CENTRAL GROUND WATER BOARD

DEPARTMENT OF WATER RESOURCES,

RIVER DEVELOPMENT AND GANGA REJUVENATION,

MINISTRY OF JAL SHAKTI

GOVERNMENT OF INDIA

INCEPTION REPORT ON NAQUIM-2.0 OF GURUR BLOCK, BALOD DISTRICT, CHHATTISGARH,

CHHATTISGARH

AAP: 2023-24

Team Lead - B. Abhishek

Scientist-C (Hydrogeologist)

NORTH CENTRAL CHHATTISGARH REGION, RAIPUR

APRIL - 2023

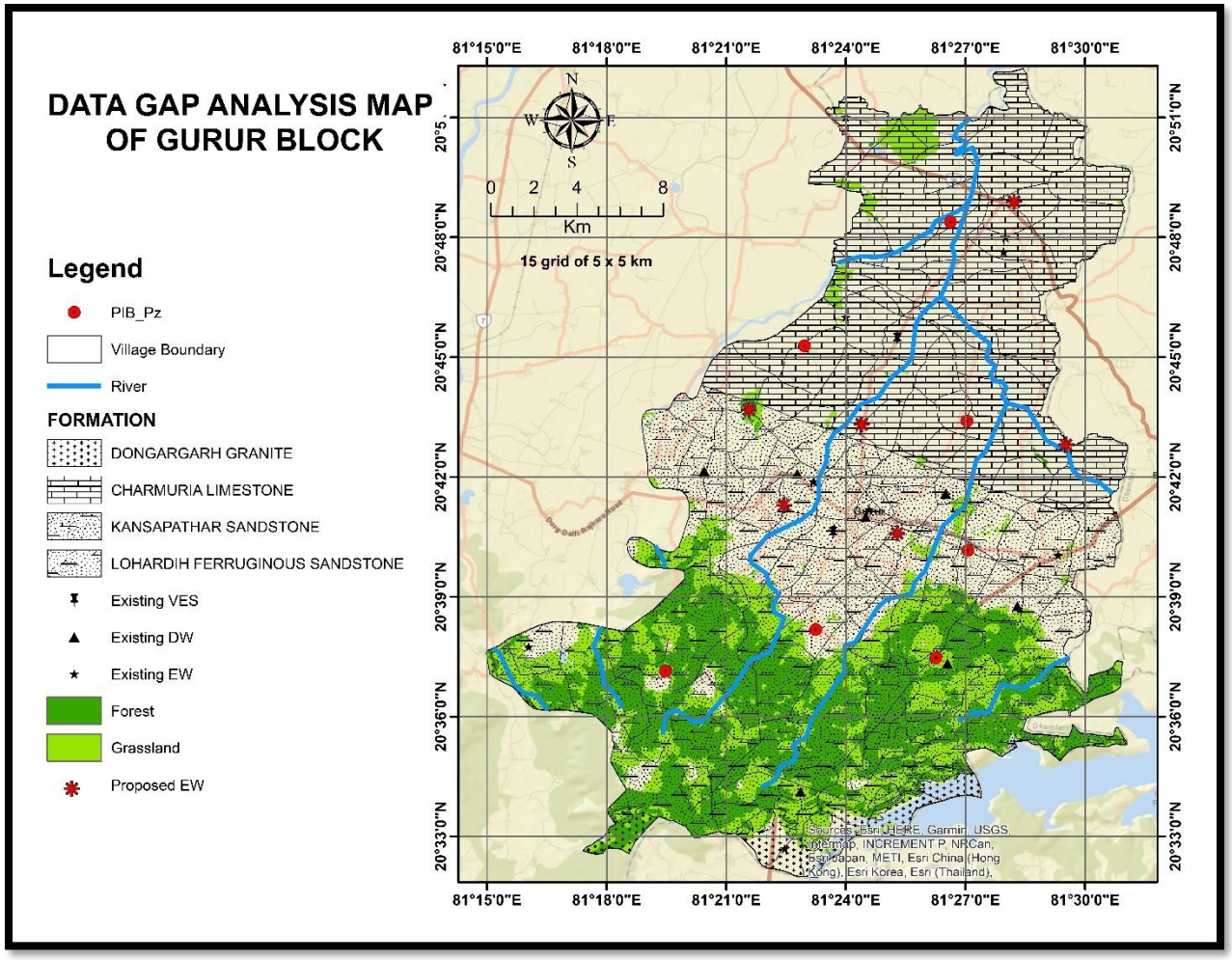
Contents

INCEPTION REPORT ON NAQUIM-2.0 OF GURUR BLOCK, BALOD DISTRICT, CHHATTISGARH

1	**STUDY AREA**	**Gurur Block, Balod district**
1.1	**Area**	411 km^2
1.2	**Latitude**	20.5335 to 20.8703 N latitudes
1.3	**Longitude**	81.2495 and 81.520 E longitude
1.4	**Villages**	121
1.5	**Total population**	143225
1.6	**Male**	71191
1.7	**Female**	72034
1.8	**Rural Population**	139450
1.9	**Urban Population**	3775
1.10	**Growth Rate**	9.39
1.11	**Climate**	Sub-Tropical
1.12	**Average Rainfall**	1239.96 mm
1.13	**Geomorphology**	Structural Plains
1.14	**Drainage**	Kharun River Tributaries- Ama and Choraha Nala
1.15	**Soil type**	Deep Black Soil, Medium black Soil, Lateritic Soil, Red Loamy Soil, Red Sandy Soil
1.16	**Geology**	Charmuria Limestone Chandrapur Sandstone Dongargarh Granite
2	**PRIORITY TYPE**	**Water Stressed Area** **Exact Reasons for overexploitation** – Extensive irrigation for Paddy crops during Rabi Season depletes the aquifer posing serious sustainability issues during the Lean months.
3	**PREVIOUS STUDIES**	
3.1	**Reappraisal Survey**	Reappraisal survey.
3.2	**NAQUIM report of Gurur block 2016-17**	NAQUIM studies carried out in Gurur block in 2016-17 by CGWB stressed on reducing the ground water draft in the command area and encourage farmers to take less water consuming crops such as Maize/Finger Millet (Ragi) instead of cultivating summer rice, which requires up to 1500 mm of irrigation water. This will reduce the groundwater development by up to 70%. The reasons behind the high development of groundwater include excessive withdrawal of groundwater, low yield and transmissivity of the aquifer, and localised fractures. Field irrigation should be replaced with channel irrigation in command and non-command areas, and micro irrigation methods should be used in command and non-command areas. Mass awareness, incentives, assured prices,

