



**Welthungerhilfe/
Sabal Nepal**

Final Report

30 Dec. 2025

Groundwater Monitoring and Recharge Project (In Two Palikas of Siraha District)

Submitted by:



**Centre for Sustainable
Development Studies Pvt. Ltd. (CSDS)**

JV SITARA Consult Pvt. Ltd.

<http://csds.com.np>

Email: info@csds.com.np

Cell: 9851189225

Table of Contents

CHAPTER 1: CONTEXT AND BACKGROUND	1
1.1 THE CONTEXT	1
1.2 RATIONALE OF THE STUDY.....	2
1.3 OBJECTIVES	4
1.4 EXPECTED OUTPUTS	4
CHAPTER 2: PROJECT AREA.....	5
CHAPTER 3: FINAL REPORT	6
3.1. DESK BASED SECONDARY RESEARCH:.....	6
3.2. PREPARATION AND SUBMISSION OF THE INCEPTION REPORT:	8
3.3. SUBMISSION OF PERIODIC REPORTS WITH SPECIFIC TASKS PERFORMED:	8
3.4. MAPPING OF STAKEHOLDERS INVOLVED IN GW-RELATED WORKS	8
CHAPTER 4: GROUND WATER MONITORING	17
4.1 GROUND WATER MONITORING	17
4.2 PROCEDURE FOR THE DESIGN OF GW MONITORING.....	17
4.3 HYDROGEOLOGICAL ASSESSMENT.....	17
CHAPTER 5: PROGRESS ON THE IDENTIFICATION AND SELECTION OF MONITORING TUBEWELLS	19
5.1 MAPPING OF THE EXISTING MONITORING WELLS IN THE PROJECT AREA:	19
5.2 RAINFALL STATIONS (INSTALLED BY THE DHM):	19
5.3 ESTABLISH A SYSTEM FOR GROUNDWATER MONITORING	20
5.4 SELECTION & DESIGN OF THE NETWORK OF MONITORING WELLS:	21
5.5 TECHNOLOGIES ADOPTED FOR MONITORING THE WELLS	22
CHAPTER 6: PROGRESS ON THE INSTALLATION OF DEEP TUBEWELLS FOR MONITORING.....	24
6.1 INSTALLATION OF DEEP TUBEWELLS FOR MONITORING:.....	24
6.2 TECHNICAL BRIEF OF THE INSTALLATION OF TWO DTWs IN JANATA NAMUNA MA. VI. SCHOOL...	25
6.2.1 Borehole Drilling of Well No. 1 of 100/100 mm of 80 m Depth (at the location with GPS of the DTW: 26.801134°N, 86.312770°E):.....	25
6.2.2 Borehole Drilling of Well No. 2 of 150/150 mm of 100 m Depth (at the location with GPS of the DTW: 26.800633° N, 86.313186°E):.....	26
6.3 INSTALLATION OF THE AUTOMATED SYSTEM IN WELL No. 2 (150 MM):	27
6.4 TECHNICAL SPECIFICATIONS OF THE SENSOR.....	28
CHAPTER 7: ANALYSIS OF THE DATA GENERATED FROM FIELD.....	29
7.1. CURRENT STATUS OF GEOLOGICAL FEATURES	29
7.2. ANALYZE HYDROGEOLOGICAL CONDITION OF THE GROUNDWATER	31
7.2.1 Use of GIS in Hydrogeological Assessment:	31
7.3. CHARACTERIZING AQUIFER PROPERTIES.....	31
7.4. EVIDENCE GENERATION BY CREATING BASELINE DATA	32
7.4.1. Data Collection	32
7.4.2. Data processing.....	32
7.5. GROUND WATER STATUS:	33
7.5.1. Use of GIS Application and Development of Water Flow Maps:.....	33
7.6. FLUCTUATION OF GROUNDWATER	34

7.7.	IDENTIFY POTENTIAL GROUNDWATER FLOW PATHS	43
7.8.	PREPARE SUB-SURFACE GEOLOGICAL CROSS SECTION FROM LITHOLOGY OF TUBE WELLS	43
7.9.	LITHOLOGICAL CLASSIFICATION OF SHALLOW AND DEEP AQUIFERS	50
8.1.	IDENTIFICATION AND DELINEATION OF THE POTENTIAL RECHARGE AREAS.....	54
	<i>8.1.1. Identification of Potential Recharge Zones (Areas) from secondary data.....</i>	<i>54</i>
8.2.	PROCESS/TECHNOLOGIES ADOPTED TO IDENTIFY THE RECHARGE POTENTIAL	55
	<i>8.2.1. Ranking Units of Each Thematic Layers</i>	<i>56</i>
	<i>8.2.2. Delineation of Recharge Potential Map</i>	<i>57</i>
8.3.	WATER QUALITY AND HEALTH	58
8.4.	IDENTIFYING POTENTIAL RISKS TO GROUNDWATER QUALITY	58
	<i>8.4.1. Identify potential risks to groundwater quality:</i>	<i>58</i>
CHAPTER 9: RECOMMENDATIONS AND CONCLUSION		60
CHAPTER 10: PROGRESS AGAINST ACTIVITIES/TASKS AND TIMELINE .		63
10.1.	JOINT MONITORING VISIT:.....	63

