	5	5.5	4	16.0
101 - 200 Rs.	1	1.1	1	4.0
Total	91	100.0	25	100.0

Source: Scheme level survey, 2011

Table 26 shows the details of schemes spending money for repair and maintenance. It was found that about 58 % of schemes had spent money over the years for repair and maintenance both from own O&M fund and support received from other agencies.

Table 26: Details of schemes spending in repair and maintenance

Scheme year	No. of Schemes	Scheme spending in repair (nos)	Total amount spent (NRs)	in %
2000	1	0	-	0
2001	5	4	331,000	15.0
2002	10	6	314,000	14.2
2003	31	15	431,000	19.5
2004	27	17	476,400	21.6
2005	12	10	542,250	24.6
2006	5	0	-	0.0
2007	1	1	111,000	5.0
Total	92	53	2,205,650	100.0

Source: Scheme level survey, 2011

Of the total amount spent for repair and maintenance it was only 18.19 % from the UCs collected O&M fund. Most of the amount was spent from VDCs sources as it was found 60.3 % of the total amount spent. This indicates for revisiting the policy and practice of O&M fund collection and utilization.

Table 27: Source of fund spent in repair and maintenance of DWS schemes

Source for fund	Amount NRs.	Amount in %
UC's O&M fund	401,150	18.19
VDC budget	1330000	60.30
DDC	155000	7.03
Other agencies	319500	14.49
	2,205,650	100.00

Source: Scheme level survey, 2011

Discussion with stakeholders reported that there is higher dependency trends among the UCs as for minor repair also they expect support form the external sources.

4.4 Availability of Maintenance Tools

WARM-P has policy of providing maintenance tools along with training to VMWs to each scheme. It was found from the survey that 90.2 % of schemes had the tools provided by the program. It was also found that 50.6 % of USs was taking responsibility of these tools while about 40 % of VMWs was found taking responsibility of tools in other cases in their respective schemes.

Table 28: Details on management of maintenance tools

Description	Number of schemes	Schemes in %
Total Schemes	92	
Schemes having tool box	83	90.2
Responsibility of tool box		
VMW	33	39.8
UCs	42	50.6
No any	1	1.2
Others	7	8.43
Total	83	100

Source: Scheme level survey, 2011

4.5 Coverage of latrines

It was found that 64.5 % of total beneficiary households were using latrines. Of the total latrines constructed more than 50 % were built with the support of WARM-P while about 34 % was built by the users themselves.

Table 29: Status of latrine coverage

Description	No.	in %
Total toilets constructed	4706	100
Latrines constructed by users themselves	1595	33.9
Latrines constructed with support of WARM-P	2505	53.2
Latrines constructed with support of other agencies	606	12.9
Total	4706	100.0
Total scheme HHs	6644	
Total HHs using the latrines	4283	64.5

Source: Scheme level survey, 2011

4.6 Other sanitary units

WARRM-P also supported for dry stands and garbage pits and kitchen garden promotion. Of the total beneficiary households, 27.4 % had dry stands. Garbage pit was only with 9.4 % of households. Kitchen garden was found with 39.6 % of households.

Table 30: Details of sanitary units and kitchen gardens

Description	Nos.	in %
Total scheme HHs	6644	100
HHs using dry stands	1821	27.4
HH using garbage pits	626	9.4
HHs doing Kitchen gardening using wastage/surplus water	2632	39.6

Source: Scheme level survey, 2011

4.7 Skilled technical workers

Locally trained skill persons are important for functioning of the services of DWS schemes. WARM-P has provided skill training to VMW, LLB, WTCT and RWH Mistris. Their availability and performance is presented in this section.

4.7.1 Village Maintenance Workers

Of the trained VMWs about 65 % were found active either working regularly or as per the need of the schemes. It was found that about 60 % of VMWs was getting remuneration. There was significant majority of the VMWs those were taking their remuneration in cash.

Table 31: Details of VMWs

Description	No.	In %
Working status of VMWs		
Regular	65	43.0
As per need	33	21.9
Not working	53	35.1
Total	151	100
Remuneration status of VMWs		
Getting cash	83	55.0
Getting in kinds	7	4.6
Not getting	61	40.4
Total	151	100.0

Source: Scheme level survey, 2011

There were only 44.4 % of schemes that were paying to VMWs. Average remuneration of VMW in a year was found to be ranged between NRs 5000 to 100,000. However, majority of them found getting the average remuneration per year up to the amount of NRs. 10000 only.

Table 32: Level of remuneration of VMWs

Range of average remuneration per VWW in a year	No. of Scheme paying VMWs	Schemes in %
Up to 5000	12	44.4
5000 - 10000	9	33.3
10000 - 25000	3	11.1
25001 - 50000	2	7.4
Above 100000	1	3.7
Total	27	100

Source: Scheme level survey, 2011

4.7.2 Women Tap stands Care Takers

There were trained WTCTs in 92.2 % of tap stands. Of them, 56.9 % was found working in their respective tap stands.

Table 33: Status of WTCTs

Status of WTCTs	Figure	In %
Total nos. of tap stands	934	
Total Trained	861	92.2
Working	490	56.9
Not working	371	43.1

Source: Scheme level survey, 2011

4.7.3 Local Latrine Builders and Rainwater Water Harvest Mistris

Table 24 shows the status of LLB and RWH Mistris. It was found that about 70 % of both these local service providers were found active. Higher numbers of RWH Mistris were found working outside the scheme area than the LLBs.

Table 34: Status of LLB and RWH Mistris

Description	Working status of LLBs/RWH Mistri								Total nos of schemes
	Active	In %	Passive	In %	Total	In %	Working outside the scheme areas	In %	
LLB	84	72	32	27.6	116	100.0	37	31.9	50
RWH	33	70	14	29.8	47	100.0	26	55.3	6

Source: Scheme level survey, 2011

Annual wage of LLB and RWH was found up to NRs. 25000. Out of 6 schemes RWH Mistris were found earning wage in 3 schemes while in total of 98 schemes LLBs were found earning wage in 28 schemes.

Table 35: Remuneration of LLB and RWH Mistris

Range of annual Wage (NRs.)	No. of Schemes paying wage	
	Rainwater	**Latrine**
Up to 5000		8
5001 - 10000	2	12
10001 - 25000	1	8
Total	3	28

Source: Scheme level survey, 2011

4.8 Impacts of the schemes

Through the scheme survey questionnaires, very broad perception of users was collected to gauge the general impacts of DWS schemes in terms of three parameters namely utilization of saved time, changes in personal hygiene, and trend of prevalence of diarrhea.

4.8.1 Personal hygiene

It was reported that about 97 % of schemes' UCs had felt that personal hygiene of people was improved after completion of scheme than it was before.

Table 36: Status of personal hygiene

Status of personal hygiene	Nos of schemes	in %
As it was before the pre scheme	2	2.0
Improved after scheme	95	96.9
Don't know	1	1.0
Total	98	100.0

Source: Scheme level survey, 2011

4.8.2 Prevalence trend of diarrhea

The prevalence trend of diarrhea was lessened in 98 % of schemes after completion of schemes. However, it was also reported that the prevalence of diarrhea increased in 2 % of schemes after completion of schemes.

Table 37: Prevalence of diarrhea

Prevalence of Diarrhea	Nos. of schemes	in %
As it was before the scheme	0	0.0
Lessen after scheme	96	98.0
Increased after scheme	2	2.0
Total	98	100.0

Source: Scheme level survey, 2011

4.8.3 Use of saved time

One of the objectives of any WATSAN program is to reduce drudgery of beneficiary people providing them drinking water nearby their residents which results in more saved time than before. Table 38 shows the use of time saved from fetching water.