		better marketing, technology development, model crop specific to the area, animal grazing, group or community fencing, training programmes, and other media should be used to discourage farmers from taking summer rice.
3.3	**Resource Assessment**	As per GEC-2022 the stage of groundwater development is 98.37% and is categorized as Critical. The annual extractable groundwater resource is 65.87 MCM, whereas the total draft is 64.79 MCM. The irrigation water draft accounts for 94.22% of the total water used.
3.4	**Published Paper**	• Kumar.et.al 2016 used multidimensional criteria approach and GIS in delineation of areas suitable for artificial recharge in Balod District and categorized Gurur area as very good to good for planning of artificial recharge structures. • Sar et al, 2017 carried out the Carcinogenic health risk accessment due to Uranium contamination in groundwater in Balod District, also covering the Gurur block. • Vibhanshu Kumar, 2022, in his study Assessment of meteorological drought in Balod district, India through GIS and Remote sensing emphasized the occurrence of a Drought period in the Balod district
4	**OBJECTIVES OF THE PRESENT STUDY**	The objectives of the present study is to delineate: 1. Detailed Aquifer Dispositions and mapping of weathered thickness . 2. Aquifer-wise ground water Water Levels. 3. Delineation of Recharge Areas and detailed artificial recharge plan. 4. Estimation/Refinement of parameters used for resource assessment. (Canal seepage factor, Seepage from ponds) and assessment of aquifer wise ground water resources. 5. Ground Water Quality. 6. Areas showing signs of subsidence. 7. Identification of potential aquifers for drinking water supply. 8. A plan for drinking water source sustainability and focus on demand side management. 9. Finally, to evolve a block-level management plan which is implementable.
5	**EXISTING DATA**	
		Number
5.1	**Exploratory Well**	8
5.2	**Observation Well/ Peizometer**	6
5.3	**VES/TEM**	2