List of Tables

Table - 1: Study Areas	5
Table – 2: Focussed Group Discussions (FGDs) with Water Users Committee of Budhijamdah Water Supply and Sanitation Users’ Committee at Budhijamdah of Golbazaar - 3	9
Table – 3: Focussed Group Discussions (FGDs) with CDO Tole Water Supply and Sanitation Construction Committee at Choharwa, CDO Tole of Golbazar - 8	10
Table – 4: Focussed Group Discussions (FGDs) at Ratanpur Tole of Karjanha - 1	10
Table – 5: List of stakeholders for Klls	11
Table – 6: List of stakeholders for Klls	13
Table – 7: Rainfall Station Installed in Siraha District by DHM (Source: DHM)	19
Table – 8: Depth of Casing and Screen while Lowering the Pipe for Well No. 1	25
Table – 9: Depth of Casing and Screen while Lowering the Pipe for Well No. 2	26
Table – 10: Water Level Monitoring Record in Monitoring Wells from April till Date (PART – I i.e. Table - 8-I)	41
Table – 11: Water Level Monitoring Record in Monitoring Wells from April till Date (PART – II, i.e., Table - 8-II)	42
Table 12: The summary status of data collection	44
Table - 13: Justification Table for Groundwater Recharge Potential Mapping	55
Table - 14: Ranking Units of Each Thematic Layers	56

List of Figures

Figure 1: Location Map of the Project Areas/Sites	5
Fig 2: Location of UN Wells and traces of Cross Section Lines	19
Fig. 3: Daily rainfall pattern in the study area recorded by the 4 metrological stations of DHM	20
Figure 4: Location of Monitoring Wells @ Golbazar M and @ Karjanha M	22
Figure 5: Municipalities divided into 30 Grids with all the surveyed STWs and finally selected STWs for the study	22
Figure 6: Tubewell Location Map	24
Figure 7: Geological Map of Golbazar M	30
Figure 8: Geological Map of Karjanha M	30
Figure 9 : Groundwater Flow Direction Model	34
Figure 10: Groundwater Fluctuations in the surveyed STWs in Gobazar Municipality	35
Figure 11: Groundwater Fluctuations in the surveyed STWs in Karjanha Municipality	37
Figure 12: Groundwater Fluctuations in Siraha Disrict in 1990/1991 referring to UN STWs and Private Wells	38
Figure 13 : Groundwater Fluctuations in the surveyed DTWs in Golbazar Municipality	39
Figure 14 : Water Level Fluctuation through Automated Logger in DTW, Golbazar	40
Fig. 15: Water Flow Map in Golbazar @ May 2025 and in Karjanha @ Aug 2025	43
Fig. 16: Classification of driller’s lithology by Shepard Classification System	45
Fig. 17: The lithological Cross Sections of Karjanhna and Golbazar Municipality	46
Fig. 18: Kr NS Section	47
Fig. 19: Kr EW Section	47
Fig. 20: GI NS-1 Section	48
Fig. 21: GI NS-2 Section	48
Fig. 22: GI EW-1 Section	49
Fig. 23: GI EW-2 Section	49
Fig. 24: Deep Aquifer Thickness Percentage Map of Golbazar Municipality	50

Fig. 25: Shallow Aquifer Thickness Percentage Map of Golbazar Municipality _____	50
Fig. 28: Unconfined Aquifer Thickness Percentage Map of Golbazar Municipality _____	51
Fig. 28: Deep Aquifer Thickness Percentage Map of Karjanha Municipality _____	52
Fig. 27: Shallow Aquifer Thickness Percentage Map of Kajzanha Municipality _____	52
Fig. 29: Unconfined Aquifer Thickness Percentage Map of Karjanha Municipality _____	53
Fig. 30: Recharge Potential Map of Karjanha M _____	57
Fig. 31: Recharge Potential Map of Golbazar M _____	57
Fig. 32: The collected faecal sludge is being haphazardly disposed at Golbazar landfill sites ____	58
Fig. 33: Tubewell of Akash Ganga _____	59
Fig. 34: Tubewell of Turkiya, Golbazar M _____	59