Table 38: Use of saved time from fetching water

Benefits of time saving	**Nos. of schemes**	**in %**
Productive work	6	6.5
Rest	3	3.3
Social work	0	0.0
Education for children	0	0.0
Mixed - Above all	83	90.2
No any benefit taken	6	6.5
Total	92	100.0

Source: Scheme level survey, 2011

It was found that people in about 90 % of schemes were utilizing the saved time in various social and economic activities.

5. OVERALL FUNCTIONAL STATUS OF THE DWS SCHEMES

In the preceding chapter findings were presented and discussed on the physical structures of the schemes in terms of individual structural parts of the scheme. Though it was quite important to know the condition of the various parts of the scheme it needs to examine the scheme as a whole to assess the overall functionality of the schemes. This section deals with the overall functionality of the schemes with brief review of other WATSAN agencies' work on it.

5.1. Past Studies on Functionality /Sustainability

There are some studies in WATSAN sector of Nepal that deal with sustainability of DWS schemes. However, there is probably only one study that has examined the functionality status of DWS schemes is the study entitled 'Nationwide Coverage and Functionality Status of Water Supply and Sanitation in Nepal' which was published by NMIP/DWSS in 2011. Though sustainability and functionality are found often used interchangeably, the concept of sustainability is more broad and concerns with long term impact while functionality concern more specifically with the physical conditions and operational status of DWS schemes. Some of the studies on functionality and sustainability are briefly reviewed here.

WASH sector status report, as an outcome of the Joint Sector Review is an important document on the comprehensive review and guidance for the WASH sector of Nepal (DWSS 2011). This report has introduced CREAM (Clear, Reliable, Economic, Adequate and Measurable) indicators as sector performance indicators which include various aspects namely access, water quality, functionality, investment cost, equity, sanitation, gender and management of water schemes by UCs.

A study carried out by Water Aid in 2010 which was entitled as 'Research into financial and institutional structures to support the functionality and sustainability of rural hill water systems' has reviewed sustainability studies carried out by some WATSAN agencies working in Nepal. This study found that the major indicators used by agencies were similar which were mainly- technical, institutional, social, environmental and financial. This study has cited the Long Term Sustainability Study (LTSS) of NEWAH which has reported the overall sustainability of NEWAH supported schemes after 3 to 6 years of scheme completion – 30% was sustainable, 50 % fair/good and 20% defunct (Water Aid: 2010:25). Based on the LTSS , a discussion paper on long term sustainability was developed and published by Water Aid which has advocated a 'multiple- criteria analysis' to monitor the sustainability status of each old scheme (more than 5 years post-completion) through multiple criteria, consisting of various indicators on technical, socio-environmental, financial and institutional aspects (Water Aid: 2010).

Rural Water Supply and Sanitation Fund Development Board (RWSSFDB) has practice of assessing sustainability of its schemes implemented in different batches being the last one of Batch III conducted in 2008. RWSSFDB also considers technical, socio-environmental, financial and institutional aspects to assess overall sustainability of the DWS schemes and conduct such study after three years of scheme completion. The final report on sustainability of Batch-III

(RWSSFDB: 2008) has ranked overall sustainability of schemes in three layers namely sustainable (75 % and above scored), fairly sustainable (50-75 % scored), and unsustainable (<50 % scored). The finding of the study is such that there was 3.3 % schemes sustainable, 80.4 % fairly sustainable and 16.3 % unsustainable. It should be noted that this study has considered the schemes sustainable which get score (>=50 % scored) equal to or greater than 50 % and reports that 83.7 % (adding up the top two layers together) of the schemes was sustainable.

As mentioned above the study of NMIP/DWSS is the principal report that has given information on functionality of schemes (DWSS, 2011) classifying functional status into six categories. According to the water and sanitation survey conducted nationwide in 2010 under this study, 17.9 % of schemes is well managed; 38.9% is in need of minor repair, 11.8 % needs major repair, 21% needs rehabilitation, 9.1 % is in need of reconstruction and 1.6 % is not possible for re- operation.

5.2. Functional Status of DWS Schemes

5.2.1. Defining functionality:

This study has primarily followed the classification of functionality of DWS schemes as defined by the NMIP/DWSS study on functionality which is as following.

Well Functioning:	Schemes that are functioning and need no repairs are categorized as "Well Functioning".
Need minor Repair:	Schemes that are functioning and need repairs that are within the capacity of users (with no external inputs required) are categorized as "Need Minor Repair".
Need Major Repair:	The scheme are functioning but need major repairs (with external inputs for construction components and technical supports required) are categorized as "Need Major Repair".
Need Rehabilitation:	Schemes that are functioning at their design level but are incapable of meeting present demand in quantity and / or quality are categorized as "Need Rehabilitation".
Need Reconstruction:	Schemes that are defunct and need major technical and financial inputs from external sources as well as sizeable contributions from users before they can function again are categorized as "Need Reconstruction".
Non Refunctionable	Scheme that can't be made to operational again with rehabilitation or reconstruction owing to a variety of reasons (eg. dried out sources) is categorized as "Non Refunctionable".

Adopted from NMIP/DWSS, 2011

Following the above functionality categories this study has assessed the functional status of schemes taking into account both the operational status of water services and structural conditions of schemes as a whole.

5.2.2. Functionality of the schemes:

For the functionality assessment of the schemes this study has only considered gravity flow system schemes excluding RWH schemes. As there were six RWH schemes, only 92 gravity flow schemes were considered for functionality assessment. Table 39 shows that majority of schemes were completed in the years of 2003 and 2004.

Table 39: Year wise functional status of DWS Schemes

Year of scheme completion	Nos. of schemes	Functional Status of schemes					
		Well functioning	Minor Repair	Major Repair	Reconstruction	Rehabilitation	Not fit for re- operation
2001	6		3	2	1		
2002	11	2	6	1		1	1
2003	33	7	16	8		2	
2004	27	7	13	6		1	
2005	15	5	6	3		1	
Total	92	21	44	20	1	5	1

Source: Scheme level survey, 2011

Overall functional status of DWS schemes is summarized in Table 40. It was found that majority of schemes were found in minor repair condition which is 48 %. Schemes in well functioning condition were 23 % of total schemes. 22 % of schemes were found in condition of major repair.

Table 40: Summary of overall functional status of DWS schemes

Category of functionality	**No. of Scheme**	**Schemes in %**
Well functioning	21	23
Minor Repair	44	48
Major Repair	20	22
Reconstruction	1	1
Rehabilitation	5	5
Not fit for re-operation	1	1
	92	100

Source: Scheme level survey, 2011

5.3 Factors Responsible For Functionality

For good functioning and sustainable operation of DWS schemes three factors mainly condition of water flow, physical condition of structures, and community management of schemes were found as leading factors.

5.3.1 Condition of hydraulic flow

The study shows that 71 % of the schemes were in well functioning and minor repair conditions. Condition of hydraulic flow as presented in section three also shows that condition of water flow at various points of DWS schemes was in well condition of more than 70 % of crucial points of the schemes. Though the water flow was found in well condition at majority of structures, the overall functional status of the schemes in well functioning condition was found rather low i.e. 23 % because of physical conditions of majority of structures in minor repair condition. However, functionality of schemes is not impeded due to minor repairs though it is essential to consider it to prevent further deterioration of the physical structures of schemes for sustainable operation.

5.3.2 Physical conditions of the structures

Physical condition of structures is crucial factor for the functioning of DWS schemes. This has been presented in details in section three of this study which shows that majority of structural parts were found in good condition. This has led to have overall functionality of schemes in well functioning and minor repair conditions. This study shows that compare to other structures intakes and main pipelines were found in moderate condition in view of repair and maintenance and responsible for determining the functionality status of the schemes.