5.4	**NHS**	8
5.5	**Water Quality**	8
5.6	**Infiltration Test**	Nil
5.7	**Pumping Tests**	3
6	**AQUIFER WISE DATA GAP ANALYSIS**	
		No of Additional Structures Required
6.1	Charmuria Limestone	EW/OW/PZ - 2 VES/TEM - 8 upto 300 m Water Level - 40 (Monitoring Wells DW/BW) Water Sample - 40+40 Infiltration Test - 4 Pumping Tests/Slug Test - 4
6.2	Chandrapur and Lohardih Sandstone	EW/OW/PZ - 4 VES/TEM - 11 upto 300 m Water Level - 35 (Monitoring Wells DW/BW) Water Samples - 35 B / 35 HM Infiltration Test - 6 Pumping Tests/Slug Test – 4
6.3	Dongargarh Granite	EW/OW/PZ - 1 VES/TEM - 1 upto 300 m Water Level - 3 (Monitoring Wells DW/BW) Water Quality - 3 B / 3 HM Infiltration Test - 2 Pumping Tests/Slug Test - 1



7. NEW DATA GENERATION

7.1 Activity wise monthly targets for new data generation

S. No	Deliverables	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan		
1	Establishment of new wells and aquifer property											
2	Sample Collection											
3	Analysis of the Water Quality Data											
4	VES/TEM											
5	Demand Assessment											
6	Rainfall Infiltration Test											
7	Pumping test/Slug test											
8	Farmer Feedback											

7.2 Plan for integration with other ongoing activities

- Addition of refined parameters in the calculation of GWRA-2023

- Preparation of recharge plan according to abstraction structures proposed in Jal Jeevan Mission and Nal Jal Yajna.

8. MONTH-WISE ACTIVITY PLAN

S. No	Deliverables	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Aquifer Dispositions											
2	Aquifer-wise ground water Water Levels											
3	Delineation of Recharge Areas											
4	Estimation/Refinement of parameters used for resource assessment											
5	Assessment of ground water resources											
6	Ground Water Quality											
7	Areas showing signs of subsidence											
8	Ground Water Quality Management Interventions including demarcation of safer aquifers											
9	Artificial Recharge Plan											
10	Other measures including meeting with state officials for additional data generation and presentation to the DM/DCs											
11	Identification of potential aquifers for drinking water supply											
12	A plan for drinking water source sustainability											

9. COMPOSITION OF TEAM

Team Lead	- B. Abhishek	Hydrogeologist (Sc-C)
Expert (Hydrogeology)-1	- Anusandhya Pradhan	Hydrogeologist (Sc-B)
Expert (Geophysics)	- Nageshwar Rao Elisela	Geophysicist (AGp)
Expert (Hydro chemistry)	- Dr. Rajnikant Sharma	Chemist (Sc-C)
Expert Engineer	- K C Nayak	Executive Engineer

10. TEAM-MEMBER-WISE RESPONSIBILITIES AND MONTHLY TARGETS FOR ENTERING IN THE MIS

10.1 Role and Responsibility

Role	Responsibilities	Indicative Designation
Team Lead B.Abhishek (Sc-C)	- Planning, Supervision and Execution of the Project - Work distribution and monitoring of activities of other team members - Preparation of the inception report. - Timely Delivery of the envisaged Outputs - Finalisation of the management plan - Presentations at different forums, sharing of the outputs. - Preparation of the draft report as per the approved Quality Standards and its Final Submission. - Other members of the team will assist the team lead. -	Hydrogeologist
Expert (Hydrogeology)-1 Anusandhya Pradhan ***(Scientist B)***	- Field Data Collection (Exploration, Pz construction, Water Level, Water Quality, Pumping Tests, Infiltration tests, demand/supply data, sample surveys and others) - Sample collection for quality studies - Secondary Data collection - Entering data in database (WIMS) - Integration of data, preparation of thematic maps, preparation cross sections etc. - Consultation with allied experts like agriculture, irrigation, agro-economics etc. - Preparation of Management Plan - Assisting the Team Lead in preparing maps and reports	Hydrogeologist
Expert (Geophysics) Nageshwar Rao Elisela (A.Gp)	- Field Geophysical Surveys - Interpretation of field data - Entering data in database (WIMS) - Integration with existing geophysical and lithology data - Preparation of inferred lithologs - Suggesting potential sites for construction of water wells/artificial recharge - Preparation of Tables, graphs and maps for reports - Assisting the Team Lead in preparing the Report	Geophysicist
Expert (Hydro chemistry) Dr. Rajnikant Sharma (Sc-C)	- Sample collection for quality studies - Analysis of samples. - Integration with existing data - Validation and interpretation of data - Entering data in database (WIMS) - Preparation of Tables, graphs and maps for reports - Assisting the Team Lead in preparing the reports	Chemist
K.C Nayak (Ex.En)	Drilling of EW/OW/PZ Making Arrangements for Pumping tests of Inhouse wells Planning and Making Arrangements for Pumping tests for private wells, if required Preparing note on drilling issues in the area Planning and Procurement of Outsourcing Services, if required. Making arrangement for monitoring of Tube/Bore wellDrilling of EW/OW/PZ	

	Making Arrangements for Pumping tests of Inhouse wells Planning and Making Arrangements for Pumping tests for private wells, if required Preparing note on drilling issues in the area Planning and Procurement of Outsourcing Services, if required. Making arrangement for monitoring of Tube/Bore well	

10.2 Monthly Target for entering in the MIS

Team Lead B.Abhishek (Sc-C)	**Apri**l – Data Gap Analysis and Preparation of Inception Report
	May - Field Data Collection
	June - Field Data Collection and meeting with various agencies for identification of core issues
	July - Data Analysis and Interpretation
	August - Data Analysis and Interpretation
	September - Data Analysis and Interpretation
	Octuber – Preparation for Midterm Work-Shop for NLEC
	November - Field Data Collection and preparation of Management Plan
	December - Sample Surveys and User Feedback
	January – Preparation of Draft Report
	February – Field Truthning of Management Plan
	March - Sharing of the reports with CHQ, SGWCC and DM/DC
Expert (Hydrogeology)-1 Anusandhya Pradhan *(Scientist B)*	- **May** - Field Data Collection and other ongoing field activities.
	- **June** - Field Data Collection
	- **July** – Data entry in WIMS
	- **August** - Data entry in WIMS and other ongoing field activities.
	- **September** - Data Analysis and Interpretation
	- **Octuber** – Preparation for Midterm Work-Shop for NLEC
	- **November** - Field Data Collection and preparation of Management Plan and other ongoing field activities.
	- **December** - Sample Surveys and User Feedback and Data entery in WIMS
	- **January** – Preparation of Draft Report and other ongoing field activities.
	- **February** – Field Truthning of Management Plan and other ongoing field activities.

	- **March -** Sharing of the reports with CHQ, SGWCC and DM/DC and other ongoing field activities.
Expert (Geophysics) Nageshwar Rao Elisela (A.Gp)	- **May -** Field Geophysical Data Collection and other ongoing field activities.
	- **June -** Field Data Collection
	- **July** – Data Interpretaion and selection of sites suitable for drilling and Data entery in WIMS.
	- **August -** Data entry in WIMS and other ongoing field activities.
	- **September -** Data Analysis and Interpretation
	- **Octuber** – Preparation for Midterm Work-Shop for NLEC
	- **November -** Field Data Collection and preparation of Management Plan and other ongoing field activities.
	- **December -** Data entry in WIMS
	- **January** – Preparation of Draft Report and other ongoing field activities.
	- **February** – Field Truthning of Management Plan and other ongoing field activities.
	- **March -** Sharing of the reports with CHQ, SGWCC and DM/DC and other ongoing field activities.
Expert (Hydro chemistry) Dr. Rajnikant Sharma (Sc-C)	- **May -** Field Sample Data Collection and other ongoing field activities.
	- **June -** Field sample Collection and analysis.
	- **July** – Field sample Collection and analysis. and Data entery in WIMS.
	- **August -** Data entry in WIMS and other ongoing field activities.
	- **September -** Data Analysis and Interpretation
	- **Octuber** – Preparation for Midterm Work-Shop for NLEC
	- **November -** Field Data Collection and preparation of Management Plan and other ongoing field activities.