5.3.3 Community Management

Community management of DWS schemes has been examined in terms of establishment of O &M fund and its utilization, service of trained VMWs, availability of maintenance tools, and registration of UCs. These aspects have been presented above in the preceding sections in details. It was found that almost of the schemes had established O&M fund during implementation when there was program's support in process facilitation. But after withdrawal of program support, majority of schemes has not collected O&M fund as only 28% of UCs were found collecting regularly. However, it was found that majority of schemes were taking fund from DDC/VDC or other agencies for the repair and maintenance of the schemes. Of the total schemes, 58 % was found spending money in repair and maintenance from various sources. 65 % of VMWs were found active in their respective schemes. Tools for maintenance were available for about 90 % of the schemes. These all community management aspects were responsible to determine the overall functional status of DWS schemes.

6. EFFECTIVENESS OF WARM-P'S TECHNOLOGY, APPROACH AND METHODS

This section deals with the effectiveness of WARM-P's technology, approach and methods in terms of functionality aspects of the schemes. WARM-P approach on supporting DWS schemes has two components – technical and social. Various steps that should be passed through the process of planning and implementing of DWS schemes are defined well in the stepwise approach of WARM-P which is comprised of both technical and social activities in sequence of schemes implementation process. In addition to the stepwise of DWS schemes, the whole approach and process is guided by WARM-P approach of holistic management of water resources at community level. These aspects are briefly discussed in this section.

The study showed that most of the structural parts of the DWS schemes were found in good condition. This gives the indication that technical part is working well. However, field visits and interaction with the stakeholders it was found that the concept of community or public tap stand should be reviewed seriously as there is rapidly increasing trend on connecting separate pipe from tap stand to houses instead of using public tap stands to fetch water. This situation suggests WATSAN agencies including WARM-P to assess the community willingness for private connection during the feasibility study of the schemes. Hence policy with multiple options on private connection and community tap stands should be developed. This will prevent the misuse of resources being spent on constructing public tap stands.

Water quality testing and use of water safety plan are considered essential technical aspects of DWS schemes to deliver health impacts. WARM-P approach should consider these activities and incorporate in the stepwise process. In some schemes it was reported that there was problem of calcium deposit in pipeline. There should be technology to solve such problems. Functionality should not be assessed only in terms of condition of physical structures and service level of water delivery. At the same time, water quality should also be assessed. WARM-P approach which has effective stepwise process in planning, implementation and operation of DWS schemes should incorporate water quality and environmental aspects.

Stream is also important source of drinking water. However, it was found that stream intake suffers often during rainy season because of deposition of mud/boulders/debris. There should be more effective technology and intake design to solve this problem.

Water lifting has also been a good alternative to take water where gravity flow is not possible as source lies down of the village. In addition to RWH system, water lifting technology using Solar or electricity should be incorporated in the WARM-P DWS technical options where possible.

Performance of UCs has been found less active than in time of scheme construction. WARM-P follow up system though covers two years of period for monitoring after completion of the scheme it is not found adequate for the community management of DWS schemes in terms of O&M fund management and repair and maintenance of DWS schemes. As meeting were not held regularly, people participation will weaken over the time. Hence, it suggests for the capacity building of UCs after the construction work of DWS schemes for certain period of time. Post construction follow up is not sufficient. UCs focus is only in construction during the planning and implementation phases.

Therefore for the institutional development of UCs there should be certain period support from the program to strengthen the UCs. Environmental aspect of the scheme should also include in post construction capacity building support of the UCs. UCs are often treated as scheme construction committee not as community based long term organization as many UCs become passive as soon as schemes are completed.

There should be exploration on effective collection and mobilization of O&M fund. As UCs were found getting fund from various sources and not collecting regularly at their own there should be certain mechanism at VDCs and DDC level for the basket O& M fund instead of only with the UCs.

Public audit system of the WARM-P is another important aspect that stakeholders appreciate as an effective process for people participation and accountability. This method should be disseminated among other WATSAN agencies for the replication. WARM-P practice of deputing technical and social staff in each scheme has attributed a lot for the quality of the schemes.

The issue is that how to increase ownership of local government bodies in the spirit of Local Self Governance Act. There is no as such any mechanism to monitor and support the completed schemes. It has fully relied on the activeness of the UCs. There should such fund that VDC could support for major repairs. Similarly, there should be WATSAN network at VDC level which can play role in facilitating and mobilizing UCs within he VDC. There should be mechanism for monitoring of completed schemes. VDC capacity should be enhanced for the monitoring and sustainability of DWS schemes with in the VDC. O& M fund monitoring should be monitored through VDC level mechanism. LSGA allows for the management of DWS at VDC level but its capacity with proper mechanism is essential.

WARM-P approach of WUMP is well appreciated by the key stakeholders. However, its use is still limited. Thus there is still challenge to bring the WUMP into practice. There should be efforts to institutionalize the WUMPs within DDC and DWSO. As other organizations are also found moving on holistic approach in the name of WASH or so, the approach of WUMP should be guided from central level agencies namely National Planning Commission, and sector ministry level. However, WARM-P itself is working with dual approach- taking DWS schemes through demand based process and through WUMP planning process. Only the WUMP approach should be followed, except in emergency situation, to avoid the shortcomings of demand based approach experienced in the past. Rather WARM- P should concentrate its effort on utilizing WUMPs information to all WATSAN agencies working in the district through DDC, VDC and DWSO division offices. Some stakeholders also reported that they did not find WUMP in DDC to use the information of WUMP for their program. It was the view of some stakeholder' that external support should be for rehabilitation or for functioning of non- functioning schemes; not only new schemes.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1. Conclusion

Majority of DWS schemes were found functional falling into well functioning and minor repair categories. Good conditions of Water flow at various points of schemes and physical conditions of individual structures were found mainly responsible for this. UCs were found mobilizing resource for repair and maintenance of their schemes seeking fund from various source mainly from VDCs. However, majority of UCs were found not collecting O&M fund at their own and not registered as per the government rule. For the effective functioning of DWS schemes program approach and technology were found as attributing factors. However, there should be some innovations in its approach of DWS schemes as well as WUMP. Based on the findings of study the study suggests some recommendation in the following section.

7.2. Recommendations

- As intakes and main pipelines were found in more need of repair and maintenance, these structures should be considered seriously for their design, implementation and maintenance. There should be more effective technology of intake design to solve the problem of deposition of mud/boulders/debris in stream intake. Similarly, plastic fittings were reported as needed to replace also seems essential to address properly.
- The concept of community or public tap stand should be reviewed .It is suggested to assess the community willingness for private connection during the feasibility study of the schemes. Hence policy with multiple options on private connection and community tap stands should be developed.
- Water quality testing and use of water safety plan activities should be incorporated in the stepwise process of DWS schemes.
- There should be technology adopted to solve the calcium deposit problems in calcium prone areas.
- In addition to RWH system, water lifting technology using Solar or electricity should be incorporated in the WARM-P DWS technical options where possible.
- For the full mobilization of VMWs and WTCTs there should be institutional mechanism to provide them refresher training as well as new training if there is absence of previously trained workers.
- For the institutional development of UCs there should be certain period support from the program to strengthen the UCs. Environmental aspect of the scheme should also include in post construction capacity building support of the UCs.

- There should be exploration on effective collection and mobilization of O&M funds and establishing basket O&M funds at VDC and DDC level.

- Public audit system should be disseminated among other WATSAN agencies for the replication.