	- **December -** Data entery in WIMS
	- **January** – Preparation of Draft Report and other ongoing field activities.
	- **February** – Preparation of Draft Report and other ongoing field activities.
	- **March -** Sharing of the reports with CHQ, SGWCC and DM/DC and other ongoing field activities.

NAQUIM 2.0 Work Distribution Table (Month-Wise) for Gurur Water Stressed Area														
Team members:		***Sh B. Abhishek (Scientist C & Team Leader), Sh. Anusandhya Pradhan(Scientist B) hydrogeologist-1, ,Sh Nageshwar Rao Elisela (A-Gp, Geophysist), Sh. Rajnikant Sharma Scientist C (Chemist))***												
Sl.	**WORK ITEMS**	**Assignments to be carried out by officers**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**
1	Base map Preparation	B. Abhishek												
2	Preparation of the Inception Report:	B. Abhishek												
3	Pre-Monsoon Field Data Collection	B. Abhishek Anusandhya Pradhan												
4	Pre-Monsoon Sample Surveys and User Feedback	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma												
5	Pre-Monsoon Other on-going field activities Exploratory drilling, geophysical studies, data entry in WIMS	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela												

NAQUIM 2.0 Work Distribution Table (Month-Wise) for Gurur Water Stressed Area															
Team members:		***Sh B. Abhishek (Scientist C & Team Leader), Sh. Anusandhya Pradhan(Scientist B) hydrogeologist-1, ,Sh Nageshwar Rao Elisela (A-Gp, Geophysist), Sh. Rajnikant Sharma Scientist C (Chemist))***												
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6	Data Analysis and Interpretation	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma												
7	Workshops and mid-term review by NLEC	Ms. Priyanka B. Sonbarse												
8	Post-monsoon Field Data Collection	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma												
9	Post-monsoon Sample Surveys and User Feedback	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma												
10	Post-Monsoon Other on-going field activities Exploratory drilling, geophysical studies, data entry in WIMS	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma.												
11	Data Analysis and Draft Report Preparation	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao												

NAQUIM 2.0 Work Distribution Table (Month-Wise) for Gurur Water Stressed Area														
Team members:		***Sh B. Abhishek (Scientist C & Team Leader), Sh. Anusandhya Pradhan(Scientist B) hydrogeologist-1, ,Sh Nageshwar Rao Elisela (A-Gp, Geophysist), Sh. Rajnikant Sharma Scientist C (Chemist))***												
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		Elisela, Sh. Rajnikant Sharma												
12	Other ongoing field activities - Exploratory drilling, geophysical studies, data entry in WIMS	Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma, K.C Nayak.												
13	Ground Water Management Plan; Field truthing of Management plan & RWH & AR Plan	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma, K.C Nayak.												
14	Other ongoing field activities - Exploratory drilling, geophysical studies, data entry in WIMS	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma, K.C Nayak.												
15	Modification of draft report with additional information collected by the above mentioned field checks	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma												

NAQUIM 2.0 Work Distribution Table (Month-Wise) for Gurur Water Stressed Area														
Team members:		***Sh B. Abhishek (Scientist C & Team Leader), Sh. Anusandhya Pradhan(Scientist B) hydrogeologist-1, ,Sh Nageshwar Rao Elisela (A-Gp, Geophysist), Sh. Rajnikant Sharma Scientist C (Chemist))***												
Sl.	**WORK ITEMS**	**Assignments to be carried out by officers**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**
	- Scrutiny and Finalisation of the Report													
16	Other ongoing field activities - Exploratory drilling, geophysical studies, data entry in WIMS	B. Abhishek, Sh. Anusandhya Pradhan, Sh Nageshwar Rao Elisela, Sh. Rajnikant Sharma												
17	Sharing of the reports with CHQ, SGWCC and DM/DC - Brochure to be prepared by 31st March.	Sh B. Abhishek,												