- WARM-P practice of deputing technical and social staff in each scheme has attributed a lot for the quality of the schemes which should be continued.
- There should be mechanism for monitoring of completed schemes. The issue of ownership of local government bodies of the completed DWS schemes should be solved in the spirit of Local Self Governance Act. VDC capacity should be enhanced for the monitoring and sustainability of DWS schemes with in the VDC. O& M fund monitoring should be monitored through VDC level mechanism.
- There should be efforts to institutionalize the WUMPs within DDC and DWSO and the approach of WUMP should be guided from policy level central agencies namely National Planning Commission, and sector ministry.
- WARM-P should concentrate its effort to create easy access for all WATSAN agencies working in the district to WUMPs information through DDC, VDC and DWSO division offices for the maximum utilization of WUMP and its institutionalization.
- It is suggested to include cost estimation for the maintenance of structures of the schemes to upgrade them to the level of well functioning schemes while undertaking such functionality studies. And there should be institutional mechanism for WATSAN agencies to support for repairing, reconstruction and rehabilitation of such schemes as per the requirement based on such study on functionality rather than only looking for the new schemes in coming days for sustainable water service.

REFERENCES:

Government of Nepal, Ministry of Physical Planning, Water Supply & Sanitation Division/Sector Efficiency Improvement Unit. 2011. WASH Sector Status Report,2011.

National Management Information Scheme (NMIP), Department of Water Supply and Sewerage (DWSS). 2011. Nationwide Coverage and Functionality Status of Water Supply and Sanitation in Nepal.

Rural Water Supply and Sanitation Fund Development Board.2008. Final Report on Sustainability Study of Batch-III Completed Schemes.

WARM-P/Helvetas.2010. Follow Up Guideline/Formats of DWS Schemes (unpublished document)

Water Aid. 2010. Research into financial and Institutional structures to support the functionality and sustainability of rural hill water systems.

Water Aid. 2010. Discussion Paper - Long term sustainability Monitoring: Water Aid's experience in Nepal.

ANNEXES

Annex-1 Terms of Reference (ToR)

1. Background

WARM-P has been supporting water resources management initiatives at community level in Nepal since the year 2001. The programme was built on the lessons and experiences of Helvetas Nepal's Community Water Supply and Sanitation Programme (1976-1994) and Self Reliant Drinking Water Support Programme (1995-2000). WARM-P is a community based programme. It supports local communities for integrated planning and development of water resources and enhancing local capacity for the same. WARM-P has a long experience in water resources management at community level. Its expertise in the sector has been well recognized by the government, and by bilateral and non- governmental agencies. It has been implementing drinking water projects under the umbrella of the Department of Water Supply and Sewerage (DWSS) of Government of Nepal.

The development goal of the programme is "established sustainable water resources management and sanitation systems devised by local communities (especially dalits, women and Janjati) to improve livelihood. The specific objectives are:

- Improved access to water and sanitation through sustained community managed water resources for the poor and excluded.

- Strengthened capacity of local service providers, local organizations and local bodies to sustain demand driven service delivery mechanism.

2. Rational of the Study

WARM-P has well defined sets of norms and standards for scheme design and implementation for ensuring quality. All the drinking water and sanitation (DWS) schemes are designed for minimum of 20 years and constructed following the norms, standards and a step wise approach. Similarly, it has adopted various measures for ensuring sustainability of the schemes constructed. Nevertheless, the programme does not have any formal mechanism to see the functional status of the schemes in the long run or even just after two years of their construction.

The programme has a mandatory practice of carrying out follow-up study for assessing the functional status of the DWS schemes implemented with its support twice after their construction is completed. However, such follow-ups have time constraint: they are carried out just within the two years of construction: the first follow-up is conducted after

6 months of completion of a scheme while the second or the final follow-up is conducted after 18 to 24 months. Except in the cases of natural calamities – floods, landslides etc, the structures constructed are found mostly intact and schemes as a whole functional during this period. The programme itself and its local partners are in contact with the local communities and directly and indirectly supporting operation and maintenance of the schemes during this period. Hence, the future of the schemes in terms of sustainability and their use up to the designed period cannot be concluded on the basis of the findings of these follow-ups alone. A separate study is needed to look at the overall functional status of the schemes constructed with programme supports. The study needs to be conducted specially in the older schemes which have already crossed many years after the final follow-up.

3. Objectives of the Study:

- To know the overall functional status of the DWS schemes. The status will be assessed using both the technical and social parameters
- To know the effectiveness of programme's technology, approach and methods, and
- Provide inputs for designing the programme's next phase. 2013-2015, and subsequent plans and policies

With the above objectives, the study will answer the following key questions:

- What are the conditions of the different major structures constructed? (structural and hydraulic)
- What are the conditions of the water sources? Is there any change in water discharge over the years?
- What is the overall functional status of the schemes?
- What is the functional status of the UCs?
- What is the status of the O&M fund? How far it has been used for the purpose it was collected?
- What is the status of the service providers (LLB / VMW / WTCT / RWH Mistris) developed by the programme? Are they working as per ToR.
- Are the schemes sustainable? Will they run up to the designed period?

4. Scope of the Study

By 2010, a total of 300 DWS schemes serving more than 100,000 people have been constructed with WARM-P support. Among the schemes constructed, 121 are in the FWDR, 103 are in the MWDR and the remaining 76 are in the WDR. Source point improvement (SI), gravity flow (piped system) and rain water harvesting (RWH) are the

types of drinking water schemes the programme has been supporting. However, most of the schemes constructed are gravity flow system.

For the purpose of this study, the consultants will conduct survey in total of 100 DWS schemes constructed with WARM-P support from 2001 to 2004 in Doti, Dadeldhura and Achham districts in the FWDR, Dailekh and Jajarkot in the MWDR and Parbat, Syangja, Kaski and Tanahu in the WDR. The consultants will assess the overall functional status of these schemes using both the technical and social parameters. The study will give less emphasis to SI schemes and scattered schemes. Though counted separately, most of the SI schemes were constructed as a part of WUMP and giving immediate relief to the people involved in the WUMP process. As the name implies, there is not any extended physical structure in the SI. It has very simple and small structure around the source point which protects its contamination; from dirt, dust, mud, unsafe water etc. possible to come / mix up from outside; and ease tapping water from the source. WARM-P will provide the consultants with type and district wise detail of the schemes to be studied.

5. Methodology

The Team Coordinator and the Study Associate will plan the appropriate methodology for this study and implement that in consultation with WARM-P/HELVETAS Swiss Intercooperation Nepal. This assignment involves a desk study of the functionality criteria used by the government of Nepal and accordingly defining that to be used for the purpose of this study.

The consultants themselves and with support from the enumerators will conduct in-depth interviews with the users and the main stake holders to bring in their experiences and impressions. Both the quantitative and qualitative methods will be used for the purpose of this study. Among the others, the methods to be followed will include:

- **Study of scheme information at WARM-P:** Design, agreement, follow-up reports etc available at the WARM-P office will be reviewed and a preliminary information as per the office record of all the schemes to be studied will be acquired.
- **Field visit and inspection:** The study team will visit the selected schemes and inspect their overall functional status.
- **Collection of data and information:** The data and information will be collected from the representatives of the user committees of each scheme using a structured questionnaire. The questionnaire will be developed by the consultants.
- **Discussion with the key stakeholders at the district level:** A brief workshop will be organized for this purpose and overall impressions of the stakeholders on WARM-P approach and schemes constructed with its support will be known.
- **Data Analysis:** Data and information collected from the field, schemes and stakeholders, will be processed, analyzed and interpreted. A systematic database in the computer will be created for future use and reference.

- **Preparation of Report:** Detail findings and conclusions will be drawn on the basis of the data analysis. A report will be prepared incorporating the data and information and their analysis and detail findings and conclusions based on the same. The report will be presented to the WARM-P for further actions

6. Roles and Responsibilities

The study team will have the following roles and responsibilities:

a) Take overall responsibility of the study. The Team Coordinator will lead the study and plan the required activities with support from the Study Associate;

b) Design the detailed methodology/methods and questionnaire for the study and orient the enumerators to be involved in the data collection process;

c) Visit the drinking water and sanitation (DWS) schemes, inspect the structures and interact with the users and stakeholders for assessing the functional status of the schemes constructed. Field visit inspection of the schemes / interaction with the users and other stakeholder – in at least 10% of the schemes targeted for the study;

d) Process and analyze the data and information collected by the enumerators and during the visit to DWS schemes;

e) Prepare draft report, incorporate feedbacks / comments from WARM-P if any, produce final report with key findings and present that at the national level meeting.

WARM-P will manage and mobilize the enumerators to collect data from field. The consultants will orient enumerators on methodology of data collection and questionnaire. The programme staff will support the consultants in field visits, data and information collection process.

The WARM-P office will backstop the study. It will support in clarifying the concept of the study and questionnaire, its implications and expectations. It will also support in providing logistics needed for the study.

7. Required Qualifications of the Consultants

The Team Coordinator

- Master's Degree in social studies or related field.
- Experienced in working in drinking water and sanitation sector.
- Proven track record in assessments of the community managed infrastructures.
- Experience and knowledge in the GoN policies related to drinking water and sanitation.
- Strong analytical skills with capacity to outline concrete recommendations for improvement.
- Excellent facilitation skills.
- Excellent report writing skills in Nepali and English.

The Study Associate

- Bachelor's Degree in Engineering or sub engineer with at least five years of professional experiences.
- Experienced in implementation of the community managed drinking water and sanitation schemes.
- Experience and knowledge in the GoN policies related to drinking water and sanitation.
- Strong facilitation and analytical skills.
- Excellent report writing skills in Nepali and English.

8. Deliverables

a) Draft study report, in English, for sharing preliminary findings

b) Final study report; in English, after incorporating feedbacks / comments from WARM-P.

9. Timeline and Time Allocation

This mandate will be effective from 10th November 2011 up to 15th January 2012. A breakdown of the number of working days of the Team Coordinator and the Study Associate required for this assignment during this period is given in the Annex-B. The draft report will be prepared and shared with WARM-P by 29th December 2011 whereas the final report will be completed by 15th January 2012.

10. Payment

Payment will be made in three instalments based upon the written request of the consultants. The first and second instalment will be of 35% and 60% respectively while the final instalment will be of the remaining 5% of the agreed amount. Each instalment will be released only on fulfilment of the conditions stated in the agreement. Except the honorarium, per dime all other payments will be made on actual basis. Tax will be deducted at source at the time of payment as per the rules of Government of Nepal.

Annex 2: Check List for District Stakeholders and UCs

Informants	• **District Federation of Water and Sanitation Users Committees** • **Division/Subdivision Office/of Drinking Water and Sanitation** • **I/NGOs working in WATSAN Sector** • **Partner organizations of WARM-P**

- How do you assess the functionality of WARM-P supported DWS projects?
- What are the strong aspects of WARM-P supported DWS projects? Why you consider them as strong elements?
- Which aspects were less successful and what are the reasons for it?
- What is your assessment of the technology used by WARM-P in implementation of DWS projects?
- What are your views on WARM-P working approach and methods in WATSAN sector?
- What is your overall impression on the sustainability of the WARM-P supported DWS projects?
- What are the key areas that you see necessary for improvements regarding planning, implementation and operation of WARM-P supported DWS?

Specific to Water and Sanitation Management Committees (WSMCs) :

- How is your project now?
- What are the most important benefits of the project?
- What is your role in project's operation and management?
- What are the good things of your projects?
- What are the things that should be improved for better project operation and management?
- How is the role and performance of trained technical persons in the project?
- What efforts are there so far for the sustainability of the project?
- What should be done further for the sustainability of the project?

Annex 3: Scheme Survey Questionnaire

जलश्रोत व्यवस्थापन कार्यक्रम/हेल्भेटास नेपाल

खानेपानी तथा सरसफाई योजनाको सुचारु अवस्थाको अध्ययन

योजनागत सर्वेक्षण प्रश्नावली

सर्वेक्षणमा सूचना लिने स्रोतहरु:

- खानेपानी तथा सरसफाई व्यवस्थापन समितिका पदाधिकारी/सदस्यहरु
- योजनामा कार्यरत स्थानीय मर्मत संभार कार्यकर्ता र अन्य तालिम प्राप्त व्यक्तिहरु
- योजनाको स्थलगत अवलोकन

१. सर्वेक्षण सम्वन्धी जानकारी

१.१ सर्भेक्षक/गणकको नाम : .....

१.२ सर्वेक्षण लिएको मिति : .....

१.३ निरिक्षकको नाम : .....

१.४ निरिक्षण/समीक्षाको मिति : .....

२.योजनाको सामान्य जानकारी

२.१ योजनाको नाम: .....

२.२ योजनाको किसिम : १. पाईप प्रणाली ☐ २. स्रोत संरक्षण ☐ ३. आकाशे पानी ☐ संकलन

(यदि आकाशे पानी संकलन योजना भएमा प्राविधिक खण्डको हकमा प्रश्न नं ५ मा जानुहोस ।)

२.३ जिल्ला : .....

२.४ गाविस : .....

२.५ वडा नं. : .....

२.६ गाउं/टोलको नाम: .....

२.७ योजना सम्पन्न भएको वर्ष : ☐ साल

२.८ योजना सम्पन्न हुंदाको लाभान्वित घरधुरी संख्या: ☐

२.८ हालको लाभान्वित घरधुरीसंख्या : ☐

क. प्राविधिक खण्ड

३. योजनाको पानी प्रवाहको अवस्था सम्वन्धी जानकारी

३.१ के यो योजनामा बाह्रै महिना पानी संचालन भइरहेको छ ? १. छ ☐ २. छैन ☐

३.२ यदि छैन भने कति महिना पानी संचालन भइरहेको छ ? ☐ महिना

३.३ एक दिनमा सालाखाला कति घण्टा धारामा पानी आउंछ ? ☐ घण्टा

३.४ मुहानवाट टंकीमा आउने पानीको वहाव कस्तो छ ?

१. डिजाइन अनुसार ☐ लिटर प्रति सेकेण्ड

२. हालको मापन अनुसार ☐ लिटर प्रति सेकेण्ड

४.योजनाको संरचना सम्वन्धी जानकारी

४.१ इन्टेक सम्वन्धी जानकारी

इन्टेकको विवरण	मुहानको नाम	क्षमता कस्तो छ ? १. शुरुको जस्तै छ । २. घटेको छ । ३. सुकेको छ ।	तारबारको अवस्था १. राम्रो छ । २. काम गरेको छैन । ३. तारवार गरेको छैन ।	संरचनाको निर्माण कस्तो अवस्थामा छ ? १. ठिक छ । २. सामान्य मर्मत उपभोक्ताले गर्नसक्ने सम्मको छ । ३. ठुलो मर्मत उपभोक्ताले गर्न नसक्ने छ । ४. पुनर्निमाण गर्नुपर्ने छ । ५. पुनप्रयोगमा आउने अवस्था छैन ।	फिटिङ्गसको अबस्था कस्तो छ ? १.ठिक छ । २.सामान्य मर्मत गर्नुपर्ने छ । ३.पुरै फेर्नु पर्ने छ ।
इन्टेक १					

इन्टेक २					
इन्टेक ३					
इन्टेक ४					
इन्टेक ५					

४.२ रिजरभ्वायर टंकी सम्वन्धी जानकारी

रिजरभ्वायर टंकीको विवरण	टंकीको क्षमता (घ.मी.)	तारबारको अबस्था १. राम्रो छ । २. काम गरेको छैन । ३. तारवार गरेको छैन ।	संरचनाको निर्माण कस्तो अवस्थामा छ ? १. ठिक छ । २. सामान्य मर्मत उपभोक्ताले गर्नसक्ने सम्मको छ । ३. ठुलो मर्मत उपभोक्ताले गर्न नसक्नेछ । ४. पुनर्निमाण गर्नुपर्ने छ । ५. पुनप्रयोगमा आउने अवस्था छैन ।	फिटिङ्गसको अबस्था कस्तो छ ? १.ठिक छ । २.सामान्य मर्मत गर्नुपर्ने छ । ३.पुरै फेर्नु पर्ने छ ।
रिजरभ्वायर टंकी १				
रिजरभ्वायर टंकी २				
रिजरभ्वायर टंकी ३				
रिजरभ्वायर टंकी ४				
रिजरभ्वायर टंकी ५				

४.३ अन्य संरचना सम्वन्धी जानकारी

संरचनाको विवरण	तारबारको अबस्था १. राम्रो छ । २. काम गरेको छैन । ३. तारवार गरेको छैन ।	संरचनाको निर्माण कस्तो अवस्थामा छ ? १. ठिक छ । २. सामान्य मर्मत उपभोक्ताले गर्नसक्ने सम्मको छ । ३. ठुलो मर्मत उपभोक्ताले गर्न नसक्नेछ । ४. पुनर्निमाण गर्नुपर्ने छ । ५. पुनप्रयोगमा आउने अवस्था छैन ।	फिटिङ्गसको अबस्था कस्तो छ ? १.ठिक छ । २.सामान्य मर्मत गर्नुपर्ने छ । ३.पुरै फेर्नु पर्नेछ ।
कलेक्सन च्याम्बर			
कलेक्सन च्याम्बर १			

संरचनाको विवरण	तारबारको अबस्था १. राम्रो छ । २. काम गरेको छैन । ३. तारवार गरेको छैन ।	संरचनाको निर्माण कस्तो अवस्थामा छ ? १. ठिक छ । २. सामान्य मर्मत उपभोक्ताले गर्नसक्ने सम्मको छ । ३. ठुलो मर्मत उपभोक्ताले गर्न नसक्नेछ । ४. पुनर्निमाण गर्नुपर्ने छ । ५. पुनप्रयोगमा आउने अवस्था छैन ।	फिटिङ्गसको अवस्था कस्तो छ ? १.ठिक छ । २.सामान्य मर्मत गर्नुपर्ने छ । ३.पुरै फेर्नु पर्नेछ ।
कलेक्सन च्याम्बर २			
कलेक्सन च्याम्बर ३			
कलेक्सन च्याम्बर ४			
कलेक्सन च्याम्बर ५			
बी.पी.टी.			
बी.पी.टी १			
बी.पी.टी २			
बी.पी.टी ३			
बी.पी.टी ४			
बी.पी.टी ५			
वितरण टंकी			
वितरण टंकी १			
वितरण टंकी २			
वितरण टंकी ३			
आई.सी.			
आई.सी १			
आई.सी २			
आई.सी ३			

४.४ पाईपलाईन सम्वन्धी जानकारी

४.४.१ मुख्य पाईपलाईन

पाईपलाईनको विवरण	पानी संचालनको अवस्था १. नियमित । २ वेला वेलामा अवरोध हुने गरेको । ३. वेला वेलामा अवरोध हुने एवं कम मात्रामा पानी आउने गरेको । ४. पानी नआउने । ५. पुनप्रयोगमा आउने अवस्था छैन ।	पाईपको अवस्था १.ठिक छ । २.सामान्य मर्मत उपभोक्ताले गर्नसक्ने । ३.ठुलो मर्मत उपभोक्ताले गर्न नसक्ने । ४.पुनर्निमाण गर्नुपर्ने । ५.पुनप्रयोगमा आउने अवस्था छैन ।
मुहान देखि सीसी/डिसी सम्म		
सीसी/डिसी देखि आर भि टि १ सम्म		
सीसी/डिसी देखि आर भि टि २ सम्म		
सीसी/डिसी देखि आर भि टि ३ सम्म		
सीसी/डिसी देखि आर भि टि ४ सम्म		
सीसी/डिसी देखि आर भि टि ५ सम्म		

४.४.२ वितरण पाईपलाईन

पाईपलाईनको विवरण	पानी संचालनको अवस्था १. नियमित । २ वेला वेलामा अवरोध हुने गरेको । ३. वेला वेलामा अवरोध हुने एवं कम मात्रामा पानी आउने गरेको । ४. पानी नआउने । ५. पुनप्रयोगमा आउने अवस्था छैन ।	पाईपको अवस्था १.ठिक छ । २.सामान्य मर्मत उपभोक्ताले गर्नसक्ने । ३.ठुलो मर्मत उपभोक्ताले गर्न नसक्ने । ४.पुनर्निमाण गर्नुपर्ने । ५.पुनप्रयोगमा आउने अवस्था छैन ।
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ..... सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		

आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ....सम्म		
आर भि टि देखि धारा नं ..... सम्म		
आर भि टि देखि धारा नं ..... सम्म		
आर भि टि देखि धारा नं ..... सम्म		
आर भि टि देखि धारा नं ..... सम्म		

४.५ धारा सम्वन्धी जानकारी

उप प्रणालीको विवरण	योजना सम्पन्न हुदाको	पुरा पानी आउने	आंशिक आउने धारा	पानी नआउने धारा	हालको कुल धारा	धाराको संरचना कस्तो अवस्थामा छ (धाराको संख्या लेख्नुहोस)	फिटिङ्गसको अबस्था कस्तो छ ? १.ठिक छ ।

	जम्मा धारा संख्या	धारा संख्या	संख्या	संख्या	संख्या	ठिक अवस्था को	सामान्य मर्मत गर्नुपर्ने	ठुलो मर्मत गर्नुपर्ने	२.सामान्य मर्मत गर्नुपर्ने छ। ३.पुरै फेर्नु पर्ने छ।
उप प्रणाली १									
उप प्रणाली २									
उप प्रणाली ३									
उप प्रणाली ४									
उप प्रणाली ५									

५. आकाशे पानी संकलन सम्बन्धी जानकारी

५.१ घैटोको निर्माण अवस्था

घैटोको क्षमता	योजना अवधिमा निर्माण भएको घैटों संख्या	उपभोक्ता आफैले निर्माण गरिएको घैटों संख्या	संचालनमा रहेको घैटों संख्या	संचालनमा नरहेको घैटों संख्या	घैटोको संरचनाको अवस्था				
					ठिक भएको संख्या	सामान्य मर्मत गर्नु पर्ने संख्या	ठुलो मर्मत गर्नु पर्ने संख्या	पुनर्निमाण गर्नुपर्ने संख्या	पुनप्रयोग मा आउन नसक्ने संख्या
घैटो (६.५घ.मी.)									
घैटो (२ घ.मी.)									
घैटो (.....घ.मी.)									

५.२ अहिले सम्म घैंटोको मर्मत गर्नेको घर संख्या

५.३ अहिले सम्म घैटोको मर्मत गर्न आवश्यक भएर पनि मर्मत नगर्नेको घर संख्या

५.४ अहिले सम्म घैटोको मर्मत गर्न आवश्यक नपरेको घर संख्या

५.५ गटरको अवस्था

जम्मा घर संख्या	गटर ठीक भएको घर संख्या	गटर सामान्य मर्मत गर्नुपर्ने घर संख्या	गटरले काम नगरेका घर संख्या

५.६ पानीको पर्याप्तता सम्बन्धी जानकारी

औसत कति महिना सम्म पानी पुग्छ ? महिना को संख्या	कुन कुन महिना पानी पुग्छ ?											
	१. वैसाख	२. जेठ	३. असार	४. साउन	५. भदौ	६. असोज	७. कार्तिक	८. मंसिर	९. पुष	१०. माघ	११. फागुन	१२. चैत्र

५.७ वर्षायाममा पानीको अवस्था

वर्षायाममा घैटो पुरा भरिने घर संख्या	वर्षायाममा घैटो पुरा नभरिने घर संख्या	वर्षायाममा पनि घैटो पुरा नभरिने कारण ?	
		छानाको सतह नपुगेर घैटो पुरा नभरिने घर संख्या	पानी कम परेकोले घैटो पुरा नभरिने घर संख्या

५.८ आकाशे पानीको प्रयोगको अवस्थाः

पिउनको लागि मात्र प्रयोग गर्ने घर संख्या	पिउन एवं अन्य कार्यका लागि प्रयोग गर्ने घर संख्या	पिउन प्रयोग नगर्ने तर अन्य कार्यका लागि मात्र प्रयोग गर्ने घर संख्या

६. चर्पि सम्वन्धी जानकारी

जम्मा निर्माण भएका चर्पी संख्या	उपभोक्ता स्वयंले निर्माण गरेका चर्पी संख्या	जलश्रोत व्यवस्थापन कार्यक्रमको सहयोगमा निर्माण भएका चर्पी संख्या	अन्य निकायको सहयोगमा निर्माण भएका चर्पी संख्या	निमाण भएका चर्पी मध्ये हाल उपयोगमा रहेका चर्पी संख्या	चर्पी उपयोग गर्ने जम्मा घर परिवार संख्या

७. अन्य क्रियकलाप सम्वन्धी जानकारी

सि.नं.	चाङ सम्वन्धी जानकारी	घर परिवार संख्या
१	चाङको प्रयोग गरिरहेको	
२	फोहर फाल्ने खाल्डो प्रयोग गरिरहेको	
३	खेर गएको /अतिरिक्त पानी उपयोग गरी करेसाबारीको खेती गरिरहेको	

ख. सामाजिक खण्ड

८. उपभोक्ता समिति सम्वन्धी जानकारी

८.१ पहिलो उपभोक्ता समिति गठन भएको वर्ष : ☐ साल

८.२ हालको उपभोक्ता समिति पर्नगठन भएको बर्ष: ☐ साल

८.३ पछिल्लो एक बर्षमा कति पटक वैठक बस्नुभयो ? ☐ बैठक संख्या

८.४ हाल सम्म कति पटक वैठक बस्नुभयो ? ☐ बैठक संख्या

८.५ के यो उपभोक्ता समिति दर्ता भएको छ ? १.छ ☐ २. छैन ☐

९. मर्मत सम्भार कोष सम्वन्धी जानकारी

९.१ मर्मत सम्भार कोष संकलन भएको छ ? १.छ ☐ २. छैन ☐

९.२ यदि छ भने शुरुमा प्रति परिवार कति संकलन गर्ने सहमति भएको थियो? रु ☐

९.३ मर्मत सम्भार कोष संकलन भएको भए अहिले कति मौजदात छ ? रु ☐

९.४ संकलन भएको भए रकम कहां जम्मा गरिएको छ ? (जुन जुन ठिक छ त्यसमा संकेत लेख्ने)

१. बैंक/वित्तिय संस्था ☐ २. समितिको जिम्मा ☐ ३. लगानी गरेको ☐

☐ ☐

९.५ के नियमित तवरमा मर्मत सम्भार कोष संकलन गर्ने गरिएको छ ? १.छ २. छैन

९.६ यदि छ भने प्रति परिवार कति संकलन गर्ने गरिएको छ ? रु **प्रति महिना/ प्रति वर्ष**

९.७ यदि छैन भने कहिलेबाट नियमित भएको छैन ? **साल**

९.८ मर्मत सम्भार कोष संकलन नहुनाको कारण उल्लेख गर्नुहोस :

१. उपभोक्ताको चासो नभएर ☐ २. समिति निष्क्रिय भएर ☐

३. योजना संचालनमा नभएर ☐ ४. अन्य ☐

९.९ हाल सम्म मर्मत सम्भार कोषको कति रकम योजनाको मर्मतमा खर्च गर्नुभयो ?

जम्मा मर्मतमा खर्च भएको रकम रु	आफ्नै मर्मत सम्भार कोषबाट रकम रु	गविसबाट रकम रु	जिविसबाट रकम रु	अन्य संघसंस्थाबाट रकम रु

९.१० मर्मत सम्भार औजार तथा उपकरण सम्वन्धी जानकारी

औजार बाकस १. छ २. छैन	औजार बाकसमा मुख्य औजारहरु १. छ २. छैन	औजार बाकस कस्को जिम्मामा छ? १. मर्मत संभार कार्यकर्ताको जिम्मामा २. खानेपानी समिति जिम्मामा ३. कसैको जिम्मामा छैन ४. अन्य	मर्मत सम्भारको लागि फिटिङहरु १. भएको २. नभएको

१० . मर्मत सम्भार कार्यकर्ता सम्वन्धी जानकारी

मर्मत सम्भार कार्यकर्ताको संख्या	नियमित काम गरिरहेका को संख्या	आवश्यकता अनुसार काम गरिरहेकाको संख्या	निष्क्रिय संख्या	पारिश्रमिक नगद पाउने संख्या	पारिश्रमिक जिन्सी पाउने संख्या	पारिश्रमिक नपाउने संख्या	औसत प्रति कार्यकर्ता पारिश्रमिक नगद रु बार्षिकमा	जिन्सीमा पारिश्रमिक पाउनेको औसत प्रति कार्यकर्ता नगदमा हुने रु बार्षिकमा

११. महिला धारा हेरालु सम्वन्धी जानकारी

११.१ योजनामा भएका तालिम प्राप्त महिला धारा हेरालुहरुः

जम्मा धारा संख्या	तालिम प्राप्त महिला धारा हेरालुहरुको संख्या	सेवा पुऱ्याइरहेका महिला धारा हेरालुहरुको संख्या	सेवा दिन नसकेका महिला धारा हेरालुहरुको संख्या

१२. मिस्त्री सम्वन्धी जानकारी

सक्रिय संख्या	निष्क्रियसंख्या	योजना क्षेत्र बाहिर काम पाउने संख्या	औसत प्रति कार्यकर्ता मासिक पारिश्रमिक रु
आकाशे पानी संकलन मिस्त्री			
चर्पी निर्माण मिस्त्री			

१३. पानी भर्न ओसार्ने सुविधाले गर्दा वचत भएको समयले दिएको फाइदा ?

१. उत्पादनशील कार्य ☐

२. आराम ☐

३. सामाजिक कार्य ☐

४. केटाकेटीले पढन पाएका छन ☐

५. केही फाइदा लिन सकेको छैन ☐

१४. योजना क्षेत्रमा व्यक्तिगत सरसफाई कस्तो छ ?

१. योजना अघिको जस्तै छ ☐

२. सुधार/परिवर्तन भएको छ ☐

१५. योजना क्षेत्रमा झाडापखालाको अवस्था कस्तो छ ?

१. योजना अघिको जस्तै छ ☐

२. कमी भएको छ ☐

३. बढेको छ ☐

१६. जनिफकारहरुको विवरणः

क्र.सं	नाम	पद	ठेगाना	फोन	सही

मिति ..... स्थान.....

तपाईले दिनु भएको समय र अमूल्य जानकारीको लागि धेरै धेरै धन्यवाद ।

Annex 4: Project Sites visited by the study team

Sn	Name of project	District	Location
1	Bijaura DWSS Project	Dailekh	Narayan Municipality -6/7
2	Salkharka DWSS Project	Dailekh	Narayan Municipality-3
3	Ratimate SI	Achham	Duni VDC -9
4	Saltada DWSS Project	Doti	Dipayal Silgadhi Municipality-8
5	Uditola DWSS Project	Doti	Dipayal Silgadhi Municipality-13
6	Budhighatal DWSS Project	Dadeldhura	Amargadhi Municipality -3
7	Dudhkande DWSS Project	Dadeldhura	Amargadhi Municipality-1
8	Deurali DWSS Project	Kaski	Deurali VDC-2/3/4/5
9	Marjyang Kot RWH	Kaski	Deurali VDC -8
10	Agetari DWSS Project	Kaski	Deurali VDC-4/5/6
11	Tal Beshi DWSS Project	Kaski	Rupakot VDC -1
12	Patihalna DWSS Project	Syangja	Bhatkhola VDC-9

Annex 5: Persons /organizations consulted during the study

Name	Office/ Address	Designation
Dipak Puri	Foreign Aid, Coordination and Planning Section, DWSS, Kathmandu	Senior Divisional Engineer
Bhupendra Aryal	RWSSFDB, Kathmandu	Chief, Monitoring and Evaluation Section
Paras Thakuri	NEWAH, Kathmandu	PME Manager
Rajendra Aryal	FEDWASUN, Kathmandu	President
Loknath Regmi	DOLIDAR,MLD, Kathmandu	Senior Divisional Engineer
Jagadiswor Barun	SNV, Surkhet	Functionality Expert
Abhiram Misra	Regional Monitoring and Supervision Office, FWDR, Rajpur, Dipayal	Engineer
Ram Bilas Thakur	Regional Monitoring and Supervision Office, FWDR, Rajpur, Dipayal	Engineer
Chandra Dev Bhatta	Regional Monitoring and Supervision Office, FWDR, Rajpur, Dipayal	Water and Sanitation Technician
Dinesh Bam	SOURCE-Nepal, Doti	Team Leader
Naresh Ojha	Bikash Samuha Nepal, Doti	Secretary
Lal Bahadur Thapa	Bikash Samuha Nepal, Doti	Member
Krishna Malla	Rural Village Water Resource Management Program, Doti	Water Resource Advisor
Devi Lal Upadhaya	SAYAL-Nepal, Doti	Member
Shayam KC	Samaj Sewa, Doti	Program Supervisor
Laba Hari Budhathoki	NEWAH , Doti Office	Project Manager

Prakash Joshi	Kedar Gramin Bikash Samaj-Nepal, Doti	Field Supervisor
Hasta Budha	FEDWASUN, Doti	Secretary
Mahendra Kumar Shrestha	Deurali DWSS UC, Kaski	Chairperson
Baburam Bhujel	Deurali DWSS UC, Kaski	Treasurer
Bisna Devi Joshi	Uditola DWSS UC, Doti	WTCT
Ram Chandra Joshi	Uditola DWSS UC, Doti	User
Pushpa Raj Joshi	Uditola DWSS UC, Doti	LLB/Mason
Raghunath Joshi	Uditola DWSS UC, Doti	LLB/Mason
Dhaure Saud	Ratimate SI UC, Achham	Chairperson
Ishwara Saud	Ratimate SI UC, Achham	WTCT
Khina Saud	Ratimate SI UC, Achham	User
Puna Saud	Ratimate SI UC, Achham	User
Kala Saud	Ratimate SI UC, Achham	User
Ram Hamal	Budhighatal DWSS UC, Dadeldhura	Chairperson
Lok Bahadur Bhandari	Budhighatal DWSS UC, Dadeldhura	User
Somraj Upreti	Budhighatal DWSS UC, Dadeldhura	User
Dil Bahadur Gurung	Tal Beshi DWSS UC, Kaski	Chairperson
Khas Bahadur Gurung	Tal Beshi DWSS UC, Kaski	Vice Chairperson
Bir Bahadur Khanal	Bijaura DWSS UC, Dailekh	Chairperson
Mohan Bhandari	Bijaura DWSS UC, Dailekh	Vice Chairperson
Roit Rana	Bijaura DWSS UC, Dailekh	Secretary
Sita Rana	Bijaura DWSS UC, Dailekh	Treasurer

Tulsa Thapa	Bijaura DWSS UC, Dailekh	Member
Saligram Giri	Bijaura DWSS UC, Dailekh	VMW
Bishnu Subedi	Bijaura DWSS UC, Dailekh	VMW
Nar Bahadur GC	Bijaura DWSS UC, Dailekh	User
Dil Kumari Khatri	Bijaura DWSS UC, Dailekh	User
Lokendra Roka	SAC- Nepal, Dailekh	Program Supervisor
Chitra Dahal	SUDEC, Dailekh	ED
Hira Singh Thapa	SOSEC, Dailekh	Chairperson
Hari Krishna Thapa	RVWRMP, Dailekh	Programme Coordinator
Shilpa Kunwar	LLINK, Dailekh	District Coordinator
Kebal Singh Bogati	Ramrest Club, Dailekh	Program Coordinator
Sushil Subedi	RVWRMP, Dailekh	Representative
Bhakka Prasad Sharma	FEDWATSAN, Dailekh	Secretary
Shambhu Prasad Luitel	DDC, Dailekh	LDO
Thir Kumar Neupane	DWSSO, Dailekh	Representative
Bal Ram Shrestha	FEDWASUN, Dailekh	Chairperson
Kabiraj Thapa	Salkharka DWSS UC, Dailekh	Secretary
Maina Thapa	Salkharka DWSS UC, Dailekh	Treasurer
Nanda Bahadur Thapa	Salkharka DWSS UC, Dailekh	VMW/Member
Sabita BK	Salkharka DWSS UC, Dailekh	User
Jyoti Singh Sunar	Salkharka DWSS UC, Dailekh	User
Chandra BK	Salkharka DWSS UC, Dailekh	User

Padam Kumari Thapa	Salkharka DWSS UC, Dailekh	WTCT
Hira Dhuni Thapa	Salkharka DWSS UC, Dailekh	WTCT
Bal Bahadur Rawal	Salkharka DWSS UC, Dailekh	User
Sita Nepali	Salkharka DWSS UC, Dailekh	User
Chandra Thapa	Salkharka DWSS UC, Dailekh	User
Kali Devi Nayak	Saltada DWSS UC, Doti	Chairperson
Bisna Debi Nayak	Saltada DWSS UC, Doti	User
Gauri Nayak	Saltada DWSS UC, Doti	User
Balu Devi Nayak	Saltada DWSS UC, Doti	Vice-Chairperson
Narayan Khadka	Saltada DWSS UC, Doti	User
Sher Bahadur Nayak	Saltada DWSS UC, Doti	User
Mata Devi Nayak	Saltada DWSS UC, Doti	User
Nina Devi Nayak	Saltada DWSS UC, Doti	User
Shiv Raj Nayak	Saltada DWSS UC, Doti	User
Lal Bahadur BK	Patihalna DWSS Project	Chairperson
Bishnu Prasad Lamichhane	Patihalna DWSS Project	Secretary
Rudra Bahadur Adhikari	Patihalna DWSS Project	User
Ratna Lamichhane	DWSSO, Syangja	Engineer
Narayan Singh Khawas	RWSSP, Syangja	WASH Advisor
EK Narayan Sapkota	Andha Andhi CDC, Syangja	Representative